*Journal of Social Sciences & Humanities*

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Pertanika is an international peer-reviewed journal devoted to the publication of original papers, and it serves as a forum for practical approaches to improving quality in issues pertaining to tropical agriculture and its related fields. Pertanika began publication in 1978 as the Journal of Tropical Agricultural Science. In 1992, a decision was made to streamline Pertanika into three journals to meet the need for specialised journals in areas of study aligned with the interdisciplinary strengths of the university.

The revamped Journal of Social Sciences & Humanities (JSSH) aims to develop as a pioneer journal for the Social Sciences with a focus on emerging issues pertaining to the social and behavioural sciences as well as the humanities, particularly in the Asia Pacific region. Other Pertanika series include Pertanika Journal of Tropical Agricultural Science (JTAS); and Pertanika Journal of Science and Technology (JST).

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# Pertanika Journal of

# SOCIAL SCIENCES
# & HUMANITIES

*A special issue devoted to issues in*
Agribusiness Supply Chain Systems

Guest Editor
Zainal Abidin Mohamed

Guest Editorial Board
Mad Nasir Shamsudin, Md. Ariff Hussien, Eddie Chiew Fook Chong,
Jamil Bojei, Alias Radam and Juwaidah Sharifuddin

## ABSTRACTING/INDEXING

# Preface

This special issue of the Pertanika Journal of Social Sciences and Humanities (JSSH) is the second issue featuring papers presented at a workshop organised by the Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia from 8-9 December 2011 at the Faculty of Agriculture, UPM. This issue brings together an additional seven papers from the workshop. The first issue was published in August 2013.

With the theme **"Agribusiness Supply Chain Systems"**, the workshop aimed to inculcate the culture of writing quality manuscripts and to increase scholarly publications and citation for the said department.

Papers published in this special issue of Pertanika JSSH underwent strict editorial processes in keeping with the journal's status as one of the leading research-based internationally-recognised journals.

Agribusiness is a sector that is currently being given more emphasis by the Malaysian government. Agribusiness refers to the complete cycle of business of agricultural production, which includes inputs for agricultural production, food production, supply chain, marketing and retailing that channels products to consumers. The issues of food security and self-sufficiency have led to stronger effort being taken to reduce the negative balance of trade in the food sector. In addressing this issue, the supply chain system used in the agriculture-related industry is scrutinised in order to increase efficiency, reduce wastage and boost its competitiveness in the world market. Agribusiness supply chain systems include all the stages from production at the farm to what is served on the consumers' plate. Among the contributions featured in this special issue are a collection of papers discussing various parts of the supply chain systems in several sectors in the Malaysian agribusiness industry, namely beef production, food processing, shrimp cultivation, the palm oil industry, paddy cultivation, herbal-based products as well as consumer behaviour.

Special thanks goes to the Faculty of Agriculture, UPM specifically to our Dean, Prof. Dr. Abdul Shukor Juraimi, and former Dean, Prof. Datuk Dr. Mad Nasir Shamsudin, for their continued support in ensuring the success of publishing this special issue. The full commitment given by the Pertanika Editorial Office and its dedicated team, under the lead of its Chief Executive Editor, Dr. Nayan Kanwal, is also highly appreciated.

Last but not least, our heartfelt gratitude to all the guest editors, Prof. Datuk Dr. Mad Nasir Shamsudin, Prof. Dr. Md. Ariff Hussien, Assoc. Prof. Dr. Eddie Chiew Fook Chong, Assoc. Prof. Dr. Jamil Bojei, Assoc. Prof. Dr. Alias Radam and Dr. Juwaidah Sharifuddin for their vigorous effort in ensuring the successful publication of this special issue.

**Zainal Abidin Mohamed**
Guest Editor,
June, 2015

# Pertanika Journal of Social Sciences & Humanities
## Vol. 23 (S) Jun. 2015

# Contents

# The Impact of Fertiliser Subsidy and New Variety of Paddy on Malaysian Paddy/Rice Industry

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## ABSTRACT

Rice is a staple food for the Malaysian population. Special attention is always given by the government to ensure the sustainability of the Malaysian paddy/rice industry. In order to encourage paddy farmers to increase paddy production, a food security policy for the paddy/rice sector has been implemented by the government towards self-sufficiency by 2020. There are three types of government intervention on Malaysian paddy and rice industry namely fertiliser subsidy, price support and import restriction or quota. There would be some impact to the industry if the government decides to implement a trade liberalisation policy. This is because trade liberalisation involves removing barriers to trade between different countries. Therefore, it would cause the supporting elements of the industry to be limited. In view of this this study has made its main objective the simulation of the impact of a fertiliser subsidy on the Malaysian paddy and rice industry. The methodology used is the system dynamics model. In addition, this study also attempts to simulate the impact of improvement in yield on the performance of the system. The simulation results suggest that there would be a positive impact to the industry with the implementation of the current policy for fertiliser subsidy. Yield obtained would increase with the implementation of the fertiliser subsidy. Consequently, it would increase paddy production. Paddy production would decrease if the government decides to remove the fertiliser subsidy. Hence the self sufficiency level (SSL) also would decrease. Due to the reduction in production, the importation of rice seems unavoidable in order to meet the demand. Meanwhile, due to population growth, the government

needs to find alternative policies to sustain the industry and increase imports in order to ensure adequate supply of rice for the Malaysian population. The simulation results indicate that the introduction of a new variety of paddy leads to increase in yield, and in turn to increase in the production level. The percentage increase in yield and production is about 3% per year.

*Keywords:* System dynamics, fertiliser, paddy/rice, policies, yield, simulation

## INTRODUCTION

Rice is a staple food for the Malaysian population. The paddy/rice industry is an important industry in Malaysia. Therefore, this industry always gets special attention from the government. In 2009, there were 172,000 paddy farmers in the country. Total hecterage for paddy production is currently at 674,928 hectares. Of this, 76% is in Peninsular Malaysia (515,657 ha) while 18% (118,919 ha) and 6% (40,352 ha) are in Sarawak and Sabah respectively. In the case of the paddy/rice industry, formulating policies for the industry is not an easy job due to the complexity of the paddy/rice industry. For example, in early 1970, the middle of 1980 and in 2008, there was instability in rice prices in the world market. This situation had a big negative impact on the industry. In addition, the paddy/rice industry always gets special attention from the government in the form of three types of government interventions namely fertiliser subsidies, price supports and import restriction or quota. Trade liberalisation involves removing barriers to trade between countries. Therefore, under trade liberalisation the supporting elements for the industry would be limited. Thus, if trade liberalisation were fully implemented, it might have some impact on the industry. For example, if the government decides to remove the fertiliser subsidy there would be some impact on production, import and self sufficiency level (SSL). This situation may cause a decline in rice production, increase in import and, hence, decrease the SSL. The introduction a new variety of paddy is expected to have a positive impact on yield. Various studies have shown that productivity of a paddy farm can be maintained with input subsidies. A study conducted by Sarris (2005) indicated that paddy farmers in India received advantages from the input subsidies provided by the government such as irrigation and fertiliser. In addition, farmers also got a procurement at minimum support prices. These subsidies contributed to an increase in rice production. Sidiq (2004) also suggests that in India, supporting elements for agricultural inputs for rice production such as credit with low interest rate increased supply of fertiliser and seed of good quality and played an important role in increasing productivity, improving the quality of rice and reducing losses . All these supports from the government helped to improve SSL for Indonesian paddy and rice production. This finding is consistent with Bakhshoodeh and Soltani's (2002) work, which found that input subsidies, coupon distribution, guaranteed price, credit programmes and

the import of rice using foreign exchange valued at a special cheap rate allocated for food were among the factors that could affect the difference between rice production and demand.

## METHODOLOGY

### System Dynamics

The methodology used in this study was the system dynamics approach. System dynamics is an approach to analyse a complex system and problem using software for computer simulation. In order to understand the behaviour of complex systems over time, this model involved all the relevant cause-effect relationships, feedback loops and time delays. Fig.1

presents the stock and flow diagram for the system dynamics model for the Malaysian paddy and rice industry.

In this study, the system dynamics model for the Malaysian paddy/rice industry consisted of two types of sub model namely technical component and economic component. Yield represented the main outcome of the technical component. Fertiliser used was a factor that could affect the yield. In this sub model the farmers' net income represented as stock while the inflow in this sub model was farmers' gross income. The technical sub model consisted of three types of outflows namely total cost, farmers' expenditure and farmers' expenditure for fertiliser. The
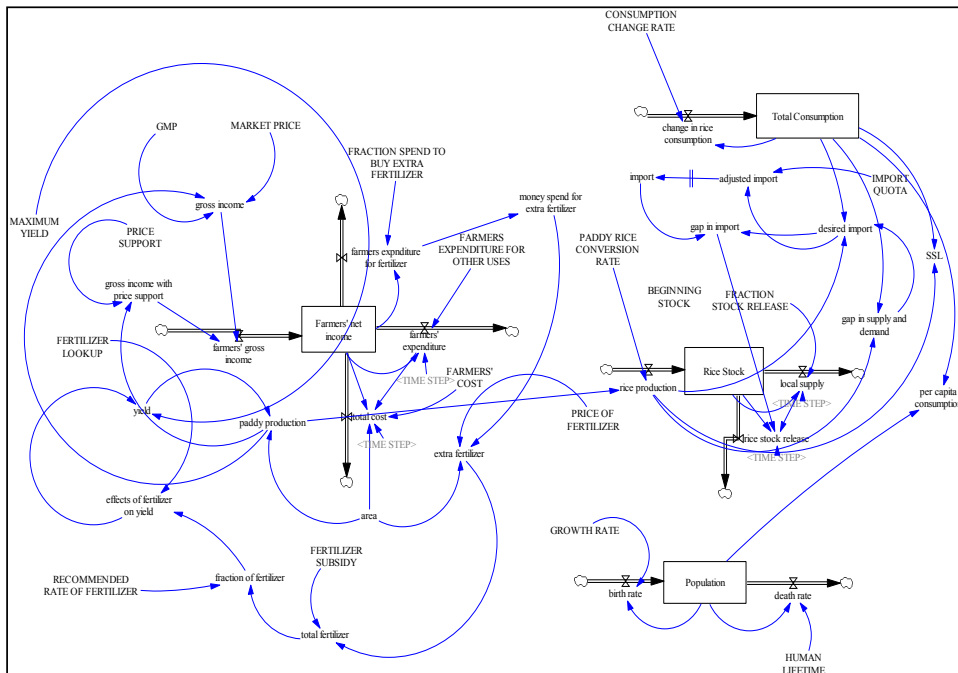


Fig.1: System dynamics model for the Malaysian rice industry

quantity of extra fertiliser used depended on the farmers' expenditure on fertiliser. If the farmers are willing to spend more on fertiliser, it would have a positive impact on the yield and paddy production. Yield is equal to the multiplication of maximum yield and effect of fertiliser on yield. In order to see the impact of fertiliser used on yield, look-up function was used. The yield obtained is at the maximum value when the total quantity of fertiliser used is the same as the quantity of recommended rate of fertiliser. On the other hand, rice production, import and consumption represent the main outcomes for the economic component in this model. In the economic component, there are three types of state variable (stock) namely rice stock, total consumption and population. Rice production represented the inflow of the rice stock while rate of rice stock release and rate of local supply represented the outflows. The conversion of paddy productions equals the rate of rice production. The equation for paddy production is yield multiplied by area planted. Desired import and actual import are the factors that can affect the rate of stock release. Local supply represented the second outflow of rice stock. The minimum function was used. Multiplication of rice stock and fraction of rice stock release is equal to local rice supply. However, in certain extreme conditions, the local supply equals rice stock divided by time step. This equation implies that "it takes what you want" (fraction rice stock release * rice stock) out of the stock. But, if there is inadequate stock, it

completely empties the stock (rice stock/ time step). Desired import and import quota are the factors that can affect the amount of rice that needs to be imported. The quantity of desired import of rice to ensure adequate supply for the Malaysian population is represented by desired import. The adjusted import variable represented the adjusted quantity of rice needed to be imported based on quantity of import quota policy imposed by the government. The secondary data used in this study are from the Ministry of Agriculture and Agro Based Industry (MOA), Lembaga Pertubuhan Peladang (LPP) and the Department of Agriculture and Department of Statistic (DOS). In order to see the changes in the behaviour of the system due to the changes in policy instruments, three types of simulation were conducted. Scenario 1 represented as the baseline scenario with no changes in government policy while Scenario 2 referred to the simulation under removal of the NPK fertiliser subsidy. It was assumed that the government would decide to remove the NPK fertiliser subsidy in 2015.

Finally, Scenario 3 referred to simulation under the introduction of a new variety of paddy. It was assumed that in the period from 2014 to 2016, the government would introduce a new variety of paddy that can increase yield. Again, in 2021, the government was expected to introduce a new variety of paddy. Table 1 summarises the descriptions of each scenario.

## RESULTS AND DISCUSSION

### Baseline Scenario 1: Simulation Under Current Scenario in Malaysia with No Changes in Government Policy

The simulation result for baseline scenario suggests that since there were no changes in quantity of fertiliser used and no new variety of paddy, the yield would be constant at 4.052 metric tonne per hectare per year as shown in Fig.2. Consequently, rice production would remain at 1.609 million metric tonne per year (Fig.3). On the other hand, due to population growth, total consumption would show an increasing trend. The quantity of rice imported was presented in Fig.3. The simulation result indicated that import of rice would increase every year until 2015 to meet the demand. However, due to imposition of the import policy, the import of rice would be the same to import quota after 2015. Therefore, the simulation results suggested that if the import quota remained at the same level after 2015, Malaysia would have a big problem, that is, inadequate supply of rice. Meanwhile, SSL would decline due to population growth. Fig.3 shows the relationship between rice production, import, SSL and consumption for Scenario 1. Simulation results suggested that under the baseline scenario rice production would remain at 1.609 million metric tonne while SSL showed a declining trend due to increase in consumption. SSL would decrease gradually to 56.6% in 2025 from 74.9% in 2011.

### Scenario 2: Simulation Under Removal of NPK Fertiliser

In Scenario 2, it is assumed that paddy farmers depend heavily on the fertiliser subsidy provided by the government. The simulation results suggest that the yield obtained would decline from 4.052 metric tonne per hectare to 3.081 metric tonne per hectare in 2015 as shown in Fig.4. These simulation results suggested that the NPK fertiliser was an important factor that

TABLE 1
Descriptions of Three (3) Types of Scenario

|  | Scenario 1 Baseline Scenario | Scenario 2 | Scenario 3 |
|---|---|---|---|
| Fertiliser Subsidy | Compound, Urea, NPK | Removal of NPK fertilizer | Compound, Urea, NPK |
| GMP | RM750/t | RM750/t | RM750/t |
| Price support | RM248.10/t | RM248.10/t | RM248.10/t |
| Area planted | 611, 166 hectares | 611, 166 hectares | 611, 166 hectares |
| Paddy rice conversion rate | 65% | 65% | 65% |
| Growth rate of population | 2.1% per year | 2.1% per year | 2.1% per year |
| Average lifetime of human | 74 years | 74 years | 74 years |
| Import quota | 700,000 t/year | 700,000 t/year | 700,000 t/year |
| Market price of paddy | RM1100 | RM1100 | RM1100 |
| Variety of paddy | No new variety of paddy | No new variety of paddy | Introduction of new variety in 2014 and 2021 |

could help to increase the yield. Similarly, a study conducted by Adekayode and Ogunkoya (2010) found that the increase in the NPK fertiliser used would improve in yield. Therefore, the simulation results suggested that if farmers depended heavily on subsidised fertiliser, the yield obtained would be constant at 3.081 metric tonne per hectare per year.

Fig.5 presents the relationship between quantity of rice production, import, SSL and total consumption for Scenario 2.
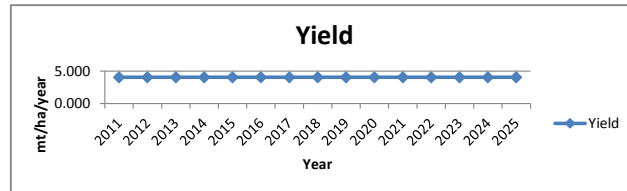


Fig.2: Yield, scenario 1
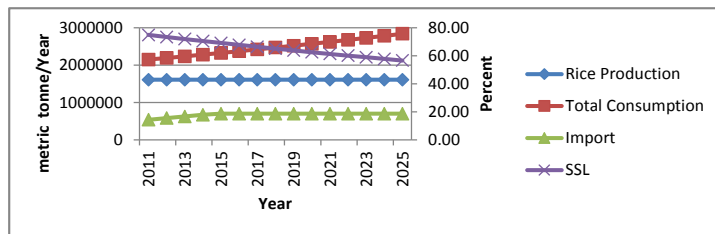


Fig.3: Rice production, total consumption, import and SSL, scenario 1
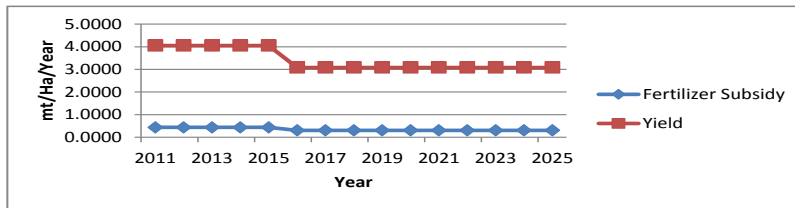


Fig.4: The effects of fertiliser subsidy on yield, scenario 2
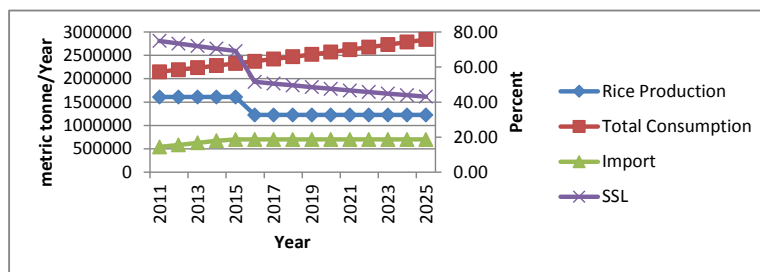


Fig.5: Relationship between rice production, total consumption, import and self sufficiency level (SSL), scenario 2

The simulation results indicated that rice production would decrease from 1.61 million metric tonne to 1.22 million metric tonne in 2015 if the government decided to remove the NPK fertiliser subsidy. Hence, rice production would also decline. Meanwhile, total import was expected to increase every year from 2011 until 2015. The simulation results from Scenario 2 suggested that SSL would decrease drastically from 69.17% to 51.55% in 2016 due to a decline in rice production. Finally in 2025, SSL was expected to decline to 43.08%.

*Scenario 3: Simulation under introduction of new variety of paddy*

The simulation results suggested that initially, the yield was about 4.052 metric

tonne per hectare per year. This yield was constant at this level until the government introduced a new variety of paddy in 2014 that was expected to be in use until 2016. The simulation results showed that there was an increment in the yield obtained when the government introduced a new variety of paddy. The yield increased from 4.052 metric tonne per hectare to 4.172 metric tonne per hectare in 2015. The percentage increase in yield was expected to be about 3% per year in 2015. This is accordance with Wobst and Mhamba (2003), who indicated that factor productivity could be enhanced by enhancing the fertiliser used and through improved seeds. However, if there is no change in fertiliser used or no introduction of a new variety of paddy, the yield would remain constant until the introduction of a
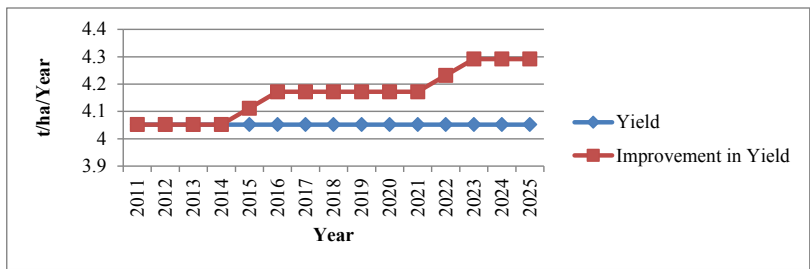


Fig.6: Yield, scenario 3
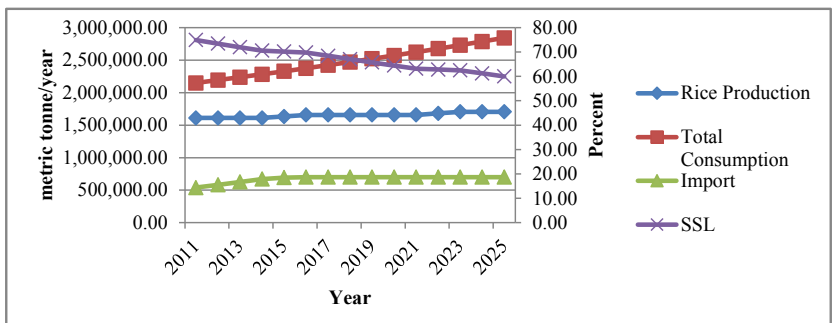


Fig.7: Relationship between rice production, total consumption, import and self sufficiency level (SSL), scenario 3

new variety of paddy as planned for 2021. The simulation results indicated that yield would increase by about 3% from 4.172 metric tonne per hectare to 4.292 metric tonne in 2021.

For the period 2014 to 2016, the simulation results indicated that there would be an increment in rice production as the government had introduced a new variety of paddy. However, in terms of quantity of rice import, after 2015 the rice import was expected to equal import quota. This scenario implied that even though production might increase it would not be able to meet prevailing demand. Initially the SSL was at 74.91% in 2011 but it declined gradually by up to 60% in 2025. The simulation results indicated that from 2011 to 2014, the percentage would decrease in SSL by about 2% per year while in 2015 to 2016 the percentage would decrease in SSL by 0.5% due to the increase in rice production as a result of the introduction of a new variety of paddy in the year 2014 to 2016. Unfortunately, after 2016, the percentage decline in SSL was back to its normal rate of about 2% per year until 2021. Again, in 2021 if a new variety of paddy is used, the percentage decline in SSL will be 0.5% per year. This scenario would occur due to the increase in total consumption. Therefore, it is suggested that for the next 15 years production needs to be increased in order to increase SSL.

## CONCLUSION AND RECOMMENDATION

This study attempted to simulate the impact of removal of fertiliser subsidy and the introduction of a new variety of paddy on the Malaysian paddy and rice industry. A system dynamics model was used to perform the analysis. Simulation results indicated removal of the fertiliser subsidy would have a negative effect on rice yield and hence, production, import and SSL. This shows that the fertiliser subsidy provided by the government does have a positive impact on increase in rice production. The simulation results also indicated that the introduction of a new variety of paddy would have a positive impact on the performance of the system.

Therefore, it may be stated that removal of the fertiliser subsidy would make paddy production in Malaysia unsustainable. Improvement in yield does have a positive effect on the industry. However, trade liberalisation would limit the supporting elements of the industry. Therefore, alternative action such as encouraging farmers to buy fertiliser on their own if the government decides to stop subsidising the cost of purchasing fertiliser should be taken. This initiative could help to ensure adequate supply of rice as demand continues to increase due to population growth. In addition, in order to increase yield, alternative policy mechanisms should be introduced. The construction of a new irrigation scheme for rain-fed areas could also be implemented from money saved as a result of removing the subsidy. The

extension services too should be enhanced in order to educate and motivate farmers to invest in increasing yield. The investments by the government in technology transfer, extension and R&D must continue and be strengthened as these efforts could help to ensure the sustainability of the industry. All these efforts would help to improve the productivity of paddy. This is very important to ensure adequate supply of rice for the Malaysian population.

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# Growers' Perceptions Towards the Needs of Their Downstream Customers in the Western Australian Apple Supply Chain

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## ABSTRACT

To succeed in an agribusiness, growers must understand what is required by their downstream customers. This paper explores the perceptions of apple growers in Western Australia towards the needs of their downstream customers. The results indicate that the most important factors that are perceived by growers to influence their downstream customer's choice of supplier are quality, price and continuity of supply. On the other hand, for downstream buyers, quality, price and a favourable long-term relationship were the most important factors that they used in selecting their preferred supplier. The growers' perception of their downstream customer's needs, and indeed, the criteria by which customers evaluate their alternative suppliers, are closely aligned. Both growers and downstream intermediaries identified quality and price as the major factors in selecting their preferred trading partners.

*Keywords:* Grower's perception, needs, downstream customers, quality, apple industry

## INTRODUCTION

Apples are among the top horticultural products in Western Australia (WA), with production of 38,368 tonnes worth AUD28.4 million in 2003 (HAL, 2004).

Fruit is mainly cultivated in the WA regions of Donnybrook, Dwellingup, Manjimup and the Perth Hills. The period of February- May is the harvesting season for apples in WA. The harvested fruit is either sent to local markets for consumption and processing or to export markets. Apple exports from WA are significant, with more than 26% of production exported in 2003. However, phytosanitary regulations restrict the import of apples into the states (Douglas, 1995); The ideal climatic conditions in WA support

the production of good quality apples. However, Australian produce is not price competitive compared with apples from countries like China, Chile, New Zealand and South Africa. This constrains Australia's share of major export markets like Malaysia and Singapore. This is visible from the decline in export volume from 5,604 tonnes in 2003 to 2,606 tonnes in 2004. At the same time, there was a surge in the availability of apples in the domestic market. As the consumption of apples had declined from 16.0 kg/capita in 2000-2001 to 13.3 kg/capita in 2001-2002 (HAL, 2004), domestic wholesale prices have fallen.

Furthermore, changes in the distribution channels and falling returns are affecting the viability of small orchards, increasing pressure for economic performance and leading to a reduced number of fruit producers (Agricultural Forestry Fisheries, 2001). The establishment of modern retail formats like supermarkets and the reduction in local buyers are forcing fruit producers to wield to the coercive market power of available buyers. In traditional supply chains, apple producers believe that market intermediaries take advantage of their poor bargaining power on account of the absence of an effective control mechanism for price regulation (HAL, 2001). Many apple growers believe that direct transactions with retail buyers could increase their net profit. Kohls and Uhl (2002) proved this insight to be incorrect by demonstrating that alternative marketing arrangements lead to increased costs for producers, which can be avoided in the traditional system.

Moreover, the fresh produce marketing system requires various factors like quality, variety, prices, profits and cost of production to be considered before changing to a new distribution system.

Changes in the fruit distribution channel to retail formats like supermarkets gives apple growers the freedom to select their downstream trading partners. A greater understanding of the functions market intermediaries perform in the supply chain will also help growers to adapt their product to meet the downstream customer's needs. Even though most growers perceive that they can achieve greater profits by bypassing market intermediaries, there are certain market functions that need to be performed. In the fresh produce industry, quality is an extremely important factor that influences competitiveness. Product quality influences the consumer's choice relative to other competing products (such as other fruits, snack products and confectionery) (HAL, 2001). Furthermore, the characteristics of fresh produce often increase transaction costs and risks due to the fact that: (1) fresh produce is perishable and sensitive to post harvest handling; (2) fresh produce it often takes some time for any damage to be become apparant, making it difficult to identify the responsible parties; (3) it is difficult to measure the quality sought in the fresh market; and (4) quality specifications often differ from customer to customer. By identifying what customers need, growers can reduce the amount of conflict in their transactions and elevate their status to preferred suppliers.

This paper aims to investigate the perceptions of WA apple growers towards their downstream customers' needs and to further identify the extent to which the criteria used by downstream customers in supplier selection matches with the growers' perceptions.

## LITERATURE REVIEW

Potential supplier evaluation by organisational buyers focus on quality, price and the ability to deliver (Dempsey, 1978; Wilson, 1994; Batt, 2003). Quality, ability to deliver and competitive price are deemed the important variables for evaluation, in that order (Weber *et al*., 1991). The existence and maintenance of competitive advantage mainly depends on product quality (Rapert *et al*., 1998). Nonetheless, product quality is a rather vague notion that has been extensively studied (Oakland, 1999). Quality assessment differs with the type of standard used for measurement. It is essentially measured using objective standards, but can also be gauged based on subjective standards. This entertains the notion that the buyers and users perception of product quality could vary. The possible change in the 'objective' product quality during distribution further complicates quality assessment.

In fresh fruit marketing, two types of quality are important to customers, namely technical and functional quality. Technical quality is related to what the customer gets from the production process. This determines the level of customer satisfaction with the quality offered for sale (Gronroos, 1995). Functional quality is related to the interaction process that determines the ongoing relationship with customers. This basically means suppliers must be able to deliver based on what the customer needs i.e. they must be able to deliver the product when the customer wants it. The quality of fresh produce can also be assessed on the basis of intrinsic and extrinsic quality attributes. Intrinsic quality is related to the physical attributes of the product, while extrinsic quality is related to the brand, the package, the place of purchase and the price (Batt, 2007). Post-purchase quality is assessed through experiential quality attributes that include taste, texture and flavour (Harker, 2001). As suggested by Batt and Sadler (1999) the intrinsic and extrinsic quality attributes that are most often used by consumers to select fresh fruit from a retail store are poor indicators of experiential (eating) quality.

Perceived value is expressed monetarily, in terms of the perceived product quality and its comparative price offer (Fornell *et al*., 1996). Value is attained from the most cost-effective completion of an activity. In this case, the concept of value establishes the price that equalises the overall costs of functionality and benefits from selection of one particular product over others (Hutt & Speh, 2000).

The importance of positive long-term relationships and their impact on the effectiveness and efficiency of marketing channels have been better understood over the last decade and a half. Emphasis has been given to the creation of value

through relationships along with technical and functional quality aspects (Ravald & Gronroos, 1996). This has resulted in the establishment of long-term relationships with preferred buyers who are capable of meeting the supplier's expectations. Thus, the traditional ways of conducting business has progressively given way to long-term supply contracts (Kurnia & Johnston, 2001). The transition from transactional exchange to relational exchange is facilitated by numerous repeat transactions that build satisfaction and trust and lead to customer loyalty (Christopher *et al.*, 1991). As Gronroos (1995) indicated, the goal of relational marketing is to attract customers and retain them. According to Gronroos (1994), relational marketing strategy differs substantially with regards to market orientation, quality criteria , information on customers, functional interdependency and responsibility. Critical factors responsible for successful relational exchange include trust, good selection of suppliers and buyers, good performance by suppliers and buyers (in terms of logistics and flexibility), reliability, a balance of power, communication and competency (Peterson *et al.*, 2000).

With the increase in the number of modern retail formats and a growing need for consistent product quality, reliable delivery and food safety, more retailers are choosing to transact directly with growers as a means of reducing costs and improving product quality (Batt, 2006). In selecting the right supplier, Ellram (1990) explored supplier selection by the customers using both hard and soft criteria. Hard criteria included price, quality, delivery and service, while the soft criteria included those that were hard to quantify like compatibility and the strategic direction that the supplier was taking in terms of building long-term relationships with buyers. In the case of customer selection criteria, rational economic theory suggests that growers will select customers who offer the highest price. Nonetheless, other criteria like prompt payment, packaging, delivery and support for promotion could also influence growers in their selection of customers (Batt, 2003). Increasingly, consumers want to know that their food is safe, where it comes from, how it was produced and who handled it (Batt, 2007). Proof of chain is becoming a key requirement, especially with regards to the various credence attributes such as how the product was produced, the means by which it was produced and what steps the growers, wholesalers and retailers have taken to minimise the environmental and social impacts of production on the community and society at large.

**METHODOLOGY**

The sampling frame for this study consisted of apple growers and market intermediaries in Western Australia (WA). A detailed questionnaire was prepared for each group to investigate growers' perceptions towards the needs of their downstream customers. A list of apple and pear growers was obtained from the WA Fruit Growers Association (WAFGA). Email was the selected medium for the initial survey of the 278 growers.

Within a period of two months, only 12 usable questionnaires were returned. After this, face-to-face interviews were conducted with the growers using a snowball technique, with the help of district associations and branches. In total, 50 apple growers were interviewed for this study.

The downstream customers included fruit packers, market agents, secondary wholesalers, supermarkets, other retailers and fruit exporters. At the time, 24 market agents operated in the Perth Metropolitan Market, of which 12 dealt with apples. In this study only six market agents and eight fruit packers participated. Secondary wholesalers who purchase fruit for and on behalf of other retailers or institutional customers were identified through the Perth Metropolitan Market website. For the retailers, a random selection of retailers were contacted from the Perth Metropolitan Yellow Pages (2004).

Though an attempt was made to contact a representative from the three major retail chains in Western Australia, only two supermarkets were willing to participate in this study. The person responsible for the purchase of fruit for each retail chain represented them during the interviews. The number of fruit exporters in Western Australia is currently declining in the main export markets, Singapore and Malaysia, due to competition from China. For the fruit exporters, a list was obtained from the Perth Yellow Pages (2004) directory and one of the exporters who participated in the study also provided a list. For all downstream customers, their willingness to participate

was confirmed via telecom before face-to-face interviews with consenting parties. In total, 41 market intermediaries participated in this study.

In this study, descriptive statistics were used to analyse general information on the activities related to apple marketing. To examine any significant differences in the growers' perceptions of their customers' criteria in choosing alternative growers in the Western Australian apple industry, the independent sample $t$-test was used. To compare what each downstream customer got from their preferred supplier, ANOVA was used.

## FINDINGS

Growers believed that the critical factors which influenced their downstream customers' choice of supplier were quality (72%) followed by price (30%) and continuity of supply (14%). The least frequently cited variables by growers were past history or reputation (4%), a personal or business relationship (4%) and the right varieties (2%) (Table 1).

Besides the open-ended questions, growers were then asked to rate how important they believed each of the following were to their customers' in their decision to choose preferred suppliers. The first six criteria chosen by the growers indicated that quality was the most important criteria in the customers' selection of preferred suppliers (Table 2).

Price and the ability of the growers to store the fruit to ensure its freshness were also perceived to be important by

the growers. A wide range of fresh fruit and individual labelling were the two least important criteria identified by growers. Besides looking at what growers thought was important in their customer's decision to purchase apples from them, growers were asked to self-evaluate the criteria that stopped or prevented them from meeting their perceived market intermediary's needs (Table 3).

For growers transacting with fruit packers (FP), the inability to supply a sufficient quantity of fruit was perceived to be the major impediment. Seasonal variations, for apples are biennial bearing, impacted on both the quantity of fruit available and the size of the fruit. For the market agents (MA), the inability of the growers to supply sufficient quantities of fruit was once again cited as the major impediment. Furthermore, growers cited problems in producing apples at prices the market agents wanted to pay. High

costs impacted directly on the grower's profitability. With only small volumes of fruit available, growers were unable to respond to the market agent's request. Things that prevented growers from meeting the secondary wholesalers (W/S) needs included size, seasonal variations and the ability of the growers to pack the apples for them. As secondary wholesalers normally supplied fruit to restaurants or institutional organisations like hospitals, they normally required a certain size or variety for their customers.

For supermarkets (SM), size was the main thing that stopped growers from meeting the supermarket's needs. As supermarkets normally have their own specifications, it was hard for growers to fulfil the supermarkets' needs in terms of the size required because growers had to sell all of their fruit. For the retailers (R), price and quality were indicated by the growers as the main things that stopped them from

TABLE 1
Criteria Growers Think Important in Their Customer's Decision to Purchase Apples from Them

| Response | Frequency | Percent (%) |
|---|---|---|
| Quality | 36 | 72 |
| Price | 15 | 30 |
| Continuity of supply | 7 | 14 |
| Presentation | 4 | 8 |
| Consistency | 3 | 6 |
| Enough fruit | 3 | 6 |
| Past history | 2 | 4 |
| Personal/business relationships | 2 | 4 |
| Right varieties | 1 | 2 |

n = 50

TABLE 2
Growers' Perception of Their Customers' Criteria in Choosing Alternative Growers

| Factors | Mean | SD |
|---|---|---|
| Free of physical injury | 5.60 | 1.030 |
| Delivering good quality apples | 5.52 | 0.909 |
| Free of pests and disease | 5.48 | 0.931 |
| Free of chemical residues | 5.38 | 1.048 |
| Right maturity | 5.36 | 0.921 |
| Good looking | 5.28 | 1.213 |
| Competitively priced | 5.14 | 1.088 |
| Store well | 5.12 | 1.350 |
| Desired variety | 5.04 | 1.212 |
| Deliver apples when required | 5.02 | 1.204 |
| Meet their immediate needs | 4.92 | 1.104 |
| Quantities required | 4.86 | 1.340 |
| Desired size(s) | 4.80 | 1.161 |
| Quality assurance programme | 4.72 | 1.666 |
| Well graded | 4.36 | 1.893 |
| Appropriately packed | 4.36 | 1.893 |
| Give credit (deferred payment) | 4.04 | 1.384 |
| Wide range of fresh fruits | 3.74 | 1.712 |
| Individually labelled | 3.30 | 1.799 |

n = 50

Note: '1 – Not at all well', '6- Very well'

TABLE 3
Things that Prevented or Stopped Growers from Meeting Downstream Customers' Needs

| CriCriteria | Frequency | | | | | |
|---|---|---|---|---|---|---|
| | FP | MA | W/S | SM | R | FE |
| Size | 2 | 1 | 6 | 1 | | 3 |
| Can pack on our own | 1 | 2 | 2 | | | 4 |
| Seasonal variation | 2 | 1 | 4 | | | 3 |
| Able to supply quantity | 3 | 6 | | | 2 | |
| Price | | 1 | | | 3 | |
| Other outlets | | 1 | | | | |
| Unable to work on short notice | | 3 | | | | |
| Cost | | 3 | | | 2 | |
| Quality | | | | | 3 | |
| Time | | | | | 1 | |
| N | 6 | 10 | 6 | 1 | 6 | 5 |

meeting the retailer's needs. Small green grocers were perceived as requiring fruit that was competitively priced while at the same time offering superior quality to their end customers. The ability of the growers to pack the fruit themselves was the main thing that stopped them from meeting fruit exporters' (FE) needs. This is because small scale growers who sell to fruit exporters generally do not have packaging facilities. Besides that, size and variety specified by fruit exporters were also identified by the growers as a major impediment.

To confirm growers' perceptions of the needs of their downstream customers, customers were also asked to list the criteria used in deciding from whom they would purchase fruit. Good quality fruit, competitive pricing and good relationships were the most commonly identified responses by fruit buyers (Table 4).

For the fruit packers, additional criteria included sufficient quantity, consistent supply, the supplier's reputation and the presence of a quality assurance system. A quality assurance system enables more fruits to be sold to downstream customers. Market agents generally prefer to do business only with their regular suppliers, taking into consideration their familiarity, reliability and

TABLE 4
Criteria Used by Each Downstream Customers in Deciding from Whom They Will Purchase the Produce

| Criteria | Frequency | | | | | |
|---|---|---|---|---|---|---|
|  | FP | MA | W/S | SM | R | FE |
| Quality | 6 | 2 | 6 | 1 | 19 | 3 |
| Good relationships | 3 | 2 | 2 |  | 8 | 4 |
| Price | 3 | 2 | 4 |  | 15 | 3 |
| Able to supply quantity | 3 | 1 |  | 1 |  |  |
| Reputation | 2 | 1 | 1 |  | 3 |  |
| Consistent supply/availability | 1 | 1 |  |  | 3 |  |
| Regular supplier | 1 |  |  |  |  |  |
| QA system | 1 | 1 |  |  |  |  |
| Fruit safety | 1 |  |  |  |  |  |
| Trust |  |  |  |  | 1 | 1 |
| Regular supplier |  | 2 | 2 |  | 1 |  |
| Co-op during shortage |  | 1 |  |  |  |  |
| Can give profit |  | 1 |  |  |  |  |
| Good storage |  |  | 1 |  | 2 |  |
| Service |  |  |  |  | 4 |  |
| Presentation |  |  |  |  | 2 |  |
| Fresh |  |  |  |  | 2 |  |
| Our own apples |  |  |  |  | 1 |  |
| Taste |  |  |  |  | 1 |  |
| N | 8 | 6 | 8 | 2 | 25 | 4 |

dependability. Secondary wholesalers and provedores also prefer to do business with their regular suppliers, while supermarkets were only concerned with product quality and quantity as the key criteria for supplier selection.

Retailers were the most demanding buyers for they expected superior service from a preferred supplier. Fruit should be fresh in appearance and quality, with good shelf life and great taste. Supporting the earlier findings of Korneliussen and Gronhaug (2003), retailers placed more importance on the technical quality of the fruit than the functional quality. The fluctuation in product quality from grower to supplier stressed the need for establishing a positive relationship between the market players. A good relationship between market intermediaries and their upstream suppliers increased the probability of fruit quality meeting their perceived expectations.

To determine customer requirements from their favoured suppliers, further analysis was undertaken to determine the importance of 19 criteria involved in the customers' decision to purchase fruit (Table 5).

TABLE 5
Criteria Customers Used When Choosing Alternative Suppliers

| Criteria | FP | MA | WS | SM | R | FE |
|---|---|---|---|---|---|---|
| | Mean | Mean | Mean | Mean | Mean | Mean |
| Free of pests and disease | 6.00 | 5. 83 | 5. 88 | 6.00 | 5. 88 | 3.75 |
| Delivering good quality apples | 5.88 | 5.50 | 6.00 | 5.00 | 5.96 | 5.25 |
| Free of physical injury | 5.88 | 4.50 | 6.00 | 5.50 | 5.92 | 4.50 |
| Competitively priced | 5.63 | 4.33 | 5.63 | 4.50 | 5.72 | 4.50 |
| Free of chemical residue | 5.62 | 5.67 | 5.63 | 5.50 | 5.76 | 4.50 |
| Good looking | 5.50 | 5.17 | 5.63 | 4.50 | 5.92 | 5.50 |
| Deliver apples when required | 5.38 | 5.83 | 5.88 | 5.50 | 5.92 | 4.75 |
| Desired variety | 5.38 | 5.17 | 5.50 | 5.50 | 5.76 | 4.25 |
| Right maturity | 5.25 | 5.50 | 5.88 | 5.50 | 5.96 | 4.25 |
| Meet their immediate needs | 5.25 | 4.50 | 6.00 | 3.50 | 5.72 | 4.75 |
| Desired size(s) | 5.00 | 5.33 | 5.13 | 5.50 | 5.28 | 3.25 |
| Store well | 4.88 | 5.67 | 6.00 | 4.50 | 5.92 | 4.25 |
| Quantities required | 4.88 | 5.17 | 5.25 | 5.00 | 5.68 | 4.25 |
| Quality assurance programme | 4.63 | 4.33 | 5.38 | 5.00 | 5.44 | 3.75 |
| Well graded | 3.75 | 6.00 | 5.38 | 5.00 | 5.36 | 5.75 |
| Appropriately packed | 3.50 | 5.67 | 4.63 | 5.00 | 4.44 | 5.50 |
| Individually labelled | 3.13 | 3.17 | 4.25 | 4.00 | 4.28 | 3.75 |
| Give credit (deferred payment) | 3.13 | 1.67 | 3.25 | 2.00 | 2.76 | 1.50 |
| Wide range of fresh fruits | 2.63 | 3.00 | 5.50 | 2.00 | 5.24 | 1.75 |
| N | 8 | 6 | 8 | 2 | 25 | 4 |

Note: '1 – Not at all important', '6- Very important'

Well graded and packed fruit was of little consequence to fruit packers, especially since these services were provided by them to small growers. Similarly, separately labelled fruit, deferred payment and a wide range of fresh fruit were of little importance to fruit packers with narrow product lines. The market agents preferred well graded, appropriately packed and not necessarily separately labelled fruit. A wide range of fresh fruit was not important for market agents and specialist wholesalers, unlike secondary wholesalers and provedores who expected a wide range of fresh fruit and vegetables from their suppliers. Again, deferred payment was the least important consideration.

The very small number of supermarket respondents in the study prevented a meaningful statistical analysis. On the whole, supermarkets expected delivery of fruit that met very specific quality and quantity parameters and was priced competitively. They were not concerned with any extension of credit or the range of fresh fruit offered by their suppliers. This points towards the selection of multiple suppliers by the supermarkets for fruit. Supermarkets yield much power in WA and thus the trading and payment terms of the supermarkets needs to be accepted by suppliers.

Small independent retailers were unconcerned with fruit labelling and packing. This is due to the ownership status of the business. Such businesses are family run with trained staff capable of differentiating between varieties. They also show more readiness towards the use of returnable plastic crates. Fruit exporters identified a wide range of fresh fruit and the need to accept an extension of credit as the two least important criteria in their decision to buy from alternative fruit suppliers.

## CONCLUSION

Generally, growers perceived things differently from their downstream buyers. While downstream buyers normally look at the quality of the produce, growers were more concerned about the price received from their preferred buyers. The results of the study indicated that most of the growers wanted a high price or the best returns from their transactions with their downstream buyers. However, at the same time, growers wanted to establish a long- term relationship as a means of reducing the risk and uncertainty associated with the exchange. Thus, both economic and relational variables were found to be important criteria in the exchange process between growers and their preferred downstream buyers.

In terms of the downstream buyers' needs, most of the buyers indicated that they wanted good quality produce at a competitive price. At the same time, they wanted to have a good relationship with their preferred suppliers. For most buyers, quality was the main criteria when choosing preferred suppliers because their end customers would usually go for quality products. Most growers were able to meet

their downstream market intermediaries' needs in terms of quality and price except for the size of the apple.

The growers perception of their downstream customers' needs, and indeed, the criteria by which customers evaluate alternative suppliers, were closely aligned. Both parties identified quality and price as important factors in the selection process of trading partners by downstream market intermediaries. As growers and downstream buyers have similar perceptions, there will be few problems in the future and thus, there is little to stop them from continuing to transact in the future.

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# The Changing Structure of Farm Household Economy in Malay Rice-Growing Villages

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## ABSTRACT

This study focuses on the structure of household expenditure in discovering the real condition of household economy in rice-growing villages. We identified actual expenses and detailed consumption items for basic subsistence at the household level in two villages. The expenditure function in the two villages indicates that the head of the household, on-farm income and off-farm income are major determinants influencing the expenditure patterns and items bought by the household. In Kg. HC off-farm income and remittances determine household expenditure rather than on-farm income. The results indicate a contrast in expenditure behaviour at the household level between the two villages, where off-farm income in Kg. HC was strongly related to household expenditure while in the case of Kg. PTBB the relationship was influenced by on-farm income.

*Keywords:* Household economy, expenditure, on-farm income, off-farm income

## INTRODUCTION

Household economy is one of the most important perspectives when considering the level of diversification for people's livelihoods as it mirrors the actual condition of their lives. It can be measured from two different perspectives, income and expenditure (Baude, 1982; Chua, 2000). We focus on both the income- and expenditure-related characteristics of household heads in different locations.

While household income and expenditure have important implications in capturing trends in a household economy, it is difficult to pinpoint from records such as earnings and expenses of households. In addition, there is general difficulty in

Generally the percentage of food expenses as an indicator of economic well-being is based on Engel's observation of the living standards of a household. This varies with family size and is negatively related to the share of food expenses in the household budget (Perali, 2003). Kirkpatrick (1971), who reviewed Engel's law of consumption, explains how the standard of living, consumption and living conditions are strongly related and states that: 1) As family income increases, a smaller percentage is spent on food; 2) As family income increases, the percentage spent on clothing remains approximately the same; 3) The percentage of expenditure for rent, fuel and light invariably remains the same; and 4) As income increases, the percentage of expenditure for cultural wants rises constantly.

This study attempted to analyse the household economy especially in relation to household expenditure and its relationship with household income. Household data were obtained through a questionnaire survey from two villages consisting of 42 households in Kampung Permatang Tinggi Bakar Bata (Kg. PTBB), Penang and 38 households in Kampung Hutan Chengal (Kg. HC), Kelantan. The objectives of the study are (1) to reveal the structure and patterns of household expenditure; (2) to identify determinants of household expenditure among income and other variables in Kg. PTBB and Kg. HC and (3) to analyse the relationship between household expenditure and income, including both the on-farm and off-farm sectors. We postulate that there are differences between these two villages as Kg. PTBB is located in an industrialised granary area in Penang, while Kg. HC is located in a rural granary area.

**HOUSEHOLD EXPENDITURE IN MALAYSIA**

Table 1 shows the average monthly expenditure per household between the period 1993/94-2004/05. It presents the patterns of household expenditure at the national and regional levels in Malaysia. The average household expenditure per month in 2004/05 was RM1,953 per month, an increase from the RM1,161 in 1993/94 and RM1,631 in 1998/99. There was an increase of 19.7% in total household expenditure between 1998/99 and 2004/05. On average, household expenditure for those living in urban areas in 2004/05 was 1.8 times higher than for those living in rural areas. The average monthly consumption expenditure was RM2,285 in urban areas and RM1,301 per month in rural areas (DOS 2004/05).

Several studies have been done covering household expenditure in Malaysia (Hazel, Roell, & Hashim, 1998; Mahadevan, 2007). Older household heads purchase more locally produced non-food items while more educated household heads allocate a greater budget to livestock products, clothing and transport, education and health in Malaysia. One of the oldest studies conducted by Purcal (1971) investigated details of people's consumption behaviour. The study focused mainly on Malay rice-growing villages on the west coast of Peninsular Malaysia. It traced consumption

we assumed the former as being the more developed area and the latter as being less developed, in terms of urbanization levels.

## Kg.PTBB in Penang State and HC in Kelantan

Kg.PTBB is located 20km from Butterworth and 2km from the Muda River. The area of Permatang Tinggi, to which this village belongs, has four different villages called A, B, C and Bakar Bata. Since 1987 mini-estates have covered 500 hectares of the paddy fields in Northern and Central Sebrang Prai. There was a fundamental change in the employment structure, in that the number of full-time farmers decreased and that of the part-time farmers increased from the 1980s to 2000s because the industrial zone was expanded and a highway was also constructed connecting to Kg. PTBB (Fujimoto, 1995).

On the other hand, HC in Kelantan is a typical rice-growing village in Kelantan that has faced serious problems such as an increase in idle land and abandoned rice farms. As mentioned earlier, KADA began to address this problem by establishing rice estates called Ladang Merdeka in the 1980s (Fujimoto, 1994). Kg. HC is located 12km from Kota Bahru in Ladang Merdeka Manan, which is one of the project areas in Pasir Mas. A total of 36.38 hectares of paddy fields in Kg. HC and neighbouring Kg. Manan have been in operation since 2002. Kg. HC was selected as a sample of the study to represent the east coast of Peninsular Malaysia.

## Sampling Frame and Data Collection

Data collection was conducted from May to July 2008 for Kg. PTBB and from November 2009 to February, 2010 in Kg. HC, Kelantan. As there were no household accounts records among the paddy farmers the respondents could generally only recall their previous month's expenses during our survey. Table 2 shows the detailed itemisation of household expenditure used in the questionnaire. The interviews were conducted on the household heads in the two villages mentioned earlier. The total number of households was 134, which included 42 farm and 92 non-farm households. The total number of employed workers was 100 individuals in 42 farm households. The household heads were mostly male except for the case of one female head.

Household expenditure can broadly be disaggregated into expenditure on food and non-food items. Theoretically, expenditure on food should include the value of food produced and consumed by the household and the value of purchased food (Ahmed, 2003). However, we only included expenditure on purchased food as production for self consumption was limited to the kitchen garden, making it very difficult to compute an actual value. Housing only included repair expenses because there were no rented houses among the households. Other expenses included the cost of repair for self-owned cars and motorbikes.

## RESULTS AND DISCUSSION

Table 3 shows the sampling distribution of paddy farmers in Penang and Kelantan. We managed to interview 42 farmers in Kg. PTBB and 39 farmers in Kg. HC. There was only one female among the 42 household heads in Kg. PTBB, Penang, while 13 of the 39 household heads in Kg. HC, Kelantan were female.

Table 4 summarises the average monthly per capita household expenditure in the two villages. There was not much variation in the household size in the sample. The mean in Kg. HC was 5 and the mean in Kg. PTBB was 5.6. As shown in Table 4, a similar trend was seen, where the percentage of food expenses occupied the largest share of household expenditure, which was 32%

TABLE 2
Expense Items and Detailed Classification of Collected Data in the Two Villages

| Expense item | Included items |
|---|---|
| Food | Cereals, meat, fish, dairy product, seasoning and eating-out |
| Housing | Rental payment |
| Utilities | Water, electric, home phone and mobile |
| Miscellaneous | Daily groceries including laundry soap, tooth paste, shampoo and etc. |
| Clothing | Traditional clothes for *Hari Raya* |
| Medical care | Medicine |
| Education | Academic fees |
| Entertainment | Tobacco and account |
| Remittance | Support to parents living separately |
| Loan | Payment of car loan |
| Others | Insurance and etc. |

Source: Own survey - 2008-2010.

TABLE 3
Sampling Distribution of Paddy Farmers in Penang and Kelantan

| Item | Kg. PTBB, Penang | | | Kg. HC, Kelantan | | |
|---|---|---|---|---|---|---|
| | No. | Average | SD | No. | Average | SD |
| Total households | 134 | | | 137 | | |
| Number of households studied | 42 | | | 39 | | |
| Gender of household heads | | | | | | |
| Male | 41 | | | 26 | | |
| Female | 1 | | | 13 | | |
| Average family size (persons) | | 5.6 | 2.5 | | 5.0 | 1.8 |
| Average formal education (years) | | 7.4 | 3.8 | | 7.7 | 4.5 |
| Average farming experience (years) | | 23.6 | 13.3 | - | - | - |
| Total number of workers | 100 | | | 84 | | |

Source: Own survey, 2008-2010.

in Kg. HC and 40% in Kg. PTBB. Table 5 shows the percentage of each expenditure item by the frequency distribution of monthly expenditure per capita. The main expenditure items were food, utilities, fuel and education fees in both villages. The groups of "RM100-199" and "RM200-299" per capita were observed among 26 households in Kg. PTBB and 22 households in Kg. HC.

*Household Income and Expenditure in the Two Villages*

The expenditure function clarifies the scale of impact on household expenditure by the determinants. This section attempts to focus on the expenditure pattern in relation to household income. Due to differences in the regional characteristics of the granaries in Penang and Kelantan, the income structure

of on-farm and off-farm activities had different characteristics. First, it is necessary to discuss household income in the two villages. Subsequently, we focus on the relationships between household income and expenditure.

There were differences in the structure of household income in the two villages. While Kg. PTBB is located close to an industrial area, Kg. HC is located a good distance away from the urban areas. This is why off-farm income in the two villages was so different: RM3,827.0 per month in Kg. PTBB and RM1,699.3 in Kg. HC. Although the percentages of on-farm and off-farm incomes were 28.1% and 71.9% in Kg. PTBB, the income ratio between each of the sources of income in Kg. HC was almost entirely derived from off-farm activities which made up 93.2% of the total. We can

TABLE 4
Average Monthly Household Expenditure Per Capita in Kg. PTBB and Kg. HC

| Expense item | Kg. PTBB, Penang | | Kg. HC, Kelantan | |
|---|---|---|---|---|
| | Ringgit per month | SD | Ringgit per month | SD |
| Food | 118.7 | 66.5 | 102.1 | 67.2 |
| Housing | 0.0 | 0.0 | 0.6 | 2.2 |
| Utilities | 24.1 | 17.9 | 43.9 | 35.0 |
| Clothing | 12.5 | 15.3 | 9.8 | 15.8 |
| Fuel | 33.9 | 46.1 | 32.3 | 32.2 |
| Medical care | 11.6 | 31.5 | 7.7 | 18.2 |
| Education | 25.2 | 26.0 | 23.7 | 50.4 |
| Entertainment | 7.2 | 37.0 | 14.6 | 24.2 |
| Remittance | 6.0 | 17.1 | 2.8 | 6.6 |
| Loan | 22.6 | 62.5 | 57.0 | 351.5 |
| Others | 33.9 | 46.1 | 24.8 | 50.9 |
| Overall | 277.2 | 189.4 | 318.8 | 365.6 |

Source: own survey - 2008-2010.

TABLE 5
Percentage of Expenditure Items by Frequency Distribution of Monthly Household Expenditure Per Capita in Kg. PTBB, Penang and Kg. HC, Kelantan

(%)

| Kg.PTBB | No. | Food | Utilities | Clothing | Fuel | Medical care | Education | Entertainment | Remittance | Loan | Others |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Less than 100 | 2 | 42.7 | 19.4 | 4.9 | 0.0 | 8.3 | 18.6 | 0.0 | 0.0 | 0.0 | 6.0 |
| 100 - 199 | 13 | 50.8 | 15.3 | 3.3 | 11.9 | 3.0 | 8.9 | 0.0 | 0.9 | 0.1 | 5.8 |
| 200 - 299 | 13 | 47.1 | 7.3 | 4.0 | 12.7 | 2.5 | 9.1 | 0.8 | 3.1 | 8.0 | 5.5 |
| 300 - 399 | 9 | 40.9 | 6.9 | 6.2 | 11.3 | 2.4 | 10.4 | 1.2 | 2.1 | 10.6 | 7.9 |
| More than 400 | 5 | 35.0 | 7.0 | 4.1 | 13.4 | 7.8 | 7.3 | 7.2 | 2.2 | 11.3 | 4.7 |
| Overall | 42 | 42.6 | 8.7 | 4.5 | 12.2 | 4.2 | 9.0 | 2.6 | 2.1 | 8.1 | 6.0 |
| Kg.HC | No. | Food | Utilities | Clothing | Fuel | Medical care | Education | Entertainment | Remittance | Loan | Others |
| Less than 100 | 3 | 45.5 | 14.5 | 1.0 | 13.6 | 1.2 | 7.5 | 1.9 | 0.0 | 0.0 | 0.0 |
| 100 - 199 | 10 | 48.3 | 29.1 | 3.1 | 20.0 | 4.7 | 8.6 | 6.6 | 1.0 | 0.0 | 7.0 |
| 200 - 299 | 12 | 44.0 | 34.1 | 7.2 | 41.8 | 1.3 | 14.0 | 8.5 | 1.8 | 0.0 | 22.3 |
| 300 - 399 | 6 | 36.1 | 68.0 | 16.3 | 33.1 | 23.7 | 17.8 | 9.7 | 6.5 | 0.0 | 9.1 |
| More than 400 | 5 | 20.7 | 58.1 | 16.9 | 35.8 | 11.7 | 96.4 | 26.7 | 7.5 | 433.3 | 12.0 |
| Overall | 42 | 34.1 | 43.9 | 9.8 | 32.3 | 7.7 | 23.7 | 14.6 | 2.8 | 57.0 | 4.6 |

Source: Own survey 2008-2010.

also see that the total amount of household income from both sources of income in Kg. HC was seriously limited.

This section attempts to identify the differences in income structure between on-farm and off-farm incomes. We calculated on-farm income, including net profit and subsidies, in Kg.PTBB using the following equation:

On-farm income
= (gross income – production costs)
+ subsidies

Gross income is the sum of all receipts from the sale of rice production to companies and institutions. Net income is gross income less all cash expenses such as those for seed, fertiliser, taxes, interest on debt and wages paid to hired labour (House, 2006).

Table 6 shows the average on-farm and off-farm incomes in Kg. PTBB and Kg. HC. While the average on-farm income was limited to RM124.3 per month in Kg. HC, LM Manan, in Kg. PTBB it was much higher, averaging RM1,081.6 per month. The latter village was not located on any of the estates in Penang state, and was managed independently by the 42 farmers. All the farmers sold their harvested production as paddy or seed depending on their contracts as well as the rice quality. Twenty-five of the farmers had been selling their production as seed at RM900 per tonne based on the uniform standard since the dry-season in 2006. In cases where the farmers preferred to sell their rice production as seed, it was necessary to make a contract with the institute's officer in order to

check the quality and field management before seeding. Consequently, we could see significant differences in gross income in the two villages, which was 7,533.5 per hectare in Kg. PTBB and 2,996.76 per hectare during the main season in 2006 in Ladang Merdeka, as shown in Table 7.

*Determinants of Household Expenditure in Two Villages*

In order to quantitatively clarify the mechanism of household expenditure determinants, this section attempts to ascertain factors determining household expenditure. The expenditure function is a measure of household welfare (Freeman, 2003). Households' behaviour is characterised by an expenditure function, defined as the minimum expenditure needed to achieve a satisfactory utility level (Agenor, 2004). A linear regression analysis was conducted. In line with Jorgensen (1997), a translog individual expenditure function was used that evaluated the aggregate expenditure per household equivalent for each member.

First, we focused on the mechanism of household expenditure throughout the two villages. A comparison of the expenditure function between the two villages illustrated the common factors that determined their household expenditure. To conduct the task the following independent variables were used: off-farm income, remittances, number of household members and location. The actual model used is as follows:

$$Y = a + b_1 \cdot X_1 + b_2 \cdot X_2 + b_3 \cdot X_3 + b_4 \cdot X_4 + b_5 \cdot X_5$$

Where,

$Y$ is the natural log of total household expenditure per month, measured in ringgit,

$X_1$ is the natural log of off-farm income, measured in ringgit,

$X_2$ is a dummy variable of the remittances, 0 for remittances and 1 for no remittances,

$X_3$ is the natural log of the number of household members, and

$X_4$ is a dummy variable of the location: 0 for Kg. PTBB and 1 for Kg. HC.

TABLE 6
Average Monthly Income by Source in Kg. HC and Kg. PTBB

| | (Ringgit per household) | | | | | | | |
| | Kg. PTBB | | | | Kg. HC | | | |
| | On-farm | | Off-farm | | On-farm | | Off-farm | |
| | ringgit | % | ringgit | % | ringgit | % | ringgit | % |
| Landlord | - | | - | | 124.3 | 6.8 | 1,699.3 | 93.2 |
| Owner Farmer | 1,176.6 | 21.4 | 4,328.9 | 78.6 | - | | - | |
| Owner tenant | 1,129.1 | 39.9 | 1,703.2 | 60.1 | - | | - | |
| Tenant | 1,086.3 | 23.1 | 3,623.7 | 76.9 | - | | - | |
| Overall | 1,081.6 | 28.1 | 3,827.0 | 71.9 | 124.3 | 6.8 | 1,699.3 | 93.2 |

Source: Own survey - 2008-2010.

TABLE 7
Income Statement per Hectare in 2002-2007, Ladang Merdeka Manan, Kelantan

| Items | 2002 | 2003 | | 2004 | | 2005 | | 2006 | | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| | wet season | dry season | wet season | dry season | wet season | dry season | wet season | dry season | wet season | dry |
| **Income** | | | | | | | | | | |
| Sold as paddy | 1,823.71 | 1,900.20 | 2,660.33 | 1,405.22 | 1,693.98 | 2,628.81 | 2,996.76 | 3,282.77 | 3,116.75 | 2,289.90 |
| Paddy subsidy | 605.15 | 632.75 | 875.95 | 507.04 | 745.94 | 846.59 | 832.84 | 938.32 | 859.18 | 659.79 |
| Deposit | - | - | - | 302.64 | - | - | - | - | - | - |
| Sub-total (A) | 2,428.86 | 2,532.95 | 3,536.28 | 2,214.90 | 2,439.92 | 3,475.39 | 3,829.59 | 4,221.08 | 3,975.93 | 2,949.69 |
| **Cost** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Wage | 456.32 | 617.87 | 643.75 | 831.12 | 795.82 | 763.68 | 892.28 | 904.42 | 955.53 | 624.51 |
| Agro-chemicals | 170.28 | 212.96 | 493.78 | 259.70 | 178.71 | 260.83 | 456.91 | 729.60 | 306.02 | 405.00 |
| Land preparation (tractor fee) | 125.74 | 254.30 | 271.64 | 287.20 | 305.15 | 366.50 | 526.72 | 244.80 | 378.48 | 217.27 |
| Seeds | 8.77 | 17.94 | 40.93 | 31.03 | 87.39 | 29.32 | 81.41 | 54.05 | 20.36 | 100.24 |
| Transportation | 7.81 | 14.24 | 7.73 | 20.89 | 22.09 | 57.32 | 5.29 | 82.36 | 65.23 | 13.06 |
| Fertilizer | 67.39 | 149.79 | 217.06 | 191.17 | 200.70 | 149.45 | 212.74 | 436.82 | 390.32 | 215.95 |
| Harvesting (combine harvester fee) | 95.82 | 100.79 | 199.81 | 127.37 | 181.73 | 223.06 | 234.13 | 198.41 | 211.72 | 199.44 |
| Others | 26.91 | 106.85 | 168.78 | 191.84 | 134.71 | 123.24 | 89.87 | 76.05 | 128.53 | 41.36 |
| Total (B) | 959.05 | 1,474.74 | 2,043.47 | 1,940.33 | 1,693.98 | 2,628.81 | 2,499.36 | 2,726.52 | 2,456.19 | 1,816.84 |
| Farm profit (A-B) | 1,469.81 | 1,058.21 | 1,492.81 | 274.57 | 1,693.98 | 2,628.81 | 1,330.24 | 1,494.57 | 1,519.74 | 1,132.85 |
| Servicing charge | 37.06 | 37.07 | 37.07 | - | 37.07 | 37.07 | 37.07 | 37.07 | 37.07 | 11.33 |
| Fund for project | 14.70 | 10.58 | 14.93 | - | 5.34 | 15.02 | 13.30 | 14.95 | 15.20 | 37.07 |
| Net profit | 1,418.05 | 1,010.56 | 1,440.82 | 274.57 | 1,693.98 | 1,483.27 | 1,279.87 | 1,442.55 | 1,467.47 | 1,084.45 |

Source:Interview to KADA officer
Note:Fund for project is 10 ringgit per acre in 2003 season I   15ringgit per acre season II.
Deposit 9,908.45 ringgit was used for landlords in 2004 season I.

Table 8 shows the estimation of the expenditure function of the household economy in the two villages. The signs of all the estimated coefficients in the expenditure function are shown to be positive, and all are significant, with on-farm income, remittances and the number of household members showing a significance at the 5% level, and off-farm income and location are both significant at the 1% level. Location had the largest influence on the level of household expenditure, followed by remittances, the number of household members, off-farm income and on-farm income.

Location is the most important among the five variables as it had an estimated elasticity of 1.027. It is clear that the location difference between the Penang and Kelantan states is an important factor where the households in Kg. HC spent more than those in Kg. PTBB. Remittances were the second most important factor which had an elasticity of 0.343. In the expenditure function, remittances represented the money received from non-residential family members. A reason why this factor was found to be significant may be because households which receive remittances tend to be poorer households, therefore making its impact more substantial on expenditure patterns. The number of household members was the third important factor which had an elasticity of 0.302. We can simply assume that household expenditure increases with an increase in family size. Further, off-farm income enlarges household expenditure by an elasticity of 0.197. It was directly related

to the non-farm sector in which the villagers had started to be employed in, in recent decades. We can assume that the pattern of household expenditure changed along with the change in employment structure in the off-farm sector. Meanwhile, on-farm income had a positive impact, which was calculated to have an elasticity of 0.110.

*Expenditure Function in Kg. PTBB and Kg. HC*

In the earlier estimates, location was the most important factor in determining expenditure patterns in the two villages, and hence, it is necessary to ascertain the determinants separately for each village. The actual model used is as follows:

$$Y = a + b_1 \cdot X_1 + b_2 \cdot X_2 + b_3 \cdot X_3 + b_4 \cdot X_4$$

Where,

Y is the natural log of total household expenditure per month, measured in ringgit,

$X_1$ is the natural log of on-farm income, measured in ringgit,

$X_2$ is the natural log of off-farm income, measured in ringgit,

$X_3$ is the natural log of household heads' age, measured in years, and

$X_4$ is a dummy variable of the remittances: 0 being for remittances and 1 for no remittances.

In Kg. HC, the regression coefficients for the two variables are statistically significant. The $R^2$ indicated that 61.0% of the variation in household expenditure was explained by the variables of remittances and off-farm

income as shown in Table 9. Both were the largest and second largest dependent variables, respectively, and were therefore identified as the most effective coefficients. In cases where the villagers did not receive any remittances, the household incomes were relatively higher than for those which received remittances from children living outside Kg. HC. The dummy variable of remittances explained the farmer's economic condition where households which did not receive any remittances spent more than the households which did receive remittances. This is because in the case of households that had enough income it was not necessary to receive remittances. Due to limited on-farm income, which mostly consisted of rental fees on the land from LM, off-farm income was the main source

of income in Kg. HC. Among households with lower income levels, remittances from children usually living outside Kg. HC was an important life-line. Where household incomes were severely limited, off-farm income directly corresponded with household expenditure.

On the other hand, the model in Kg. PTBB had weak explanatory power as it only had an $R^2$ value of 0.263. The regression coefficients for the two variables were barely significant for on-farm income and the number of household members as they were only significant at the 10% level. As the levels of household income were generally high in Kg. PTBB, the model showed that income did not have a direct impact on household expenditure. On-farm income and the number of family members

TABLE 8
Determinants of Household Expenditure in the Two Villages

|  | Two villages | | |
|---|---|---|---|
|  | Regression Coefficient | | T-value |
| A | 6.713 | *** | 4.384 |
| On-farm income | 0.110 | ** | 2.368 |
| Off-farm income | 0.197 | *** | 4.045 |
| Remittance (dummy: remittance=0, none=1) | 0.343 | ** | 2.213 |
| No. of household members (persons) | 0.302 | ** | 2.207 |
| Location (dummy: Kg.PTBB=0, Kg.HC=1) | 1.027 | *** | 5.577 |
| R | 0.696 | | |
| F value | 11.403 | | |
| N | 80 | | |

Source: Own survey - 2008-2010.
Note: ***significant at the 1% probability level.
  ** significant at the 5% probability level
  * significant at the 10%probability level
: Planted area in Kg. PTBB, Rented out in Kg. HC

barely influenced household expenditure. This is because on-farm income was one of the main income sources among household heads handling household expenditure. Further, the number of household members was directly related to the amount of household expenditure and number of employed workers among family members in the off-farm sector.

These models illustrated that each village had different behavioural patterns of household expenditure. It is interesting to note that different factors had an impact on household expenditure in Kg. HC and Kg. PTBB. In Kg. HC, the off-farm income and remittances corresponded with household expenditure. On the other hand, the model measuring Kg. PTBB did not have much explanatory power with only on-farm income and the number of family members having a slight amount of influence on expenditure.

Referring to existing income differences between each of the households, Kg. PTBB households had comparatively higher incomes compared to Kg. HC households. Expenditure behaviour at the household level indicated a characteristic contrast, which was that income of high-income households had a weaker relationship with the expenditure, while income of the low-income households had a stronger corresponding relationship with the expenditure

## CONCLUSION

This study specifically focused on household expenditure, concentrating on the input and outflow parts of the household economy in two villages. We clarified the patterns and determinants of the household economy in terms of the characteristics of farm households. We captured the expenses for basic subsistence, which household heads

TABLE 9
Determinants of Household Expenditure in kg. PTBB, Penang and Kg. HC, Kelantan

|  | Kg. PTBB, Penang | | | Kg. HC, Kelantan | | |
|---|---|---|---|---|---|---|
|  | Regression Coefficient | | T-value | Regression Coefficient | | T-value |
| A | 5.074 | *** | 7.446 | 4.438 | *** | 8.229 |
| On-farm income | 0.121 | * | 1.919 | 0.111 | | 1.665 |
| Off-farm income | 0.066 | | 0.823 | 0.273 | *** | 4.352 |
| No. of household member (persons) | 0.391 | * | 1.845 | 0.277 | | 1.504 |
| Remittance (dummy: remittance=0, none=1) | 0.138 | | 0.682 | 0.729 | *** | 3.618 |
| $R^2$ | 0.263 | | | 0.610 | | |
| F value | 3.294 | | | 12.891 | | |
| N | 42 | | | 38 | | |

Source: Own survey 2008-2010.

Note: ***significant at the 1% probability level.

** significant at the 5% probability level

* significant at the 10% probability level

paid mostly from their own earnings and remittances from children.

We identified actual expenses and detailed consumption items for basic subsistence at the household level in the two villages we studied. We found the determinant factors in household expenditure to be as follows: off-farm income, remittances, the number of household members and location. In particular, we identified that regional differences characterised the expenditure patterns in the expenditure function in the two villages. Among the determinants, the age of the household head and on-farm income in Kg. PTBB, and off-farm income and remittances in Kg. HC were especially influential on various expense items.

In terms of household income, it was clear that off-farm income had a large influence on household expenditure in Kg. HC, just as on-farm income had in Kg. PTBB. In the case of Kg. PTBB, income from the off-farm sector formed a large percentage of the household income. Generally, the rice farmers handled their family finances as the head of the household with their own income representing the main source of the household income. This is why on-farm income was still predominant in determining household expenditure in Kg. PTBB. On the other hand, in the case of Kg. HC, the residents had no other choice but to secure revenue by earning off-farm income and from remittances due to severely limited on-farm income. Thus, in Kg. HC off-farm income and remittances determined household expenditure rather than on-farm income. The results indicate a contrast in

expenditure behaviour at the household level between the two villages, where Kg. HC as the lower-income group had a strong tie with household expenditure while Kg. PTBB as the higher-income group had a weaker tie to its expenditure.

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# Water Service Valuation in Tidal Lowland Agriculture

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## ABSTRACT

Water service is a key factor in tidal lowland agriculture where water supply fluctuates following the tidal cycle. Under controlled situations, water can be properly supplied to farmland based on crop water requirements through proper operation and maintenance of the tidal irrigation system. This study aimed at estimating the value of water service in order to support the implementation of a water service fee. The benefit from water service is compared to a water service fee estimated from the cost of water distribution. To achieve the objective, the study employed production function estimation with rice as the main crop. Data were collected through a field survey on randomly selected farmers at Telang Delta, the rice production centre for tidal lowlands of South Sumatra, Indonesia. The result indicates that the value of water service in rice production is higher than any estimates of a water service fee. Proven to be a significant determinant of rice production, it has been suggested that water service should obtain financial support from farmers who benefited from available water service.

*Keywords:* Water service, valuation, tidal lowland

## INTRODUCTION

Water in tidal lowlands is "plenty, but scarce". It is plenty since by nature lowlands are frequently flooded according to the hydro-topographic characteristics of lowlands (Schultz, 2007). Nevertheless, it is also considered scarce as a result of nature's

tidal cycles by which under uncontrolled systems water levels cannot be maintained properly in accordance with the need of a particular crop.

Water scarcity in tidal lowlands is particularly experienced by farmers at the beginning of the second crop (March) when rainfall decreases and tidal water cannot be adequately retained under an open system. Thus water scarcity increases as the plant grows (Zilberman & Lipper, 1999). Crop water needs can only be fulfilled when water structures (gates and canals) can retain tidal water as much and as long as possible (Ali *et al*., 2002). This is possible only if water service functions well.

Water service is categorised as a non-market good (Tietenberg, 2006). It increases the value of water as a resource to the extent that water becomes available to fulfil the amount needed to water the crop. In order to function properly, water service requires not only good water structures (canals and gates), but also proper operation and maintenance and a well managed institution. Therefore, besides providing benefits, water service incurs cost to carry out these tasks that should be borne by the users benefitting from it. However, benefit from a water service is expected to be greater than the cost that water users are willing to pay. For this reason, water service, as an environmental good, needs to be valued to estimate its benefit.

This research aimed to value water service in tidal lowlands, which are mainly based on agriculture with the intent to benefit crop production. The value of water service can further be used as a measure in the assessment of a water service fee.

Water service is valued for several different purposes. At least three were mentioned in water management literature, including water distribution improvement and pollution control (Cornish *et al*., 2004), cost recovery (Molle *et al*., 2008; Cornish *et al*., 2004) and water use optimisation and efficiency (Singh, 2007; Bar-Shira *et al*., 2006; Gonzalez-Alvarez *et al*., 2006).

Several methods have been used to value water service according to the above objectives. These methods vary from fixed and variable cost estimation (Gonzalez-Alvarez *et al*., 2006; Tarimo *et al*.,1998), marginal (social) cost of water delivery (Bar-Shira *et al*., 2006), environmental cost internalisation (Esteban *et al*., 2008) and block tariff application to water market instrumentation (Goetza *et al*., 2008), linear programme modeling (Latinopoulos, 2005), price elasticity prediction (Schoengold *et al*., 2006) and production function (Pagiola *et al*., 2004; Suthirathai, 1997). The choice of proper methods depends on the objectives of water service valuation.

In crop production, water service can be considered as an input since it contributes to providing water at a controllable level according to crop water requirements, without which optimum conditions cannot be achieved. Therefore, the value of water service in crop production can be reliably assessed using production function. Production function has been used in resource valuation through measurement of its impact on produced goods. In the

previous work of Suthirathai (1997), for example, the value of mangrove as a resource was successfully revealed through fish production function estimation. The benefit of Haiti's forest remnants protection has been estimated using irrigated agricultural production function (World Bank, 1996). Later, the production function was adopted as one of the main economic valuation techniques (Pagiola *et al.*, 2004). It is termed as "change in productivity" and categorised as one of the preference methods.

The value of water service as a resource as well as an input can be observed through the production function of a particular crop. Its value can be estimated as the change in crop productivity that occurs due to the existence of water service in the crop production process.

## METHODS

As a non-market good water service can be reliably assessed using non-market valuation techniques (Tietenberg, 2006). In this study, production function as a non-market valuation technique estimated the economic value of water service in tidal lowland rice production. Water service was considered as an input that directly affected rice production as other conventional inputs did.

Production function was applied through three consecutive steps. The first step was to specify the production function for tidal lowland rice. This was a functional relationship between farm inputs (seed, chemicals, fertilizers, labour

and water service) and output (rice). The Cobb-Douglas production function stated below was used to specify this functional relationship.

$$\ln Y_i = \beta_0 + \beta_1 \ln SEED$$
$$+ \beta_2 \ln CHEM + \beta_3 \ln FERT$$
$$+ \beta_4 \ln LABOR + \beta_5 D_{WS} + \varepsilon_i$$
$$[1]$$

where
$Y_i$ = total rice production in tonnes
$SEED$ = seed used in kg
$CHEM$ = chemical used in Rupiah
$FERT$ = fertilisers used in Rupiah
$LABOR$ = labour used in man days
$D_{ws}$ = dummy variable water service with
    0 = without water service and
    1 = with water service

The second step was to estimate the change in output (rice production) for every unit change in the input using the production function specified in the first step. Regression was used to estimate the magnitude and direction of these changes. Both individual and overall effects of the inputs on the output were assessed.

The third step was to calculate the value of water service in rice production. The value of water service was the difference in rice production between rice produced with water service and without water service. Since water service was a dummy variable (1 = with water service; 0 = without), rice production with and without water service could be estimated as follows:

The production function for farm without water service:

$$E\left(\ln Y_i \middle| D_{WS} = 0\right) = \beta_0 \qquad [2]$$

The production function for farm with water service:

$$E\left(\ln Y_i \middle| D_{WS} = 1\right) = \beta_0 + \beta_1 \qquad [3]$$

The intercept $\beta_0$ was the mean log production and the slope coefficient ($\beta_1$) was the difference in mean log production of farm with water service and without.

This research was carried out in the deltaic area of Telang I, South Sumatra, Indonesia. This area was selected since it was among the most productive reclaimed tidal lowland areas supported by a relatively better water management system. Some parts of the area have been equipped with water management structures at secondary and tertiary blocks. Water users associations (WUAs) have been established to manage the operation and maintenance of the system. Similarly, on-farm water management has been applied by individual farmers. Cropping patterns that determine the operation of the system have been planned and implemented by farmer groups. However, a water service fee (WSF) has not been implemented yet due to the absence of objective measures of WSF.

Data were collected through a sample survey due to the fact that tidal lowland areas reclaimed for agriculture was quite large and the farmers shared rather similar characteristics in terms of land ownership and cropping patterns. A stratified random sample of 500 farmers was drawn from the research population in the designated secondary blocks, covering farmers whose farmland had water service and whose farmland did not have water service.

## RESULTS AND DISCUSSION

### Production Costs, Production and Productivity of Rice

As a primary production process, rice production employs several primary inputs such as seed, fertilizers of several kinds, some types of pesticide, labour and some sorts of equipment. Three kinds of fertilizer were used for rice cultivation, namely nitrogen, phosphorous and potassium fertilizers. The uses of the first two kinds were recommended, whereas the third was used according to particular need. Pesticide consisted of three types, namely herbicides, insecticides and fungicides. The use of these inputs followed the type of crop and the area cultivated. The costs of these inputs are presented in Table 1. These costs were estimated based on per hectare rice cultivation in the first planting season. The cost for each input was derived from the whole research sample based on its average value (mean).

Production is the output of farming activities as the result of employing inputs. The amount of production depends on the land under cultivation such that it varies among farmers with different land holdings. In order to measure a standard output of farming activities, a measure of productivity is employed. Besides its independency on the use of inputs, measure of productivity

uses cultivation acreage as a reference. Therefore, productivity refers to the output per unit land cultivated.

Analysis of the data on rice production among respondents of this research indicated that rice production varied from as low as 1.5 tonnes to as high as 79.2 tonnes on-farm dried paddy due to the variation in area cultivated from as low as 0.25 hectare to as high as 12 hectares. The average production was 9.75 tonnes (standard deviation = 5.70 tonnes) and the average cultivation area was 1.84 hectares (standard deviation = 0.99 hectare). Analysis of rice productivity indicated that among all of the respondents, the average productivity was 5.35 tonnes per hectare on-farm dried paddy (standard deviation = 0.88 tonne).

## The Value of Water Service in Rice Cultivation

Valuation of water service in rice cultivation was carried out using the production function in which water service was one of the inputs. Rice production is a function of a set of input factors such as seed, chemicals, fertilizers and labour for various activities within the whole process of rice cultivation starting from land preparation, planting, fertilizer application, pests and disease control until harvesting. In order to estimate the effect of these variables, a multiple regression analysis was performed. Water service is one of the variables entered into the model to measure its contribution on rice production to imply the value of water service.

TABLE 1
Costs of Rice Cultivation Per Hectare in the Study Area

| Inputs | Types of Input | Unit | Volume | Unit Cost (Rp) | Total Cost (Rp) |
|---|---|---|---|---|---|
| Seed | Rice seed | Kg | 63.5 | 6,000 | 381,000 |
| Pesticides | Herbicides[1] | n.a | n.a | n.a | 344,770 |
| | Insecticides[1] | n.a | n.a | n.a | 72,480 |
| | Fungicides[1] | n.a | n.a | n.a | 107,000 |
| Fertilizers | Nitrogen | Kg | 220 | 1,300 | 286,000 |
| | Phosphorus | Kg | 121 | 2,300 | 278,300 |
| | Potassium[2] | Kg | n.a | n.a | 13,910 |
| Labor | Land preparation | Man day | 10 | 50,000 | 500,000 |
| | Planting | Man day | 4.5 | 50,000 | 225,000 |
| | Fertilising | Man day | 2 | 50,000 | 100,000 |
| | Controlling | Man day | 2 | 50,000 | 100,000 |
| | Harvesting[3] | Man day | 51 | 50,000 | 2,550,000 |
| Total | | | | | 4,958,460 |

Notes:
[1]Various types with various unit (L, ml, kg, gram, etc) such that only total cost is applied.
[2]Only few samples used this type of fertiliser such that average volume was not relevant.
[3]Consists of harvesting and threshing; harvesting cost is in shared product with the ratio 1:7 (12.5% for labour, 87.5% for owner). Threshing cost is Rp50 per kg output. All of these expenses are made equivalent to man day.)
n. a: Not applicable

Multiple regression analysis was conducted using the Cobb-Douglas production function and the results are presented in Table 2. The R Square value indicated that 93.6% of variation in rice production was explained by the independent variables. The analysis of variance (F-test) proved that the overall model was statistically significant at 95% confidence interval. Analysis on the effect of each of the independent variable was performed using the t-test. Among all of the independent variables considered to have an effect on rice production, all but seed had a significant effect on the dependent variable.

The coefficient of thedummy variable water service was positive and significant. Considering '0' for 'without water service' and '1' for 'with water service', the positive value of this coefficient could be interpreted as that rice production of the farmland with water service was 4% higher than that without water service (exponentiated 0,040 is 1.0408, subtracting 1 from this gives 0.04, multiplying this by 100 gives 4%). Taking

the mean rice productivity of the farmland without water service as the basis (5.3180 tonnes per hectare), this productivity is expected to increase to 5.5350 tonnes per hectare when the respondents employ water service on their farmland.

Taking productivity as the basis for calculation, the change from a farm without water service to one with water service in rice production will increase the productivity by 0.217 tonne per hectare (the difference between productivity with water service as opposed to that without water service). In monetary terms, this increase in productivity was equal to Rp455,700 per hectare, assuming the price of on-farm dried paddy at local market was Rp2,100 per kg. This amount can be considered as the average value of water service in rice cultivation. In other words, this is the benefit of water service in rice production.

In comparison, the 'cost' of water service (as a proxy of a water service fee) estimated using the cost of water distribution varied from as low as Rp315,000 per hectare

TABLE 2
Regression Coefficients and the Value of t-test Statistics

| Variables | Coefficients | Std. Error | $t$ | Sig. |
|---|---|---|---|---|
| (Constant) | -3.910 | .212 | -18.449 | .000 |
| Seed | .023 | .026 | .901 | .368 |
| Chemicals | .034 | .018 | 1.828 | .068* |
| Fertiliser | .128 | .026 | 5.030 | .000*** |
| Labour | .782 | .028 | 28.374 | .000*** |
| Water Service (Dummy) | .040 | .013 | 3.026 | .003*** |

Note:
Dependent variable is total rice production
All variables are in logarithm except for water service
R Square = .936; F-test = 57.083; Sig. of F-test = .000
*Significant at 10%; **Significant at 5%;  ***Significant at 1%

TABLE 3
Costs of Water Service (Per Year) and WSF Estimates (Per ha Per Year)

| Type of Cost | Cost Components | Block Area Applies | | Total (Rp) | WSF (Rp/ha/year) |
| | | Tertiary | Secondary | | |
| --- | --- | --- | --- | --- | --- |
| Supply Cost | OM cost | 1,600,000 | | 80,580,000 (per 256 ha) | $WSF_1$ = 315,000 |
| | Capital depreciation and replacement cost | 3,180,000 | | | |
| | WUA management cost | | 4,100,000 | | |
| Economic Cost | Opportunity cost | 31,500 (per ha) | | 88,644,000 (per 256 ha) | $WSF_2$ = 346,500 |
| Full Cost | Avoidance cost of not consuming contaminated canal water | 45,000 (per ha) | | 100,164,000 (per 256 ha) | $WSF_3$ = 391,500 |

per year (the supply cost) to Rp346,500 per hectare per year (the economic cost) and to Rp391,500 per hectare per year (the full cost) (Table 3). In comparison, the 'benefit' of water service as an input in rice production (as proxy of water service fee) is Rp455,700 per hectare per year (assuming only one crop per year). Therefore, it is valid to say that the 'benefit' of water service was sufficient enough to cover its highest 'cost' (the full cost).

**CONCLUSION**

Water service is an environmental good. It contributes to crop production through fulfilling crop water requirements that are needed for optimum crop yield. Therefore, its value can be measured through the production function estimation.

In agricultural tidal lowlands where water management is a key factor, water service has been proven to be a statistically significant variable in rice production. The presence of water service in rice cultivation has significantly increased rice production. This increase is considered to be the financial value of water service upon which a water service fee can be reliably imposed.

The financial value of water service is higher than any estimates of a water service fee. Therefore, it can be used to cover the highest cost (the full cost) of agricultural water management in tidal lowlands. With this available fund, operation and maintenance of tidal irrigation system can be achieved and current agricultural water management in tidal lowlands can be sustained.

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# Structure, Conduct and Performance of the Malaysian Meat and Meat Preparation Industry

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## ABSTRACT

Higher concentration tends to be inefficient in the allocation of resources especially in price setting and probable collusion among larger firms. One of the most influential approaches among various theories of industrial organisation is the Structure-Conduct-Performance (S-C-P) model, which highlights the competitive conditions of an industry by examining the structure of the industry in relation to behaviour (conduct) and performance of companies. Thus, the objective of the study is to investigate the level of concentration and industry performance of selected meat and meat preparation manufacturing sub-sectors in Malaysia and to examine the relationship between market structure, conduct and performance of the industry. Secondary data were collected from selected meat manufacturing firms registered under the CCM. Results indicate that the meat processing industry tended to have a moderate concentration with monopolistic market structure prevailing throughout the study period, where more than 60% of the industry market share is being controlled by four firms. Results from the TSLS regression technique indicate that market structure provides a weak effect on advertising. This indicates that the lower the concentration ratio of the industry, the higher the expenditure spent on advertising in order to attract customers to buy products. Consequently, increases in advertising expenses have a positive effect on a firm's profit. Thus, there is a direct relationship between market structure, conduct and performance with positive and significant feedback effect among the variables; however, the magnitude of the feedback varies.

## INTRODUCTION

Malaysia has a growing and impressive food manufacturing industry that produces for both the domestic and export markets. This sector has been growing at an annual rate of 6.2% since 1995, making it one of the fastest growing sectors in the resource-based manufacturing industry. The output value of the food manufacturing industry expanded from RM10.8 billion in 1983 to RM47.4 billion in 2000 and increased to RM192 billion in 2007 (DOS, 2009). As part of the food manufacturing industry, the meat processing industry also plays an important role in contributing to the total food output in Malaysia. Even though the contribution to total output is quite small, the demand of food products especially meat and meat products, has shown an increasing trend over the years. This can be seen clearly from Table 1, with increasing numbers in the meat processing industry in Malaysia. Changes in lifestyle, busy routines, double income families and prepared meals are some of the factors that are normally cited to show the increasing demand of meat and meat products beside their availability and convenience for consumption.

Table 1 shows a number of establishments in the Malaysian processed meat industry. The number of firms that involved in this industry fluctuated during the study period. The number increased from 49 in 1996 to 53 in 1999 and it decreased to 40 in 2001. However, the numbers have continuously increased until 2007 with 55 establishments.

TABLE 1
Number of Establishments in the Malaysian Meat Processing Industry, 1996-2007

| Year | Number of Establishments |
|------|--------------------------|
| 1996 | 49 |
| 1997 | 53 |
| 1999 | 53 |
| 2000 | 40 |
| 2001 | 40 |
| 2002 | 47 |
| 2003 | 42 |
| 2004 | 43 |
| 2006 | 52 |
| 2007 | 55 |
| 2008 | 55 |
| 2009 | 55 |

Source: Census of Manufacturing, Department of Statistics (DOS), 2010

Similarly, the export performance of manufactured meat is quite encouraging as the total export of the industry has been increasing each year. The total export earnings increased from RM27 million in 1998 to RM68 million in 2003. This figure increased further to RM77 million in 2007, more than double its value in 1998 as shown in Table 2. From Table 2, one can see that Malaysia has had a positive balance of trade in processed meat products since 2005. This could be due to the contribution of the poultry sub-sector, which has been aggressively developing new product lines and exploring new export markets.

Although the contribution of the meat and meat processing industry to the whole economy is encouraging, the higher concentration tends to be inefficient in the allocation of resources especially in price setting and probable collusion among the larger firms. It is a well known fact that there are few major players in the meat and meat processing industry in Malaysia. There has not been much research into this phenomenon, leaving room for some fact-finding missions and further studies. One of the most influential approaches among various theories of industrial organisation is the Structure-Conduct-Performance (SCP) model, which highlights the competitive conditions in an industry by examining the structure of the industry related to the behaviour and performance of firms. Thus, the objective of the study was to investigate the level of concentration and industry performance of selected meat and meat preparation manufacturing sub-sectors in Malaysia and to examine the relationship between market structure, conduct and performance in the meat manufacturing industry.

**METHODOLOGY**

Most of the manufacturers in the meat processing industry are under the Small Medium Enterprise (SMEs) category while some can be categorised under large firms as shown in Table 3. According to the National SMEs Development Council, firms with an annual sales turnover of between RM250,000 and less than RM10 million can be categorised under SMEs. The gap between large and small firms in the Malaysian meat manufacturing industry is wide in terms of numbers and sale volumes and values. Thus, few large and scale efficient firms tend to dominate the meat processed industry as they have a higher market share over the smaller firms.

TABLE 2
The Value of Import and Export of Processed Meat Products in Malaysia, 1990-2009

| Year | Processed Meat Exports | Processed Meat Imports |
|---|---|---|
| | RM ('000) | RM ('000) |
| 1998 | 26,986 | 33,168 |
| 2000 | 34,820 | 47,335 |
| 2003 | 136 | 799 |
| 2004 | 126 | 964 |
| 2005 | 85 | 1049 |
| 2006 | 92 | 991 |
| 2007 | 112 | 1197 |
| 2008 | 211 | 1372 |
| 2009 | 239 | 1514 |

Source: Census of Manufacturing DOS, 2010

TABLE 3
Total Sales for Meat Processed Industry in
Malaysia, 1998-2007

| Year | Total Sales |
|------|-------------|
| 1998 | 1,032,457,256 |
| 1999 | 1,136,578,913 |
| 2000 | 1,147,422,533 |
| 2001 | 1,268,610,845 |
| 2002 | 1,487,575,222 |
| 2003 | 1,475,951,131 |
| 2004 | 1,554,209,271 |
| 2005 | 1,669,470,758 |
| 2006 | 1,762,704,586 |
| 2007 | 1,360,299,899 |

Source: Companies Commission of Malaysia
(CCM), 2009

The conceptual framework of the paper is based on the Structure-Conduct-Performance (S-C-P) paradigm by Bain (1956) and Mason (1939). Fig.1 shows a theoretical framework on the relationship between market structure, conduct and performance. The analysis of S-C-P starts with three aspects, market structure, market conducts and market performance, which reciprocally affect each other (Xinhong *et al*., 2003).

As indicated by Xinhong *et al*. (2003), in the short term, market conduct is the direct cause that decides market performance while market structure is the basic factor that restricts market conduct. However, in the long term, market structure changes as a result of change of market conduct and performance, and sometimes, change of market performance may directly make market structure change. Basic supply and demand determine market structure, which directly affect market conduct and performance.

*Structure-Conduct-Performance Measurement*

The Structure-Conduct-Performance (S-C-P) paradigm was used in this study. Data were collected from the Company Commission of Malaysia (SSM). Thirty (30) meat processing companies were selected based on their profitability and performance from 1998/99 to 2008/09. Structure and conduct related to how the market functioned within the limits of its basic condition, whereas performance related to how well the market functioned (Mason, 1939; Bain, 1956). The SCP paradigm advocated active government involvement in industry to ensure that competition prevails. Therefore, government policies have direct influence on all three SCP elements.
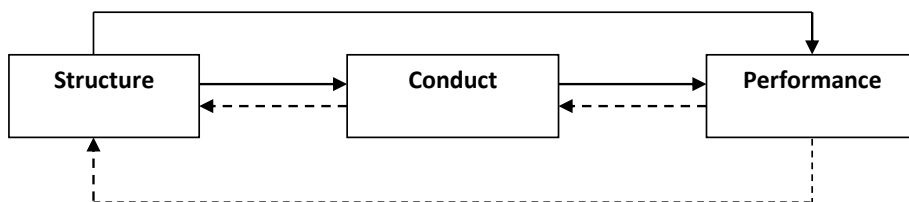


(Source:  Adopted from Xinhong *et al*., 2003)

Fig.1: Relationship between market structure, conduct and performance

Market structure is a form and character of market relation among firms in industry. It includes relation and character in quantity, scale, share and benefit allocation among buyers, sellers, buyers and sellers and existing buyers and sellers and those who may be planning to go into the market to determine competition form. It was measured using concentration ratio (CR4) and the Herfindhl Hirschman Index (HHI).

The concentration ratio for the k largest firms in an industry was calculated by adding the market shares of these k firms. This can be represented as $CR_k = S_1 + S_2 + S_3 + S_4 + S_5 + ... + S_k$, where $S_i$ is the market share of the $i$th firm. A very commonly used concentration ratio is the four-firm concentration ratio or CR4. The CR4 is the total market share held by the top four firms in an industry and it is calculated as $CR4 = S_1 + S_2 + S_3 + S_4$. The percentage of CR4 was measured in four classifications. There are differences with Bain's classification, which is indicated by using percentile, but it is still based on CR4 classification as shown in Table 4. It classifies the market structure on the basis of volume of industry and on the basis of firms' share in the total industry. Accordingly, control of 75-100% of the business of a product by a firm was considered as a highly concentrated oligopoly, while 50-75% control was recorded as a moderately concentrated oligopoly, 25-50% control was called a slightly concentrated oligopoly and control of less than 25% of the business was referred as to as being atomistically competitive.

Market share is the share of firm i in the time period t. The proportion of the market that the firm is able to capture will indicate the firm's performance relative to other competitors. This proportion is referred to as the firm's market share. Market share is often associated with profitability and thus,

TABLE 4
Classifying Industries with the CR4 in Percentage

| CR4 | Interpretation of Market Structure | Bain's Classification |
|---|---|---|
| CR4 = 0 | **Perfect Competition:** Competitive system in which a large number of firms produce a homogenous product for a large number of buyers | 75-5100: highly concentrated |
| 0 < CR4 < 60 | **Monopolistic Competition:** Many sellers each of whom produces similar but slightly differentiated products; each producer can set its price and quantity without affecting the marketplace as a whole | 50-575: moderately concentrated |
| 60 < = CR4 | **Oligopoly:** A market condition in which sellers are so few that the actions of any one of them will materially affect price and have a measurable impact on competitors | 25-550: slightly concentrated |
| 90 < CR4 < 100 | **Monopoly:** A situation in which a single company or group owns all or nearly all of the market for a given type of product or service, often leading to high prices and inferior products | 0-525: atomistic |

Source: A Guide for Industry Study and the Analysis of Firms and Competitive Strategy, 2001.

many firms seek to increase their sales relative to those of competitors. Market share is estimated by dividing an individual firm's revenue with the total industry revenue (Edwards, 2006). An individual firm's market share is calculated as:

Market Share
= Individual Firm Revenue /
Total Industry Revenue

As mentioned earlier, another index that can be used to measure market concentration is the Herfindahl Hirschman Index (HHI). The HHI is a more comprehensive and revealing measure of industry concentration. It is able to show differences in concentration between industries even when the CR4 measures (or CR8 measures) are identical. The HHI is calculated by summing the squares of the individual market shares of all the firms in an industry. This is represented as $HHI = S_1^2 + S_2^2 + S_3^2 + S_4^2 + S_5^2 + ... +S_n^2$, where $S_i$ is the market share of the $i^{th}$ firm. According to the US Department of Justice (USDOJ, 1992), a market with an HHI less than 1,000 is considered unconcentrated, between 1,000 and 1,800 moderately concentrated, and over 1,800 highly concentrated as shown in Table 5.

Market conduct, on the other hand, is the actual behaviour of buyers and sellers in a market. It includes pricing policy, activities to raise entry barriers and rent seeking activities to establish regulation to limit competition. Advertising intensity (ADV) can be used as a proxy to market conduct (Dorfman & Steiner, 1954; Needham, 1978). Markets do not advertise equally, either absolutely or relatively. To compete in some industries requires substantial investments in advertising, while success in other industries requires hardly any media advertising (Willis & Rogers, 1998). Intensive advertising is associated with successful product differentiation and it will erect a barrier to entry that should be conductive to greater concentration. According to Resende (2006), in the case of a persuasive role of advertising, barriers to entry play a central role in enabling market power as they are associated with brand loyalty. Advertising creates a stronger preference for the established brand and the scope for stronger market dominance (and concentration) and therefore for the exercise of market power. Advertising affects the structural and performance characteristics of an industry, and it is likely to affect the

TABLE 5
Classifying Industries with the HHI

| HHI | Interpretation of Market Structure |
|---|---|
| HHI < 1000 | Monopolistic Competition = Unconcentrated |
| 1000 < HHI < 1800 | Oligopoly = Moderately Concentrated |
| 1800 < HHI | Monopoly = Highly Concentrated |

Source: A Guide for Industry Study and the Analysis of Firms and Competitive Strategy, 2001.

prices that consumers pay for products that are advertised. Advertising intensity is measured by the ratio of advertising expenditures to sales. Based on Dorfman and Steiner's (1954) conditions,

$$\text{Advertising / Sales Ratio (ADV)} = \frac{A}{S}$$

[1]

where:
S = (sale) and
A= (advertising expenditure)

Firms with a low advertising to sales ratio tend to have little market power and low price-cost margin. *Ceteris paribus*, oligopoly has larger advertising-sales ratios compared to monopolists and competitive firms. Meanwhile, a monopolist's advertising is greater than that of firms in a perfectly competitive level of advertising.

Performance measure is based on outcomes resulting from competition among firms, within an industry, the market and the entire economy. It shows how a firm or a system is performing and identifies the trends of performance over time. In an industry, performance is directly impacted by the structure and conducts of the industry and can ultimately be used as a measure of the success of a firm. Performance is therefore a function of a firm's conduct and the industry structure (Porter, 1980). There are two general indicators in measuring performance in terms of profit rate, which are the rate of return on assets after tax and the rate of return on shareholders' equity after tax. Another indicator in terms of sales

is the rate of return on sales after tax. All these three measurements are considered as part of the profitability ratio.

The rate of return on assets after tax (ROA) measures the overall ability of the firm to utilise the assets in which it has invested to earn a profit.

$$\text{Return on Assets (ROA)} = \frac{P - T + I}{A}$$

[2]

where:
P = net profits
T = tax on profits
I = interest payment to debt holders
A= total assets

Rate of return on shareholders' equity after tax (ROE) is used to measure profitability. Investors use ROE, a measure of profitability, in comparative analysis to help investors make informed investment decisions (Acheampong, 2000). The rate used in this study can be written as:

$$\text{Return on Shareholders' Equity (ROE)} = \frac{P - T}{E}$$

[3]

where:
P = net profits
T = tax on profits
E = stockholders' equity

Return on Sales after Tax (ROS) is a robust measure of profitability that correlates positively and strongly with other widely-used profitability measures, such as return on assets (Cool & Dierickx, 1993; Goll &

Rasheed, 1997). The rate of return on sales (ROS) is expressed as follows:

Return on Sales after Tax (ROS) $= \dfrac{P - T}{S}$ [4]

where:
P = net profits
T = tax on profits
S = total sales

*Regression Model*

The TSLS (Two Stage Least Square) regression technique was used to estimate the parameters and linkages of the concentration (structure), advertising (conduct) and profitability (performance) variables as the elements in the S-C-P model.

Three equations in this study were identified using regression analysis by taking market structure, market conduct and market performance in a function of the other two variables. Three variables of considerable interest within the traditional S-C-P paradigm (concentration, advertising and profits) were more properly considered as jointly determined within a system of equation (Hay & Morris, 1991).

The general three equation S-C-P model is as follows:

STRUCTURE
  = *f* (CONDUCT, PERFORMANCE)
CONDUCT
  = *f* (STRUCTURE, PERFORMANCE)
PERFORMANCE
  = *f* (STRUCTURE, CONDUCT)

Evaluation of the state of competition requires an understanding of how the relevant markets function in practice. Market structure determines performance. The market structure which was measured by concentration ratio is endogenously determined and conditions the conduct that is measured by advertising expense of the firms, and that in turn determines market performance (profitability).

Concentration ratio of the four largest firms (CR4) measured based on the firms' total sales was used as the dependent variable in the structure equation. The dependent variables for the conduct and performance equations were the advertising to sale ratio (ADV) and profitability (ROE) of the four largest firms, respectively. The market structure (concentration) equation below was assumed to be a function of lagged advertising ($ADV_{t-i}$), lagged capital intensity ($CAP_{t-i}$) and lagged profits ($ROE_{t-i}$). The market structure (concentration) equation can be presented as follows:

$$CR4 = \alpha_0 + \alpha_1 ADV_{t-i} + \alpha_2 CAP_{t-i} + \alpha_3 ROE_{t-i} + \varepsilon \quad [5]$$

The lag structure was used to identify more precisely the relationship between the three variables. It enabled those variables to enter as exogenous rather than endogenous variables. It was generally hypothesised that past values would increase the current concentration level. Capital intensity (CAP) was lagged as it could act as a potential barrier to entry. The larger the capital requirement to enter an industry and more

differentiated the product, the higher the level of concentration (Kong, 2004). According to Kambhampati (1996), concentration may be affected by lagged value of advertising and profits, but in principle the direction of the effects is uncertain and cannot be predicted.

Market conduct is the actual behaviour of buyers and sellers in an industry. It includes pricing policy and activities to raise entry barriers to establish regulation to limit competition. Below is an equation of market conduct:

$$ADV = \beta_0 + \beta_1 ROE_t + \beta_2 GRO_{t-1} + \beta_3 CR4_t + \mu \qquad [6]$$

Market conduct is being measured by advertising and it is affected by industry structure. According to the S-C-P paradigm, concentration and profit should be positive and significant in the conduct equation. Firms should advertise more if the concentration and profits are high. Growth of firms (GRO) was used as the demand for processed meat products. Kambhampati (1996) noted that lagged growth in sales should be negative. However, Delorme *et al*. (2002) argued that lagged growth should be positive, as there should be an increase in advertising to combat increased competition among the incumbents in the market to capture this increased demand. In this study, the advertising intensity for the four largest firms for ten years was used to run the regression analysis. The growth measurement was done using sales growth rate.

A high level of past profits is expected to attract new entrants into the industry and reduce concentration. Thus, market performance equation can be presented as:

$$ROE = \gamma_0 + \gamma_1 GRO_{t-1} + \gamma_2 CAP_t + \gamma_3 CR4_t + \gamma_4 ADV_t + \xi \qquad [7]$$

Profitability should be higher in an industry in which barriers to entry exist. The higher the entry barriers, the less established firms have to consider the response of potential entrants when setting profit margins. Profit should be positively related to the entry barriers as being measured by capital intensity (CAP). To account for this source of entry barriers, the advertising to sales ratio (ADV) is included in the profit equation, with the expectation that higher advertising intensity bring to higher profitability. Growth is expected to influence profitability positively since it reflects increase in demand or decrease in cost or both. Since capital will earn a normal profit under competition, ROS will be larger and more capital intensive in production techniques, even in the absence of barriers to entry. A study by Allen and Shaik (2005) revealed that the variable market share had a statistically significant impact on the net profit margin for the agricultural commodity carrier of the trucking industry in the United States. ROEs of the four largest firms for 10 years were used to run the regression analysis.

**RESULTS AND DISCUSSION**

Table 6 shows the concentration ratio of the four largest firms (CR4), the eight largest firms (CR8) and the Herfindahl Hirschman

Index (HHI) for the meat processing industry in Malaysia from 1998/99 to 2008/09.

CR4 shows that the four largest firms in the industry accounted for 73.36% of the total value of sales in 1998. It decreased over the years and declined to 63.43% in 2007. For CR8, total value of sales was about 93.01% in 1998 and it decreased to 83.61% during a study period. The decrease levels of concentration indicated decreased market power and increased market competitiveness of SMEs in the meat manufacturing industry. This could be due to more firms having entered and captured the market share, which led to the industry's concentration to decline. This is in accordance with Stepherd's (1997) findings that market power declined as CR4 decreased. In other words, on average, each top four firms had at least 68.82% of the total market share. The high percentage of CR4 indicated that the meat manufacturing industry was moderately concentrated in the late 90s and declined to 63.42% in 2007.

Table 6 also shows the Herfindahl Hirschman Index (HHI) of the meat manufacturing industry in Malaysia. The HHI indicated that the industry declined from being highly concentrated in the late 90s to moderately concentrated in the 2000s. This was consistent with the CR4 results. The results also suggested that the competition in the industry had gradually increased, causing market power to decrease.

Advertising is a form of product differentiation whereby firms communicate to consumers what goods and services they are selling. Advertising to sale ratio or 'advertising intensity' (ADV), has often been used as a proxy to examine market conduct and behaviour in the S-C-P function. Advertising affects the structural and performance characteristics of an industry, and it is likely to affect the prices that consumers pay for products that are being advertised.

Table 7 shows the advertising sales ratio (ADV) and the value of rate of return on asset after tax (ROA), rate of return on shareholder's equity after tax (ROE) and rate of return on sales after tax (ROS) of the four largest firms in the meat manufacturing industry. The industry advertising expenditure indicated a decreasing trend over the study period. The advertising

TABLE 6
Concentration Ratio in Terms of Cumulative Percentage of Market Share for Meat Processed Industry

| Year | CR4 | CR8 | HHI | Gini Coefficient |
|---|---|---|---|---|
| 1998 | 73.358 | 93.01 | 2134.79 | 0.598 |
| 2000 | 69.561 | 89.91 | 1696.08 | 0.591 |
| 2002 | 67.972 | 88.84 | 1599.38 | 0.587 |
| 2004 | 65.020 | 87.08 | 1533.03 | 0.58 |
| 2006 | 63.596 | 85.34 | 1349.59 | 0.546 |
| 2007 | 63.429 | 83.61 | 1294.20 | 0.545 |

Source: Calculated from CCM, Malaysia.

expenditure peaked in 1998 with ADV of about 2.676 and declined to 2.567 in 2007. With a higher ADV, the entrance barrier was also increased because advertising increases the costs of production, brand royalty and consumer demand over a longer term (Lipezynski & Wilson, 2001). Larger firms can apply advertising effectively because they are better known compared to smaller firms. In this situation, only small amounts of advertising are required to maintain the firms' market share and performance.

The performance indicators of ROA, ROE and ROS showed a decreasing trend over the study period. Even after the economic crisis of 1999 to 1998, firms in the industry did not manage to recover from the downturn by 2002. The reason was that a majority of the firms in the industry were small and medium enterprises (SMEs); therefore, they needed a longer time to regain their sales. Similar findings were also reported by Kong *et al*. (2004). Another reason could be that the numbers of firms that were involved in the industry increased from 49 in 1996 to 55 in 2007 (DOS, 2008), making the industry more competitive and causing profit earnings to decrease as newcomers captured the market share. The decreasing trend revealed the inability of the firms in the industry to utilise their assets, which were invested to earn profits (Lasher, 2000). Moreover, the rate of return on total investment for the industry was quite low as compared to ROE over the study period.

The relationship and the feedback effect between the structure, conduct and performance of the meat processing industry and concentration ratio of the four firms (CR4) can be seen in Table 8. The regression results of the TSLS of the SCP of the meat manufacturing industry showed that lagged capital intensity (CAP1) was positively related to CR4 but not significant, indicating a weak relationship with CR4. The results also showed that there was a strong relationship between market structure and market conduct and performance,

TABLE 7
Market Conduct and Performance of the Meat Processing Industry in Malaysia, 1998-2007

| Year | Advertising Intensity | ROA | ROE | ROS |
|------|----------------------|--------|--------|------|
| 1998 | 2.676 | 5.1240 | 15.746 | 3.62 |
| 1999 | 2.638 | 4.7789 | 15.746 | 3.18 |
| 2000 | 2.624 | 4.1767 | 14.867 | 2.51 |
| 2001 | 2.620 | 4.0729 | 14.387 | 2.32 |
| 2002 | 2.604 | 3.1492 | 14.346 | 1.77 |
| 2003 | 2.593 | 2.8114 | 13.877 | 1.38 |
| 2004 | 2.589 | 2.7211 | 12.947 | 1.35 |
| 2005 | 2.587 | 2.1165 | 12.466 | 0.73 |
| 2006 | 2.573 | 1.4430 | 11.868 | 0.69 |
| 2007 | 2.567 | 1.4223 | 10.584 | 0.55 |

which was significant at 0.01% and 0.05%, respectively. The positive sign indicated that concentration of the industry would increase if as proxy of conduct, lagged advertising (ADV1) and proxy of performance, profit (PFT1) increased. It suggested that effective past profit, capital and advertising could increase concentration of the four firms further in the sense that market share would increase. Thus could create barriers to entry in the industry.

Conduct equation (as proxy of Advertising Intensity [ADV]) showed a negative relationship with performance but was positive with market structure. Market structure was significant at

0.01%. It indicated that market structure had a strong feedback effect on market conduct, where the firms spent more on advertising if the market concentration of the industry increased. However, it had a weak relationship with market performance and was not significant. The result showed that conduct did not seem to depend on performance of the firms, suggesting that conduct is best regarded as a forward-looking, strategic variable (Delorme, 2002). Lagged growth is negatively related and significant at 0.05%, meaning that the firms would spend less on conduct as presented by advertising expenditure if the previous year's performance was good.

TABLE 8
TSLS Regression Results for the Malaysian Meat Manufacturing Industry

| Independent variable | TSLS | | |
|---|---|---|---|
| | Concentration | Advertising | Profit |
| Intercept | 1.19 (0.653) | 0.11 (2.539) | 0.22 (0.685) |
| (ADV1) | 18.43[a] (3.035) | | |
| (CAP1) | 0.582 (0.618) | | |
| (PFT1) | 2.34[b] (2.112) | | |
| (GRO1) | | -0.003[b] (-2.042) | -0.003 (0.352) |
| (CAP) | | | 0.25[c] (1.659) |
| CR4 | | 0.03[a] (4.355) | 0.10[a] (3.053) |
| (ADV) | | | -1.47 (1.244) |
| (PFT) | | -0.05 (0.805) | |
| $R^2$ | 0.865 | 0.799 | 0.784 |

$t$-value in parentheses, [a, b] and [c] significant at the 0.01, 0.05 and 0.10 levels respectively

The performance equation was presented by profit as the dependent variable showed a positive relationship with structure (CR4) and conduct (CAP) and was significant at 0.01% and 0.1% respectively. However, advertising intensity and lagged growth were not significant in explaining the feedback effect on performance. The finding was similar to Delorme's (2002). Delorme found that there was no systematic relationship between advertising, industry growth and profitability. Profitability should be higher in an industry in which barriers to entry exist. Thus, industry profit should be positively related to concentration and capital intensity (CAP), which determine entry barriers in the industry. As concentration and conduct of the firm increase, the performance of the firm will also increase. The finding was also similar to that of Oustapassidis (1998).

The TSLS results indicated that market structure provided a direct effect on performance and conduct. The CR4 can be highly concentrated if the firms spent more on advertising to attract customers to buy their products. Consequently, the increase in advertising expense would generate lower performance from the firms. Thus, market structure, conduct and performance are directly related with each other. The feedback effect is also directly related to market performance, to market conduct and to market structure of the industry. Similarly, market conduct can also affect market performance but these relationships are relatively weak and not significant in some cases.

## CONCLUSION

The Concentration Ratio (CR) and the Herfindahl-Hirschman Index (HHI) results clearly showed that the market for meat manufacturing in Malaysia was moderately concentrated during the study period. This can be proven by the existence of some larger firms that controlled a large market share of the industry. The concentration ratio of the top four firms (CR4) ranged from 60-65 over the study period and according to Bain, the meat processing industry is moderately concentrated; this was substantiated by the HHI. This indicated that there were many sellers in the industry and each produced similar, but slightly differentiated products. This indicated that each producer could set its own price and quality without affecting the market as a whole.

The results proved the existence of both primary and secondary feedback effects between market structure, conduct and performance in the meat and meat products manufacturing industry. The results of the regression analysis indicated the existence of primary and feedback effects between market structure, conduct and performance based on the industrial organisation approach in the Malaysian meat manufacturing industry. The results showed that concentration directly affected the firms' advertising expenditure (conduct) and profitability (profitability). In addition, advertisement intensity and profitability demonstrated the lag feedback effect on structure of the industry, that is, while structure gave a positive feedback effect on conduct and performance, market

performance did not have a feedback effect on market conduct.

Since the meat and meat product manufacturing industry is moderately concentrated, there are signs of collusion or merger among the top four firms. Thus, the monopolisation of the industry by one firm is highly unlikely to happen. The industry can be categorised as displaying monopolistic competition where there are many sellers with differentiated products and they each have their own market niche. The Malaysian government has managed to successfully reduce monopoly power and to increase the competitive levels among the firms in this industry. This is to ensure that the industry remains open to new entrants while market power of established firms in the industry is reduced. The government should maintain competitive levels among the firms and at the same time protect small market players from unfair market practices used by the larger firms.

Market expansion can facilitate new entrants into the market place and hence, reduce market concentration. It is, however, less certain whether the trend could be sustained in the long run. In an effort to establish domestic competitiveness, the Malaysian government has to intensify policies for the promotion and growth of Small and Medium Enterprises (SMEs) in the meat and meat manufacturing industry by providing more investment incentives, loans and open market opportunities, especially among the Organisation of Islamic Conference (OIC) countries and to promote Malaysia as a Halal Hub centre for the Muslim world.

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# The Assessment of Comparative Advantage of the Non-Ruminant Subsector through Policy Analysis Matrix (PAM) in Peninsular Malaysia

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## ABSTRACT

The objective of this study was to assess comparative advantages of the non-ruminant subsector in selected states of Peninsular Malaysia. The study analysed livestock production, namely chicken meat and eggs in three states i.e. Negeri Sembilan, Perak and Selangor. This study used a Policy Analysis Matrix (PAM) to determine whether non-ruminant products have a comparative advantage for production under commercial, medium or small scale farm size. The study demonstrated that Malaysia has a strong comparative advantage in the production of chicken meat compared to the production of eggs. Chicken meat produced on a commercial scale has a DRC ratio of 0.24 while eggs produced on a medium scale have a DRC ratio of 0.26. Both farms have a comparative advantage because their ratio implies that the value added per unit of product is larger than the value of domestic resources used to produce in that unit. According to Tsakok (1990), the level of comparative advantage of each subsector is greatest if the DRC ratio is close to zero. As a result, broiler farms on commercial scale with a DRC ratio of 0.24 have a higher degree of comparative advantage compared to layer farms on a commercial scale with DRC ratio of 0.71 .

## INTRODUCTION

The Tenth Malaysia Plan (10MP) spelt out policies to increase food production. The government has been promoting and revitalising the agriculture sector to become a

modern food zone with efficient technology-driven food production, commercial scale farming, farming of new crops, livestock and downstream agricultural activities. The new agricultural programmes demand greater orientation towards more modern and commercial scale production of agro-products to spur domestic food production including livestock products. Similarly, the National Agro-Food Policy (2011-2020) has also spelt out the importance of the livestock industry in Malaysia. It is emphasising the efficiency and competitiveness of the non-ruminant sector as well as its development and improved efficiency.

The policy to increase food production is closely related to free trade agreements that will provide opportunities for agricultural products from foreign countries to conduct trade in Malaysia. Free trade also provides opportunities for Malaysian agricultural products in international markets. The policy of increasing food production is expected to increase the quantity and quality of food products so that Malaysia can compete with other agricultural products from abroad.

The argument behind the idea of free trade basically refers to the concept of comparative advantage and the benefits that can be achieved through specialisation in accordance with comparative advantage. Livestock product is one of the commodities that are freely traded, both as import substitute products and as export promotion products.

## THE LIVESTOCK INDUSTRY IN MALAYSIA

The livestock subsector in Malaysia grew 9.25% between January and December 2012. Livestock was contributing around 11.7% to the overall performance of the agriculture sector in 2012. The value-added livestock subsector continued to grow by 7.1% in the period 2001 to 2010, mainly driven by higher production of poultry and beef cattle. The value added for cattle and goat farming increased 8.7% and 16.4% respectively in the same period as a consequence of integrated and commercial feedlot farming as well as the implementation of Livestock Sector Entrepreneurship Transformation Scheme. The production of poultry expanded 8 .3% in the period 2001 to 2010. The introduction and implementation of transferring effective microorganism technology, modern poultry farming as well as incentives for farm enhancement contributed to the increase in poultry production (Economic Planning Unit, Prime Ministers Department, 2014).

Currently, Malaysia is the third largest producer of poultry meat in the Asia Pacific region (MIDA, 2014), contributing to about 5% of the region's total production (Malaysian-German Chambers of Commerce, 2012). Malaysian poultry farming represents the largest proportion of the livestock industry in terms of output value. The 2013 ex-farm production value of poultry eggs was estimated to be RM3.7 billion and poultry meat output was estimated at about RM7.01 billion (Department of Veterinary Services Malaysia, 2014).

These subsectors are operated largely in a commercially-orientated manner and are increasingly managed as private or public limited companies.

The ruminant sector lags far behind with the majority of cattle, goat and sheep still owned by individual farmers who rear these animals as part of their overall rural agricultural activities. The total ex-farm output value of beef was estimated to be about RM1.04 billion and mutton at about RM101.63 million in 2013 (Department of Veterinary Services Malaysia, 2014).

Livestock in Malaysia is dominated by poultry meat, which has the largest share of production with 58%, followed by eggs, pork and beef with a production share of 27%, 10%, and 2% respectively. Among these products, poultry meat production is the largest. In the last five years, the average production of chicken meat has been 1,202.0 metric tonnes. This amount is relatively large compared with the average production of eggs of 566.2 metric tonnes or pork with an average production of 206.0 metric tonnes. In fact, the average production of poultry meat is very large when compared with the average production of beef and goat meat, of which there are only 42.2 and 2.2 metric tonnes respectively (Department of Veterinary Services Malaysia, 2014).

In addition, the level of self-sufficiency for beef, goat, pork, poultry meat and poultry eggs were 29.50%, 12.87%, 93.87%, 101.92% and 114.50% respectively in the year 2012 (Department of Veterinary Services, 2014). The data above show that the number for poultry production has exceeded demand in this country. This condition provides opportunities for poultry products to enter the export trade with the intention of raising foreign exchange for the country. This is in accordance with the theory of trade, where the excess production can be used for exports while a lack of production is met through imports (Tsakok, 1990).

Still related to the goals of the National Agro-Food Policy (DAN, 2011-2020), the transformation of the livestock industry will focus on the development of livestock commercial , production of quality breeds, expansion of Good Animal Husbandry Practices (GAHP) and the production of animal feed of quality at competitive prices. Moreover, some aspects of R & D in terms of animal disease control and efficiency of livestock systems will be emphasised. Therefore, the question is whether Malaysia has the comparative advantage in the production of broiler and layer products?

## THE POLICY ANALYSIS MATRIX

This study aimed to determine the comparative advantages of the poultry sector in Malaysia. The Policy Analysis Matrix (PAM) methodology was used as an analytical tool for investigating which poultry subsector i.e. egg or broiler had comparative advantage. According to Yao (1997) and (Morrison, 2002) the structure of the PAM can be described as a product of two accounting identities: one defining profit as the difference between revenues and costs and the other measuring the effects of divergence (distorting policies and market

failures) as the difference between observed parameters and parameters that would exist if the divergences were removed. The primary objective of constructing a PAM is to derive a few important policy parameters for policy analysis. In this paper, four most commonly used parameters were derived:

i.) Nominal Protection Coefficient of Output (NPCO)

ii.) Nominal Protection Coefficient of Input (NPCI)

iii.) Effective Protection Coefficient (EPC)

iv.) Domestic Resource Cost (DRC) ratio

The PAM as presented in Table 1 had three rows. The first row of the PAM was calculated using private prices or financial prices. Private prices are those actually received or paid by the economic actors. The second row was a calculation based on social prices (economic prices), which describe the price or social value of the economic value for the elements of cost and performance. The third row was the calculation of the price difference in private cost and the social cost as a result of the impact of government policies or existing market distortions.

The first row of the PAM was the calculation of private profitability (D), defined revenue (A) minus total costs (B+C), where, B and C were foreign and domestic inputs, respectively (Table 1). In other words, the first row of the PAM contained the value for the accounting identity measured at private prices, which are the prices actually used by local

producers to purchase their inputs and sell their outputs. Private profitability in the first row demonstrated the competitiveness of the poultry production system, given current prices for inputs, outputs and policies. The second row of the PAM calculated the social profit that reflected social opportunity costs. Social profits measured efficiency and comparative advantages. Social profitability (H) measured revenue valued at social prices minus value of foreign and domestic inputs both valued as social prices. A positive social profit indicated that the system used scarce resources efficiently and contributed to national income (Nelson, 1991). The negative social profits indicated social inefficiencies and suggested that production at social cost exceeded the cost of import. In other words, the sector cannot survive without government support when social profits are negative. The final row of the PAM represented the extent to which policies distort revenues and costs from international levels.

The PAM framework can also be used to calculate important indicators for policy analysis. These include NPCO, NPCI, EPC and DRC. The Nominal Protection Coefficient measures the impact of commodity specific price interventions such as import tariffs. The NPCO is given by the ratio of private revenue to social revenue (A/E). An NPCO greater than one implies that the domestic output is protected and vice versa, if the ratio is less than one. The NPCI is expressed as B/F (the ratio of value of tradable inputs at local market prices or private prices to value of

tradable inputs at world market prices or social prices). The EPC measures the total effect of government interventions; it can be computed from the PAM as a ratio of value added in local market prices (A-B) to the value added in world prices (E-F). If EPC is greater than one, it indicates that government intervention has favoured local production although it is more economical to import the commodity (Legese, 2007).

The DRC is the ratio of the domestic of production in social values (G) to value added again in social terms (E-F). It indicates the cost of domestic factors that have to be incurred to obtain one unit of value added in social terms. A DRC value between zero and less than one implies that the commodity has a comparative advantage while a value above one and those negative indicate that an activity is wasting scarce resources that could be used efficiently elsewhere (Mahlanza *et al*., 2003).

## DATA AND GENERAL ASSUMPTION

The study used both secondary and primary data. The secondary data were obtained from various resources such as from the Department of Statistics, Department of Veterinary Services (DVS), Ministry of Agriculture (MOA), Ministry of Finance (MOF) and other related sources. The secondary data were used to understand the industry and to formulate the research issues. The main data for this study came from primary data. Field survey was conducted in late 2012 and early 2013 among poultry farmers. The gathered information took into account the information on the production in the year 2012, such as quantities of farm production outputs and inputs, scale of farm and prices paid and received by producers. The poultry subsector was classified by farm size of commercial, medium and small scale farms as shown in Table 2. Classification of farms size facilitates comparison of the different farm sizes where there are

TABLE 1
Structure of the Policy Analysis Matrix (PAM) Methodology

|  | REVENUE | COST | | PROFIT |
|  |  | INPUTS TRADABLE | INPUTS NON-TRADABLE |  |
| --- | --- | --- | --- | --- |
| Private Prices | A | B | C | D = A - B - C |
| Social Prices | E | F | G | H = E – F - G |
| Divergence | I = A – E | J = B – F | K = C – G | L = I - J - K= D - H |

Source: Pearson, 2003

Note:    A = Revenue in Private Price
         B = Inputs Tradable in Private Price
         C = Inputs Non-Tradable in Private Price
         D = Private Profitability
         E = Revenue in Social Price
         F = Inputs Tradable in Social Price

G = Inputs Non-Tradable in Social Price
H = Social Profitability
I = Output Transfer
J = Input Transfer
K = Factor Transfer
L = Net Transfer

variations in cost of production and revenue due to the differences in utilisation of resources and the value of output and input.

This survey was implemented in Negeri Sembilan, Perak and Selangor. The location selection was based on the potential resources of livestock in the centre area of livestock products in Peninsular Malaysia. The number of samples used in this survey was 39 broiler producers and 18 layer producers in the areas of research. The method of analysis was using the structured questionnaire. The main information collected from the survey was: (1) Livestock reconciliation table and estimation of farm production and (2) Cost profile for each livestock enterprise. The presentation of the livestock reconciliation table was based on the format used by Tan *et al*. (1989). The total physical output for each category was estimated as follows:

a) Broiler Farm

Production = Live weight gain over the production
            (per kg of live weight)

          = Sales (kg live weight)

          + Home consumption
            (kg live weight)

          + closing stock
            (kg live weight)

          - opening stock
            (kg live weight)

b) Layer Farm

Total farm production of the primary product of eggs was equal to sales plus home consumption in egg boxes, where for every single box, there were 30 eggs. Based on the Department of Statistics in Malaysia, every one million eggs is equal to 60 metric tonnes of eggs. This means that every one metric tonne of eggs is equal to 16667 eggs or equal to 556 egg boxes.

The compilation of revenue and production cost profiles collected from the farms was in the private value. These private values need to be converted into social values prior to DRC calculations. Conversion Factors (CF) were used to convert the private values to social values. The CF of a selected item that had a direct involvement in the production of poultry was estimated by using the formula obtained from Veitch M.D (1986). The selected items that the CF needed to estimate were categorised into immediate inputs and primary inputs. The immediate inputs included the following: feed MVS (medicine, vaccines and supplements), livestock purchased, fuel, repair and maintenance, utility and office supplies. The primary inputs included labour, depreciation, interest and land rent. Other items included were TAX, licenses and losses.

*This is the only information available for Conversion Ratio (CR). The Economic Planning Unit (EPU) has not come out with a new conversion ratio.

In addition, the cost of inputs needed to be converted into the domestic and foreign components using conversion ratios. All inputs or outputs that were not being traded across national boundaries of the particular country either because of the cost of production or limited trade practices

were called domestic components. The cost of domestic components is also known as non-tradable cost. On the other hand, all inputs or outputs that were traded if their production and consumption affected the country's level of imports or exports on the margin were called foreign components. The cost of foreign components is also known as tradable cost. The breakdown of domestic and foreign components is presented in Table 4.

TABLE 2
Classification of Poultry Farms

| COMMODITY | FARM CLASS | POPULATION |
|---|---|---|
| Broiler | Commercial | >130,000 birds/period |
| | Medium | 25,000 - 130,000 birds/period |
| | Small | <25,000 birds/period |
| Layer | Commercial | >90,000 birds/period |
| | Medium | 18,000 - 90,000 birds/period |
| | Small | <18.000 birds/period |

Source: Department of Veterinary Services (DVS), 2012.

TABLE 3
Conversion Factors from Private to Social Analysis*

| INTERMEDIATE INPUT | | | CONVERSION FACTOR |
|---|---|---|---|
| | Feed | | 0.95 |
| | MVS | | 0.88 |
| | Livestock Purchase | | 0.95 |
| | Fuel | | 0.88 |
| | Repairs & Maintenance | | 0.78 |
| | Water | | 0.75 |
| | Electricity | | 0.84 |
| | Office Supplies | | 0.90 |
| TAX | | | 0.00 |
| LAND RENT | | | 1.00 |
| LICENCE | | | 0.00 |
| PRIMARY INPUT | | | |
| | Labour | | 0.82 |
| | Depreciation | | |
| | | Building | 0.86 |
| | | Equipment | 0.90 |
| | | Transportation | 0.70 |
| | Interest | | 1.30 |
| LOSSES | | | 1.00 |

Source: Veitch, 1986.

TABLE 4
Allocation of Costs Between Domestic and Foreign Components

|  |  |  | DOMESTIC (%) | FOREIGN (%) |
|---|---|---|---|---|
| Intermediate Input |  |  |  |  |
|  | Feed |  |  |  |
|  |  | Broiler | 20 | 80 |
|  |  | Layer | 20 | 80 |
|  | MVS |  | 20 | 80 |
|  | Repairs & Maintenance |  | 100 | 0 |
|  | Water |  | 90 | 10 |
|  | Electricity |  | 90 | 10 |
|  | Fuel |  | 50 | 50 |
|  | Livestock Purchase |  |  |  |
|  |  | Broiler | 50 | 50 |
|  |  | Layer | 50 | 50 |
|  | Office Supplies |  | 100 | 0 |
| Tax |  |  | 100 | 0 |
| Land Rent |  |  | 100 | 0 |
| Licence |  |  | 100 | 0 |
| Primary Input |  |  |  |  |
|  | Labour |  | 100 | 0 |
|  | Depreciation |  |  |  |
|  |  | Building | 100 | 0 |
|  |  | Equipment | 100 | 0 |
|  |  | Transportation | 67 | 33 |
|  | Interest | Building | 95 | 5 |
| Losses |  |  | 100 | 0 |

Source: Veitch, 1986

*This is the only information available for Conversion Ratio (CR). The Economic Planning Unit (EPU) has not come out with a new conversion ratio.

## RESULTS AND DISCUSSION

In this study, the Policy Analysis Matrix (PAM) was used to evaluate the comparative advantages of alternative activities, namely broiler and layer subsectors in the Malaysian poultry industry. The most prominent indicators used from the PAM were the Domestic Resource Cost (DRC) ratio and Social Profitability (SP). A simple definition of the DRC is that it measures the ratio of the cost of domestic factors used by the commodity (production) system to the value added of the system, both measured at social prices. In other words, the DRC measures the ratio of the cost of domestic resources used by the commodity system to the value of imported resources created by the commodity system, both measured at social prices.

Similarly, social profits measure efficiency or comparative advantage, although outweighed by the DRC for comparison of different activities. The results can be taken directly from the second row of the PAM matrix, where social profits equal social revenues minus total social costs (domestic and foreign costs).

In addition, the PAM framework can also be used to calculate important indicators for policy analysis. The nominal protection coefficient (NPC), a simple indicator of the incentives or disincentives in place, is defined as the ratio of private price to a comparable world (social) price. NPC can be calculated for both output (NPCO) and input (NPCI). The other indicator is an effective protection coefficient (EPC), which measures the total effect of the government interventions. The summary result of protection coefficients on layers and broilers subsector production are reported in Table 5.

*Analysis of Protection*

The ratio formed to measure output transfers is called the Nominal Protection Coefficient of Output (NPCO). NPCO shows how much private prices differ from social prices. If NPCO exceeds one, the private prices are higher than the import or export price and thus the industry is receiving protection. If NPCO is less than one, the private price is lower than the comparable world price and the industry is unprotected by policy. As can be seen in Table 5, the NPCO for poultry industry is 1.05 and it indicates that policies have caused domestic output price of the poultry industry in Peninsular Malaysia to be higher than the world price by approximately 5% (Mahlanza *et al*., 2003). In other words, the value of total output was 5% greater than it would have been in the absence of the policy. The condition of the current price of poultry products has indirectly provided an incentive for the development of poultry production in Peninsular Malaysia.

TABLE 5
Analysis of Protection

| KIND OF FARM | FARM CLASS | NOMINAL PROTECTION COEFFICIENT OF OUTPUT (NPCO) | NOMINAL PROTECTION COEFFICIENT OF INPUT (NPCI) | EFFECTIVE PROTECTION COEFFICIENT (EPC) |
|---|---|---|---|---|
| BROILER | Small | 1.05 | 1.05 | 1.05 |
| | Medium | 1.05 | 1.05 | 1.05 |
| | Commercial | 1.05 | 1.06 | 1.05 |
| | All Size | 1.05 | 1.05 | 1.05 |
| LAYER | Small | 1.05 | 1.05 | 1.05 |
| | Medium | 1.05 | 1.06 | 1.05 |
| | Commercial | 1.05 | 1.05 | 1.05 |
| | All Size | 1.05 | 1.05 | 1.05 |

Source: Farm survey, 2012/13.

Ratios, which are free of currency or commodity distinctions, are used to compare among tradable inputs. The ratio formed to measure tradable input transfers is called the Nominal Coefficient on Inputs (NPCI). NPCI shows how much private prices of tradable inputs differ from their social prices. If NPCI exceeds one, the domestic input cost is higher than the input cost at world prices and the system is taxed by the policy. If NPCI is less than one, the private price is lower than the comparable world price and the system is subsidised by the policy (Pearson, 2003). According to evaluation of government protection in Table 5, the NPCI of the Malaysian poultry industry ranged between 1.05 and 1.06. These coefficients suggested that producers were paying 5%-6% more for their tradable inputs than if they had been able to obtain them at their respective social price (Morrison, 2002). This means the policy provided 5%-6% tax per unit of tradable input paid by domestic producers (Joubert, 2000).

The existence of government policy in the form of value added tax on input production in the poultry industry is related to the higher portion of foreign component of the inputs used in the poultry production, especially feed and Medicine Vaccine Supplement (MVS). Both broiler and layer use 80% of the foreign component respectively even as the input MVS for poultry production uses 80% of the foreign component. The higher foreign component used on input has caused the price to rise due to import tariff, which has also created a negative transfer from the entire set of policies affecting tradable inputs.

The Effective Protection Coefficient (EPC) assesses the net effect of different interventions in the market and in doing so recognises that such interventions can either enhance or reduce economic efficiency (Kydd *et al.*, 1990). EPC compares the value added in domestic prices with value added in world prices. EPC is another indicator of incentives measured as the ratio of value added at private price to value added at social price (Nakhumwa, 1999). This coefficient measures the net effect resulting from the product market and tradable input and output policies. Table 5 shows that the EPC of the Malaysian non-ruminant industry is 1.05. These coefficients illustrated that the Malaysian poultry industry enjoyed a subsidy of up to 5% for its value added feature (Yao, 1997).

*Analysis of Social Profitability*

As indicated earlier the basic output from the poultry production can be divided into two main products, broiler and layer farm. Table 6 shows that the social profitability (SP) column for all scale broiler and layer farms were positive SP. These ratios indicated that both broiler and layer farms in Peninsular Malaysia were efficient.

According to Table 6, the broiler farm in commercial scale could produce the highest profits in the poultry subsector. This farm had a ratio of SP of about 2.09, which means that every one kilogram of broiler produced would give a profit of about RM2.09/kg in live weight. Layer farm in the medium scale became superior with the ratio of SP

of about 1.72, which is capable of giving a profit of RM1.72/kg in live weight for every one kilogram of eggs produced. In conclusion, the broiler farm on commercial scale is a more profitable farm that produces the highest profits compared with poultry farms in Malaysia of other sizes.

*Analysis of Comparative Advantage*

The analysis revealed that overall, the poultry subsector had a comparative advantage in the production of livestock products, especially broiler production on commercial scale and egg production on medium scale. Table 6 shows that broiler farm on commercial scale had a DRC ratio of about 0.24. This ratio means that the farm used US$0.24 domestic resources to produce an output with a value of about US$1. In other words, commercial broiler farms can save US$0.76 of foreign exchange in every broiler produced. Layer farms of medium scale had DRC ratio of about 0.26, which means that the farms used

US$0.26 of domestic resources to produce an output with a value of about US$1 and saved US$0.74 of foreign exchange. These indicators suggested that the broiler farm on commercial scale had a degree of comparative advantage higher than that of the layer farm on medium scale. According to Tsakok (1990), the level of comparative advantage of each subsector is greatest if the DRC ratio is close to zero.

A sensitivity analysis was conducted to test the results of the analysis of comparative advantage in the production of the poultry subsector as input prices had increased, especially those belonging to the feed price. It is known that feed cost and the cost of DOC purchased dominate the cost of inputs in broiler production. Commercial broiler production still had a comparative advantage even when feed price was increased by 20% and when the cost of purchased livestock was increased by 20%. Even if both the price of feed and the price of purchase of day-old chicks (DOC) were

TABLE 6
Analysis of Comparative Advantage and Social Profitability

| KIND OF FARM | FARM CLASS | SOCIAL PROFITABILITY (SP) | DOMESTIC RESOURCE COST (DRC) |
|---|---|---|---|
| BROILER | Small | 0.14 | 0.89 |
| | Medium | 0.31 | 0.78 |
| | Commercial | 2.09 | 0.24 |
| | All Size | 1.98 | 0.70 |
| LAYER | Small | 0.29 | 0.80 |
| | Medium | 1.72 | 0.26 |
| | Commercial | 0.38 | 0.71 |
| | All Size | 0.47 | 0.66 |

Source: Farm survey conducted in Peninsular Malaysia, 2012/13.

increased simultaneously by 20%, the commercial broiler production still had a comparative advantage. Table 7 shows the DRC and its sensitivity analysis on price of feed and purchase of DOC.

Broiler production in the medium-sized farms did not have a comparative advantage when feed costs increased by 20%; this was also true when the cost of purchase of DOC increased by 20%. If both feed and DOC costs were increased simultaneously by 20%, the medium broiler production did not have a comparative advantage.

Similarly, the small-sized broiler farms did not have a comparative advantage when feed costs increased by 10% or when the cost of purchase of DOC rose by 10%. An increase in the cost of these two items simultaneously by 10% showed that the small broiler productions did not have a comparative advantage.

The sensitivity analysis showed that increasing feed cost and cost of DOC purchased by up to 20% could eliminate the comparative advantage of broiler productions in the medium- and small-sized farms. However, if both costs increased up to 20% they still could not eliminate the comparative advantage in the commercial broiler productions. Based on the results

TABLE 7
Sensitivity Analysis of Comparative Advantage in Poultry Subsector

| FARM SIZE | BROILER | | LAYER | |
|---|---|---|---|---|
| | SENSITIVITY ANALYSIS | DRC | SENSITIVITY ANALYSIS | DRC |
| All sizes | Normal | 0.70 | Normal | 0.66 |
| | Increased feed cost 20% | 1.17 | Increased feed cost 20% | 1.11 |
| | Increased cost of DOC purchased 20% | 0.94 | Increased labour cost 20% | 0.71 |
| | Increased feed cost 20%+cost of DOC purchased 20% | 1.24 | Increased feed cost 20%+labour cost 20% | 1.13 |
| Commercial | Normal | 0.24 | Normal | 0.71 |
| | Increased feed cost 20% | 0.38 | Increased feed cost 20% | 1.26 |
| | Increased cost of DOC purchased 20% | 0.33 | Increased labour cost 20% | 0.74 |
| | Increased feed cost 20%+cost of DOC purchased 20% | 0.49 | Increased feed cost 20%+labour cost 20% | 1.28 |
| Medium | Normal | 0.78 | normal | 0.26 |
| | Increased feed cost 20% | 1.14 | Increased feed cost 20% | 0.53 |
| | Increased cost of DOC purchased 20% | 1.01 | Increased labour cost 20% | 0.29 |
| | Increased feed cost 20%+cost of DOC purchased 20% | 1.28 | Increased feed cost 20%+labour cost 20% | 0.57 |
| Small | Normal | 0.89 | Normal | 0.80 |
| | Increased feed cost 10% | 1.09 | Increased feed cost 20% | 1.24 |
| | Increased cost of DOC purchased 10% | 1.04 | Increased labour cost 20% | 0.96 |
| | Increased feed cost 10%+cost of DOC purchased 10% | 1.15 | Increased feed cost 20%+labour cost 20% | 1.32 |

Source: Farm survey conducted in Peninsular Malaysia, 2012/13.

of this analysis it can be concluded that increasing input costs by up to 20% in the commercial broiler production will not cause comparative disadvantages to the commercial-size broiler production.

On the other hand, the total production cost of the layer is dominated by the feed and labour costs. Egg production on the medium-size farms still had a comparative advantage when the feed or labour cost was increased by up to 20%. This production still had a comparative advantage when both costs were simultaneously increased by 20%.

The commercial egg production units still had a comparative advantage when the labor costs were increased by 20%. However, the comparative disadvantage was removed when feed costs were increased by 20%. This production also had a comparative disadvantage when both costs were simultaneously increased by 20%.

The small egg production units still had a comparative advantage when the labour cost increased by 20%. As the feed cost was increased by 20%, this production had a comparative disadvantage. This production also had a comparative disadvantage when both costs were simultaneously increased by 10%.

Based on the results of the sensitivity analysis it can be concluded that even with an increase in labour cost was made by up to 20%, egg production in Malaysia still had a comparative advantage, but the rising cost of feed by up to 20% could eliminate the comparative advantage of layer production on ommercial- and small-size farms. At the

same time, the medium-layer farm size still had a comparative advantage despite the increased input costs of up to 20%.

## CONCLUSION AND RECOMMENDATIONS

This study applied the PAM on the poultry sector in Peninsular Malaysia. The results showed that Malaysia had a comparative advantage in the production of poultry namely, broiler and layer chicken. Broiler was more efficiently produced on a commercial scale while layer was more efficiently produced on the medium scale.

However, producers need to consider the impact of the increase in feed prices in poultry production. The cost of feed is the largest component in poultry production, taking 68% in broiler and 87% in egg production. Adding to the problem is that 80% of feed cost consists of imported components. This makes it difficult for the Malaysian government to regulate the level of the feed prices because increased imports of feed prices would reduce the level of comparative advantage in the production of poultry products.

As a recommendation, the government needs to advise livestock producers to find or produce alternative feeding stuff. The alternative feeding stuff must use more than 50% of domestic components in order to reduce dependence on imported feed. Furthermore, the government needs to consider building up the animal feed industry and hence, should examine how to produce animal feed from local resources such as PKC (palm kernel cake) more

effectively and efficiently and have a feed conversion ratio as for corn-based feed ingredients.

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# Effects of Go-Green Campaigns on Changing Attitude Towards Green Behaviour

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## ABSTRACT

A lot of effort has been made by the Malaysian government via go-green campaigns to relay the importance of green behaviour to society. Go-green campaigns have been in force over the last three decades but the effectiveness of such campaigns is yet to be determined. This study seeks to uncover the association between the socio-demographic characteristics and the respondents' attitude towards green behaviour based on the information they received through the go-green campaigns. A structured questionnaire was designed as the instrument to gather data for this study. A conceptual model was developed to identify the variables that were likely to affect the respondents' attitude and decisions on adopting green behaviour. One thousand two hundred and six (1,206) respondents were administered randomly to discover their intention of performing green behaviour following the go-green campaigns. Chi-square and the binary logistic regression model were applied to answer the study objectives. The results show that selected socio-demographic profiles such as age and marital status significantly affect the respondents' intention towards performing green behaviour.

*Keywords:* Attitude, green behaviour, go-green campaign, logit regression, socio-demographic

## INTRODUCTION

Concern for protection of the environment began at the end of the 1960s in the United States of America and the European Union (Grnert & Juhl, 1995). In recent years, great attention has been given to environmental degradation and conservation and these issues are now part of the global agenda.

Among the environmental problems, climate change has become a core issue. It has a negative impact on the earth and includes issues such as the increase of global mean temperatures, rising sea levels and imbalanced global temperature distribution in tropical and polar areas (IPCC, 1990). There have been a number of international agreements to protect the environment such as the Kyoto Protocol, which was drafted by the United Nations Framework Convention on Climate Change (NUFCCC) in 1997. The convention aims to protect the environment and was enforced in 2005. This international agreement contains 26 articles and carries the signatures of 166 countries that have committed to apply the articles to reduce the production of greenhouse gases (UNFCCC, 2012).

Today, consumers have become more concerned about the direct effect of environmental problems on their daily life (European Commission, 2008). Moreover, the Global Environment Outlook (GEO/4) believes in integrating the protection of the environment into a mind-set and to encourage greater public participation in environmental programmes (Hounsham, 2006). To achieve this, educational programmes and promotional campaigns such as go-green campaigns are being employed.

The seriousness of environmental problems and protection in Malaysia can be traced back to 1974 when the Environment Quality Act was introduced (Initial National Communiation, 2000). However, the country is still facing some environmental problems such as water and air pollution (DOE, 2010). The sources of water pollution in Malaysia come from sewage treatment plants, manufacturing, agro-based industrial and animal farming as well as agricultural activities and surplus plane (DOE, 2010). Similarly, the sources of air pollution are related to industrial and vehicular emissions (DOE, 2010). Air pollution can also be linked to forest fires in Sumatra and deforestation in Malaysia and Indonesia (Ramachandran, 2012). Thus the Malaysian government has made a strong effort and commitment to protect the environment. For instance, in 2005, the National Strategy Plan for Solid Waste Management was introduced. Along with this plan, the go-green campaign of 3R (i.e. Reduce, Reuse, Recycle) was launched (Chua *et al*., 2005). In 2009, the government introduced a new ministry known as Ministry of Energy, Green Technology and Water. Together with Non-Governmental Organisations, the ministry organises campaigns on awareness of the importance of environmental conservation and ways to protect it. Thus, the ministry promotes and encourages the public to use green technology as well as eco-friendly products (KeTHA, 2009). The go-green campaign of 'No Plastic Bag Day' every Saturday was launched in 2010; customers are charged 20 sen per plastic bag on Saturdays as a measure to encourage them to bring their own shopping bags (MDTCC, 2012). Moreover, Malaysia has launched a nationwide campaign to plant 26 million trees by 2014; this figure represents Malaysia's population

of 26 million (The Star Online, 2010). Furthermore, Malaysia cooperated with the United Nations' Environmental Programme in its 'The Billion Tree Campaign' in 2007, with around 10,000 Malaysian schools taking part by planting trees around the country (Amar, 2008). In 2013, Malaysia joined the 'Earth Hour Campaign' against climate change for the third time through its representative; the World Wildlife Foundation for Nature Malaysia (WWF-Malaysia) (The Star Online, 2013).

## A REVIEW OF THE LITERATURE

Green consumers are those who are increasingly aware and concerned about environmental issues (Soonthonsmai, 2007) and aim to perform green behaviour (Akehurst *et al*., 2012). Green behaviour is generally judged in the context of consideration by society as a protective way to conserve the environment or as a tribute to healthy environment (Krajhanzl, 2010). Social psychology literature on environmentally-friendly behaviour argues that attitude is an important factor for performing this behaviour (Donaton & Fitzerald, 1992). In another study on Dutch households by Arkesteijn and Oerlemans (2005), it was found that the attitudinal factors towards the environmental responsibility are significantly influential in the adoption of green behaviour. Other studies also suggest that there are several influential factors such as effectiveness and beliefs that influence the intention to perform green behaviour (Barnes & Parks, 2012). Furthermore, Padel and Foster (2005)

also found that environmental concerns could be effective in performing green behaviour. Motivation (Steg, 2008) could be another influential factor that is related to green behaviour. In addition, the findings of the study by De Pelsmacker and Janssens (2007) show the importance of the role that society plays on an individual when making decisions to perform green behaviour.

Similarly, demographic characteristics (Squires *et al.*, 2001) such as marital status, age, gender and educational level can affect the performance of behaviour related to the environment (Squires *et al*., 2001; Mostafa, 2007; Mills & Schleich, 2012; Nguyen *et al*., 2010; Egea & Garc, 2013). Han *et al.* (2009) indicate that women are strongly different in terms of possessing environmentally-friendly behaviour than men. Moreover, Rezai *et al*. (2013) have shown that the socio-demographic factors of educational level affect the intention to go green. Beside, Nasir and Karakaya (2013) assert that age of the respondents positively affects the intention of performing green behaviour, and younger respondents (Royne *et al*., 2011) are more willing to behave in an environmentally-friendly way.

A campaign is an educational tool for changing a behaviour (Coffman, 2002), and its impact is not the same for a target with different social demographic characteristics (Curtis & Headicar, 1997). Farrelly *et al*. (2002) state that campaigns can be influential on attitude and belief as well as intention. However, Reubsaet *et al*. (2009) believe that campaigns in some ways can increase knowledge and shape the attitude

of a target group with no footprints on attitude. Go-green campaigns are those campaigns which make respondents become aware of environmental degradation and try to teach people to adopt green behaviour in order to save the environment and subsequently the earth (Islam *et al*., 2010). In Malaysia the concept of go green is new (Phuah *et al*., 2012) and people are still not quite familiar with or aware of go-green campaigns (Rahim *et al*., 2012 & Phuah *et al*., 2012,). For example, the go-green campaign, 'No Plastic Bag Day' was not very popular at the beginning (Azman *et al*., 2012); however, after a lapse of time the public showed a positive attitude towards it (Zen *et al*., 2013). In contrast, Omran *et al*. (2009) concluded that some other go-green campaigns such as the one on waste disposal in Malaysia failed because respondents did not have a positive attitude towards it.

In spite of all the effort put into protecting the environment, the concept of green behaviour is still new in Malaysia. Therefore, this study aimed to measure the respondents' attitude towards go-green campaigns. It is important to measure which socio-demographic variables will influence the respondents' attitude towards participating in go-green campaigns that reflect their concern for the environment. The study also aimed to predict the extent to which socio-demographic variables would affect the respondents' intention to perform green behaviour as a result of go-green campaigns.

## MATERIALS AND METHODS

The sampling method of the present study was simple random sampling. One thousand two hundred and six (1206) respondents were randomly selected. They were interviewed via the structured questionnaire in Klang Valley in Malaysia to test their attitude towards go-green campaigns and green behaviour. Supermarkets such as Tesco, AEON, Big AEON, EcoSave and Giant were selected as locations to collect data because people from all walks of life go there to do their shopping. A 7-point Likert scale (1 presents strongly disagree and 7 presents strongly agree) was applied to determine the respondents' attitudinal measurement of attitude towards go-green campaigns and green behaviour. The questionnaire consisted of four sections.

The first section measured the knowledge and awareness of the respondents about go-green campaigns and green behaviour as it is argued by Hoch and Delghton (1989) and Park *et al*. (1994). In this part, respondents were asked some questions such as "Have you ever heard of go-green campaigns?" and "Are you aware of the green behaviour idea?"

The second section measured how much the respondents' attitude was affected by go-green campaigns and acquiring green behaviour by using a 7-point Likert scale with reference to Taylor and Todd (1995). To find out the respondents' attitude towards go-green campaigns and green behaviour questions such as "In my opinion if I follow a go-green campaign I can protect the environment" and "To me, using fewer

plastic bags is a step towards green" were asked.

As argued by Rezai *et al*. (2013), the intention of the behaviour can be measured by the dichotomous questions. The third section of the questionnaire measures the intention of respondents to perform green behaviour via go-green campaigns. In this part, the intention was tested through statements like "Do you find go-green campaigns influential in building your intention to perform green behaviour?" Finally, the last section of the questionnaire gathered information on socio-economic and demographic characteristics of the respondents such as gender, age, income level, educational background, marital status and residential area.

To achieve the study's objective, a reliability test, chi-square analysis and binary logistic regression were employed. The reliability test of the Cronbach alpha was used to test the internal consistency among the statements in the questionnaire. Chi-square analysis was employed to test whether or not there was a significant difference between the selected socio-demographic variables and the respondents' attitude towards go-green campaigns and green behaviour. The following hypotheses were subsequently formed:

*Hypothesis 1*

There is no significant difference between socio-demographic factors such as gender, age, marital status or educational level and the respondents' attitude towards go-

green campaigns with regards to concern for the environment.

*Hypothesis 2*

There is no significant difference between socio-demographic factors such as gender, age, marital status or educational level and the respondents' attitude towards green behaviour in reducing global warming and climate change through the effects of go-green campaigns.

*Hypothesis 3*

There is no significant difference between socio-demographic factors such as gender, age, marital status or educational level and the respondents' attitude towards go-green campaigns where these programmes are perceived as being informative.

The binary logistic regression was applied to estimate the effects of the independent variables on the intention of respondents to perform green behaviour as a result of go-green campaigns. Table 1 illustrates the explanatory variables that were used in this model to gauge the respondents' intention to perform green behaviour. The dichotomous dependent variable Y is the 'respondents' intention to perform green behaviour as a result of go-green campaigns'. The two categories of this variable are 'respondents intention to perform green behaviour ', which is

coded as 1, and the second category is 'respondents do not have the intention to perform green behaviour', which is coded as 0. The present study selected the following variables as independent variables: gender, marital status, residential area, income level, education background, age, environmental concern, motivation and concern for society, importance of green behaviour and participation in go-green campaigns. The binary logistic regression model in particular is presented as:

$$\ln \frac{\pi}{1-\pi}$$
$$= \beta_0 + \beta_{1x\text{Gender}} + \beta_{2x\text{Marital Status}}$$
$$+ \beta_{3x\text{ Residential Area}} + \beta_{4x\text{ Income}}$$
$$+ \beta_{5x\text{ Educational Level}} + \beta_{x6\text{ Age}}$$
$$+ \beta_{7x\text{ Environmental concern}}$$
$$+ \beta_{8x\text{ Importance of green behaviour}}$$
$$+ \beta_{9x\text{ Motivation}}$$
$$+ \beta_{10x\text{ Concern for the society}}$$
$$+ \beta_{11x\text{ Participating}}_{\text{in go-green campaign}}$$
$$+ e$$

**RESULTS AND DISCUSSION**

The Cronbach alpha value was determined to gauge the reliability of the study. This value was 0.946, which shows consistency among all the questions in the questionnaire; therefore, the model is fit for the study.

*Descriptive Statistics Analysis*

The socio-economic demographic of respondents are presented in Table 2. Out of 1206 respondents, 67.3% of the respondents

were female, 70.2% were residents of urban areas and 71.6% were married. Just over half of the respondents were educated at tertiary level (68.7%). With regards to age, 13.5% were below 25 years, with the majority being between 26-45 years of age (65.4%) while around 21.1% were over 46 years of age.

*Respondents' Attitude Towards Go-Green Campaigns and Green Behaviour*

Table 3 shows the respondents' attitude towards go-green campaigns as well as green behaviour that is influenced via these campaigns. The results show that most of the respondents displayed a positive attitude towards go-green campaigns and green behaviour. Sixty-six percent of the respondents stated that by participating in go-green campaigns they could protect the environment, and 62.1% of the respondents believed that go-green campaigns informed them that green behaviour could reduce global warming and climate change. Moreover, 79.2% of the respondents believed that reducing the usage of plastic bags was a step towards becoming green. A positive attitude towards this campaign can be observed among respondents by analysing the responses. In this regard, 75.2% of the respondents supported the statement that go-green campaigns informed them of how they could perform green behaviour.

*Chi-Square Analysis*

Go-green campaigns can affect people of various socio-economic characteristics in

different ways. Therefore, it is interesting to find the association between the demographic profile of the respondents including gender, marital status, educational level and age with their attitude towards go-green campaigns and green behaviour. Table 4 explains the results of the chi-square test between the socio-demographic characteristics of the respondents and their attitude towards the go-green campaigns with regards to concern for the environment.

The results show that only marital status had an insignificant association with the attitude towards go-green campaigns and concern for the environment. Respondents who were female ($\chi^2$= 7.96, p<0.01) displayed a greater positive attitude towards these types of campaigns to preserve the environment. Furthermore, respondents who were educated at tertiary levels showed a more positive attitude towards this concept ($\chi^2$=19.11,p<0.01). In terms of age, the

TABLE 1
Explanatory Variables Measuring Respondents' Intention to Perform Green Behaviour via Go-Green Campaigns

| Variables | Design value (coding system) |
|---|---|
| Gender | 0=Male |
| | 1=Female |
| Residential Area | 0=Suburban |
| | 1=Urban |
| Marital Status | 0=Single |
| | 1=Married |
| Income | 0=Below RM 3000 |
| | 1=Above RM 3001 |
| Age | 0=Below 35 |
| | 1=Above36 |
| Educational Level | 0=Primary& Secondary |
| | 1=Tertiary |
| Participation in go-green campaign | 0=Not participated |
| | 1=Participated |
| Environmental concerns | 0=I am not concerned about the environment |
| | 1=I am concerned about the environment |
| Importance of green behaviour | 0=Green behaviour is not important to protect the environment |
| | 1=Green behaviour is important to protect the environment |
| Motivation | 0=I am not motivated to perform green behaviour via go-green campaign |
| | 1=I am motivated to perform green behaviour via go-green campaign |
| Concern for society | 0=Not being concerned for society |
| | 1= I am concerned for society |

TABLE 2
Demographic Profile of Respondents (n=1206)

| Characteristics | Percentage | Characteristics | Percentage |
|---|---|---|---|
| Gender | | Educational level | |
| Female | 67.3 | Primary | 9.1 |
| Male | 32.7 | Secondary | 22.1 |
| Residential area | | Tertiary | 68.7 |
| Urban | 70.2 | Income level | |
| Suburban | 29.8 | <2000 | 14.8 |
| Marital status | | 2001-3000 | 26.8 |
| Single | 28.4 | 3001-4000 | 36.6 |
| Married | 71.6 | 4001-5000 | 12.6 |
| Age | | >5001 | 9.3 |
| <25 yrs | 13.5 | | |
| 26-35 | 31 | | |
| 36-45 | 34.4 | | |
| 46-55 | 14.3 | | |
| >56yrs | 6.8 | | |

TABLE 3
Respondents' Attitude Towards Go-Green Campaigns and Green Behaviour

| Statement | Likert scale scores (percentage) | | | | | | | Mean |
|---|---|---|---|---|---|---|---|---|
| | 1* | 2* | 3* | 4* | 5* | 6* | 7* | |
| 1. I believe that if I follow go-green campaigns I can protect the environment. | 0.8 | 1 | 2.4 | 6.1 | 23.7 | 38.9 | 27 | 5.69 |
| 2. Go-green campaigns tell me my green behaviour can reduce global warming and climate change. | 1 | 1.2 | 3.5 | 9.5 | 22.9 | 32.1 | 30 | 5.68 |
| 3. To me, using fewer plastic bags is a step towards going green. | 0.7 | 1.2 | 2.7 | 5.9 | 10.4 | 33.1 | 46 | 6.08 |
| 4. Go-green campaigns inform me of how I can perform green behaviour. | 0.6 | 1.2 | 3.2 | 6.1 | 13.6 | 30.3 | 45 | 5.87 |

TABLE 4
Chi-square Value and Respondents' Attitude Towards Go-Green Campaigns and Concern for the Environment

| Socio-demographic variables | $\chi^2$ |
|---|---|
| Gender | 7.968*** |
| Age | 57.311*** |
| Marital status | 0.84 |
| Educational level | 19.117*** |

*** Significant at 1% level

respondents who were younger than 35 years had a more positive attitude that go-green campaigns could protect the environment ($\chi^2$=57.311,p<0.01).

The result of chi-square in testing the association between the respondents' demographic profile and their attitude towards green behaviour to reduce global warming and climate change through the effects of go-green campaigns are presented in Table 5. The results show that respondents who were female ($\chi^2$= 95.158, p<0.01) and married ($\chi^2$= 54.313, p<0.01) displayed a more positive attitude towards green behaviour and believed that this behaviour could reduce global warming and positively affect climate change.

Similarly, Table 6 summarises the results of the association between demographic profiles of the respondents and their attitude towards go-green campaigns and perception of these programmes as being informative. The results show that respondents who were below 35 years old had a positive attitude and perceived these campaigns as being informative ($\chi^2$= 38.587, p<0.01). Furthermore, those who were married ($\chi^2$=2.833, p<0.1) and educated at tertiary level ($\chi^2$=16.52, p<0.01) displayed a more positive attitude towards go-green campaigns compared to persons who were single and less educated.

*Results of the Binary Logistic Regression*

The application of the binary logistic regression was used to find the extent to which the selected socio-economic characteristics and attitudinal factors influenced respondents in having the intention to perform green behaviour. Table 7 shows the estimate logistic model for respondents' intention to perform green behaviour via go-green campaigns. Based on the results, the socio-economic characteristics of respondents such as gender, residential area, marital status, age, educational level and income influenced their intention. It also shows that go-green campaigns had a greater influence on women than on men by 1.57 times since the estimated coefficient for gender was positive and significant at 99% confidence level. The finding indicates that the estimated coefficient for the married respondents was positive and they had 1.65 times greater intention in performing this behaviour compared to singles.

Respondents who were residents of urban areas were more likely to go green by 1.68 times with a positive estimated coefficient at 95% confidence level. Furthermore, the results indicate that those who were older than 35 years were 0.52 times less likely to go green than other age groups. Income level and educational background can play an effective in adopting green behaviour as the respondents who had tertiary education and an income level of more than RM3001 a month displayed a stronger intention to go green. The likelihood of intention to behave in an environmentally-friendly way due to go-green campaigns was increased by 2.64 times in the case of educated persons (i.e. tertiary level); by 2.47 times in the case of persons with higher incomes (above RM3001 per month). The results also

TABLE 5
Chi-square Value and Respondents' Attitude Towards Green Behaviour to Reduce Global Warming and Climate Change with the Effects of Go-Green Campaigns

| Socio-demographic variable | $\chi^2$ |
|---|---|
| Gender | 95.158*** |
| Age | 0.663 |
| Marital status | 54.313*** |
| Educational level | 7.765** |

TABLE 6
Chi-square Value and Respondents' Attitude Towards Go-Green Campaigns and Perceiving Go-Green Campaigns as Informative Programmes

| Socio-demographic variable | $\chi^2$ |
|---|---|
| Gender | 1.521 |
| Age | 28.587*** |
| Marital status | 2.833* |
| Educational level | 16.52*** |

*** Significant at 1% level, significant at 10%

TABLE 7
Estimated Logistic Model for Intention to Perform Green Behaviour via Go-Green Campaigns

| Variables | Estimated coefficients | Standard errors | Significant level | Exp (B) |
|---|---|---|---|---|
| Gender | 0.455 | 0.229 | 0.047** | 1.576 |
| Marital Status | 0.502 | 0.238 | 0.035** | 1.654 |
| Residential area | 0.523 | 0.243 | 0.000*** | 1.688 |
| Educational level | 0.817 | 0.232 | 0.000*** | 2.643 |
| Income | 0.905 | 0.229 | 0.000*** | 2.472 |
| Age | -0.645 | 0.235 | 0.006*** | 0.525 |
| Environmental concerns | -0.109 | 0.108 | 0.313 | 0.897 |
| Importance of green behaviour | 0.264 | 0.177 | 0.000*** | 14.50 |
| Motivation | -0.168 | 0.124 | 0.174 | 0.845 |
| Concern for the society | 2.507 | 0.172 | 0.000*** | 12.27 |
| Participating in go-green campaign | 0.565 | 0.217 | 0.009*** | 1.760 |
| Constant | -1.435 | 0.347 | 0.000 | 0.238 |
| -2 log likelihood | 611.33 | Nagelkerke R Square | 0.77 | |
| Cox and Snell R Square | 0.571 | Hosmer and Lemeshow Test | 0.381 | |

** significant at 1% level, * significant at 5% level

indicate the important role society plays in the intention to go green (Table 7). Based on the results, the variable of concern for society was significant at 99%, and this variable was highly effective as the odds of the respondents having the intention to perform green behaviour due to concern for society was 12.27 times higher than for respondents who were not concerned. Furthermore, the variable of the importance of performing green behaviour plays a role on the intention of the person to perform green behaviour. The likelihood of having the intention to perform green behaviour via go-green campaigns for respondents whose attitude was that performing green behaviour was important for protecting the environment increased by 14.50 times more than for the other respondents. The results show that participating in go-green campaigns is effective in building green intentions. The positive estimated coefficient at 99% shows that respondents who participated in go-green campaigns had a higher intention by 1.76 times. In addition, the other two variables of motivation and environmental concerns were not effective as the related coefficients were not significant.

## DISCUSSION

In this study, the attitude of respondents towards go-green campaigns, green behaviour and the intention of behaving in an environmentally-friendly way as a result of go-green campaigns were tested. Similar to other studies, the present study concludes that there is a significant difference between the socio-demographic profiles of the respondents including age and marital status (Thompson, 1998) and educational level (Magnusson *et al.*, 2001; Roitner-Schobesberger, 2008) with their intention of performing green behaviour. For instance, during this study, it was observed that respondents with higher education (i.e. tertiary level) were more concerned about the environment. This finding is supported by the literature, which asserts that educational level positively affects the attitude and intention of performing green behaviour (Onyango *et al.*, 2007; Tsakiridou *et al.*, 2008).

Furthermore, in the present study, it was observed that the attitude that green behaviour can reduce environmental degradation like climate change was observed to be greater among women compared to men. To support this finding, Banerjee and McKeage (1994) explain that women are more conscious of the environment and they are more likely to purchase eco-friendly products than men. Moreover, during this study, it was observed that respondents who were younger than 35 years old and held a higher educational degree (i.e. tertiary level) had the attitude that go-green campaigns were an informative source for them.

In addition to the above findings, this study contributes to the literature on the effects of socio-economic characteristics and attitudinal factors on intention to perform green behaviour due to go-green campaigns. Based on the results, it can be stated that respondents who were women, younger (below 35 years old) and more

highly educated (i.e. tertiary level) were more likely to have the intention to perform green behaviour via go-green campaigns. These results are consistent with the results of the study by Egea and Garc (2013), in which gender and education levels were proven to be effective on environmentally motivated consumption reduction but not age. Besides, the variable of concern for society was observed as being one of the main predictors of intention to behave in a green way via go-green campaigns. This finding corresponds with the findings of the study by Prestin and Pearce (2010), which showed the important role of society in influencing a person to perform green behaviour. Furthermore, the findings of the current study support the crucial role of the importance of the green behaviour variable. In fact, this variable plays an important role as one of the main predictors of intention in performing green behaviour. This finding is also supported by the findings of Laroche *et al.* (2001), which showed that consumers who are willing to pay more for green products are those who believe that awareness of present ecological problems and use of environmentally-friendly products are important.

Besides this, the findings of the present study contribute to the effectiveness of the role of participating in go-green campaigns. Therefore, it can be concluded that if the respondents are motivated to participate in go green campaigns and green activities, the likelihood of having the intention to perform green behaviour will increase among

them. In this regard, campaign organisers from both the governmental sectors and Non-Governmental Organisations can set up programmes such as exhibitions, trade shows and seminars or workshops to introduce the concept of green behaviour to the public. These programmes can present the adverse effects of environmental degradation like global warming, air pollution and water pollution on both the environment and human life. Moreover, possible actions that can be taken by humans to reduce environmental degradation can be taught. Through these programmes, the general public can be motivated to perform green behaviour after being given more information on how they can behave in an environmentally-friendly way in order to protect the environment.

## CONCLUSION

There is no doubt that changing one's behaviour is a time-consuming endeavour. Go-green campaigns are just a beginning for people who aim to change their behaviour. An effort should be made to expand the influence and accessibility of such environmental protection programmes.

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*Manuscript review*: Manuscripts deemed suitable for publication are sent to the Editorial Board members and/or other reviewers. We encourage authors to suggest the names of possible reviewers. Notification of the editorial decision is usually provided within to eight to ten weeks from the receipt of manuscript. Publication of solicited manuscripts is not guaranteed. In most cases, manuscripts are accepted conditionally, pending an author's revision of the material.

*Author approval*: Authors are responsible for all statements in articles, including changes made by editors. The liaison author must be available for consultation with an editor of *The Journal* to answer questions during the editorial process and to approve the edited copy. Authors receive edited typescript (not galley proofs) for final approval. Changes **cannot** be made to the copy after the edited version has been approved.

### Manuscript preparation

*Pertanika* accepts submission of mainly four types of manuscripts. Each manuscript is classified as **regular** or **original** articles, **short communications**, **reviews**, and proposals for **special issues**. Articles must be in **English** and they must be competently written and argued in clear and concise grammatical English. Acceptable English usage and syntax are expected. Do not use slang, jargon, or obscure abbreviations or phrasing. Metric measurement is preferred; equivalent English measurement may be included in parentheses. Always provide the complete form of an acronym/abbreviation the first time it is presented in the text. Contributors are strongly recommended to have the manuscript checked by a colleague with ample experience in writing English manuscripts or an English language editor.

Linguistically hopeless manuscripts will be rejected straightaway (e.g., when the language is so poor that one cannot be sure of what the authors really mean). This process, taken by authors before submission, will greatly facilitate reviewing, and thus publication if the content is acceptable.

The instructions for authors must be followed. Manuscripts not adhering to the instructions will be returned for revision without review. Authors should prepare manuscripts according to the guidelines of *Pertanika*.

### 1. Regular article

*Definition:* Full-length original empirical investigations, consisting of introduction, materials and methods, results and discussion, conclusions. Original work must provide references and an explanation on research findings that contain new and significant findings.

*Size:* Should not exceed 5000 words or 8-10 printed pages (excluding the abstract, references, tables and/or figures). One printed page is roughly equivalent to 3 type-written pages.

### 2. Short communications

*Definition:* Significant new information to readers of the Journal in a short but complete form. It is suitable for the publication of technical advance, bioinformatics or insightful findings of plant and animal development and function.

*Size:* Should not exceed 2000 words or 4 printed pages, is intended for rapid publication. They are not intended for publishing preliminary results or to be a reduced version of Regular Papers or Rapid Papers.

### 3. Review article

*Definition:* Critical evaluation of materials about current research that had already been published by organizing, integrating, and evaluating previously published materials. Re-analyses as meta-analysis and systemic reviews are encouraged. Review articles should aim to provide systemic overviews, evaluations and interpretations of research in a given field.

*Size:* Should not exceed 4000 words or 7-8 printed pages.

**4. Special issues**

*Definition:* Usually papers from research presented at a conference, seminar, congress or a symposium.

*Size:* Should not exceed 5000 words or 8-10 printed pages.

**5. Others**

*Definition:* Brief reports, case studies, comments, Letters to the Editor, and replies on previously published articles may be considered.

*Size:* Should not exceed 2000 words or up to 4 printed pages.

With few exceptions, original manuscripts should not exceed the recommended length of 6 printed pages (about 18 typed pages, double-spaced and in 12-point font, tables and figures included). Printing is expensive, and, for the Journal, postage doubles when an issue exceeds 80 pages. You can understand then that there is little room for flexibility.

Long articles reduce the Journal's possibility to accept other high-quality contributions because of its 80-page restriction. We would like to publish as many good studies as possible, not only a few lengthy ones. (And, who reads overly long articles anyway?) Therefore, in our competition, short and concise manuscripts have a definite advantage.

**Format**

The paper should be formatted in one column format with at least 4cm margins and 1.5 line spacing throughout. Authors are advised to use Times New Roman 12-point font. Be especially careful when you are inserting special characters, as those inserted in different fonts may be replaced by different characters when converted to PDF files. It is well known that 'μ' will be replaced by other characters when fonts such as 'Symbol' or 'Mincho' are used.

A maximum of eight keywords should be indicated below the abstract to describe the contents of the manuscript. Leave a blank line between each paragraph and between each entry in the list of bibliographic references. Tables should preferably be placed in the same electronic file as the text. Authors should consult a recent issue of the Journal for table layout.

Every page of the manuscript, including the title page, references, tables, etc. should be numbered. However, no reference should be made to page numbers in the text; if necessary, one may refer to sections. Underline words that should be in italics, and do not underline any other words.

We recommend that authors prepare the text as a **Microsoft Word** file.

1.  Manuscripts in general should be organised in the following order:

    o   **Page 1: Running title.** (Not to exceed 60 characters, counting letters and spaces). This page should **only** contain the running title of your paper. The running title is an abbreviated title used as the running head on every page of the manuscript.

        In addition, the **Subject areas m**ost relevant to the study must be indicated on this page. Select the appropriate subject areas from the Scope of the Journals provided in the Manuscript Submission Guide.

    o   A **list** of n**umber of black and white / colour figures and tables** should also be indicated on this page. Figures submitted in color will be printed in colour. See "*5. Figures & Photographs"* for details.

    o   **Page 2: Author(s) and Corresponding author information**. This page should contain the **full title** of your paper with name(s) of all the authors, institutions and corresponding author's name, institution and full address (Street address, telephone number (including extension), hand phone number, fax number and e-mail address) for editorial correspondence. The names of the authors **must** be abbreviated following the international naming convention. e.g. Salleh, A.B., Tan, S.G., or Sapuan, S.M.

        **Authors' addresses.** Multiple authors with different addresses must indicate their respective addresses separately by superscript numbers:

        George Swan[1] and Nayan Kanwal[2]
        [1]Department of Biology, Faculty of Science, Duke University, Durham, North Carolina, USA.
        [2]Office of the Deputy Vice Chancellor (R&I), Universiti Putra Malaysia, Serdang, Malaysia.

    o   **Page 3**: This page should **repeat** the **full title** of your paper with only the **Abstract** (the abstract should be less than 250 words for a Regular Paper and up to 100 words for a Short Communication). **Keywords** must also be provided on this page (Not more than eight keywords in alphabetical order).

    o   **Page 4 and subsequent pages**: This page should begin with the **Introduction** of your article and the rest of your paper should follow from page 5 onwards.

**Abbreviations.** Define alphabetically, other than abbreviations that can be used without definition. Words or phrases that are abbreviated in the introduction and following text should be written out in full the first time that they appear in the text, with each abbreviated form in parenthesis. Include the common name or scientific name, or both, of animal and plant materials.

**Footnotes.** Current addresses of authors if different from heading.

2. **Text.** Regular Papers should be prepared with the headings **Introduction**, **Materials and Methods**, **Results and Discussion, Conclusions** in this order. Short Communications should be prepared according to "*8. Short Communications."* below.

3. **Tables.** All tables should be prepared in a form consistent with recent issues of *Pertanika* and should be numbered consecutively with Arabic numerals. Explanatory material should be given in the table legends and footnotes. Each table should be prepared on a separate page. (Note that when a manuscript is accepted for publication, tables must be submitted as data - .doc, .rtf, Excel or PowerPoint file- because tables submitted as image data cannot be edited for publication.)

4. **Equations and Formulae.** These must be set up clearly and should be typed triple spaced. Numbers identifying equations should be in square brackets and placed on the right margin of the text.

5. **Figures & Photographs.** Submit an original figure or photograph. Line drawings must be clear, with high black and white contrast. Each figure or photograph should be prepared on a separate sheet and numbered consecutively with Arabic numerals. Appropriate sized numbers, letters and symbols should be used, no smaller than 2 mm in size after reduction to single column width (85 mm), 1.5-column width (120 mm) or full 2-column width (175 mm). Failure to comply with these specifications will require new figures and delay in publication. For electronic figures, create your figures using applications that are capable of preparing high resolution TIFF files acceptable for publication. In general, we require **300 dpi or higher resolution for coloured and half-tone artwork** and **1200 dpi or higher for line drawings**.

For review, you may attach low-resolution figures, which are still clear enough for reviewing, to keep the file of the manuscript under 5 MB. Illustrations may be produced at extra cost in colour at the discretion of the Publisher; the author could be charged Malaysian Ringgit 50 for each colour page.

6. **References.** Literature citations in the text should be made by name(s) of author(s) and year. For references with more than two authors, the name of the first author followed by '*et al*.' should be used.

Swan and Kanwal (2007) reported that …
The results have been interpreted (Kanwal *et al.,* 2009).

o   References should be listed in alphabetical order, by the authors' last names. For the same author, or for the same set of authors, references should be arranged chronologically. If there is more than one publication in the same year for the same author(s), the letters 'a', 'b', etc., should be added to the year.

o   When the authors are more than 11, list 5 authors and then et al.

o   Do not use indentations in typing References. Use one line of space to separate each reference. The name of the journal should be written in full. For example:

■   Mellers, B. A. (2006a). Choice and the relative pleasure of consequences. *Psychological Bulletin, 126,* 910-924.
■   Mellers, B. A. (2006b). Treatment for sexually abused children and adolescents. *American Psychologist, 55,* 1040-1049.
■   Hawe, P. (2005). Capturing the meaning of "community" in community intervention evaluation: Some contributions from community psychology. *Health Promotion International, 9,*199-210.
■   Braconier, H., & Ekholm, K. (2006). Swedish multinationals and competition from high and low wage location*. Review of International Economics, 8,* 448-461.

o   In case of citing an author(s) who has published more than one paper in the same year, the papers should be distinguished by addition of a small letter as shown above, e.g. Jalaludin (1997a); Jalaludin (1997b).

o   Unpublished data and personal communications should not be cited as literature citations, but given in the text in parentheses. 'In press' articles that have been accepted for publication may be cited in References. Include in the citation the journal in which the 'in press' article will appear and the publication date, if a date is available.

7. **Examples of other reference citations**:

*Monographs*: Kalimapour, Y.R. (2004). *Images of the U.S. Around the World: A Multicultural Perspective*. Albany, NY: State University of New York Press.

*Chapter in Book*: Bjork, R. A. (2007). Retrieval inhibition as an adaptive mechanism in human memory. In H. L. Roediger III & F. I. M. Craik (Eds.), *Varieties of memory & consciousness* (pp. 309-330). Hull: Hull University Press.

o *Proceedings*: Amir Awang. (2006). Counseling, human resources development and counseling services. In Sulaiman M. Yassin, Yahya Mat Hassan, Kamariah Abu Bakar, Esah Munji and Sabariah Mohd. Rashid (Eds.), *Proceedings of Asia Pacific Conference on Human Development* (p. 243-246). Serdang: Universiti Putra Malaysia.

8. **Short Communications** should include **Introduction, Materials and Methods, Results and Discussion, Conclusions** in this order. Headings should only be inserted for Materials and Methods.  The abstract should be up to 100 words, as stated above. Short Communications must be 5 printed pages or less, including all references, figures and tables. References should be less than 30. A 5 page paper is usually approximately 3000 words plus four figures or tables (if each figure or table is less than 1/4 page).

*Authors should state the total number of words (including the Abstract) in the cover letter.  Manuscripts that do not fulfill these criteria will be rejected as Short Communications without review.

## STYLE OF THE MANUSCRIPT

Manuscripts should follow the style of the latest version of the Publication Manual of the American Psychological Association (APA). The journal uses American or British spelling and authors may follow the latest edition of the Oxford Advanced Learner's Dictionary for British spellings.

## SUBMISSION OF MANUSCRIPTS

All articles should be submitted electronically using the ScholarOne web-based system. ScholarOne, a Thomson Reuters product provides comprehensive workflow management systems for scholarly journals. For more information, go to our web page and click "**Online Submission**".

Alternatively, you may submit the electronic files (cover letter, manuscript, and the **Manuscript Submission Kit** comprising *Declaration* and *Referral* form) via email directly to the Executive Editor. If the files are too large to email, mail a CD containing the files. The **Manuscript Submission Guide** and **Submission Kit** are available from the *Pertanika*'s home page at http://www. pertanika.upm.edu.my/home.php or from the Chief Executive Editor's office upon request.

All articles submitted to the journal **must comply** with these instructions.  Failure to do so will result in return of the manuscript and possible delay in publication.

Please do **not** submit manuscripts to the editor-in-chief or to any other office directly.  All manuscripts must be **submitted through the chief executive editor's office** to be properly acknowledged and rapidly processed at the address below:

Dr. Nayan KANWAL
Chief Executive Editor
*Pertanika* Journals, UPM Press
Office of the Deputy Vice Chancellor (R&I)
IDEA Tower II, UPM-MTDC Technology Centre
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor,
Malaysia

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or visit our website at http://www.pertanika.upm.edu.my/ for further information.

Authors should retain copies of submitted manuscripts and correspondence, as materials can not be returned. Authors are required to inform the Chief Executive Editor of any change of address which occurs whilst their papers are in the process of publication.

## Cover letter

All submissions must be accompanied by a cover letter detailing what you are submitting.  Papers are accepted for publication in the journal on the understanding that the article is original and the content has not been published or submitted for publication elsewhere.  This must be stated in the cover letter.

The cover letter must also contain an acknowledgement that all authors have contributed significantly, and that all authors are in agreement with the content of the manuscript.

The cover letter of the paper should contain (i) the title; (ii) the full names of the authors; (iii) the addresses of the institutions at which the work was carried out together with (iv) the full postal and email address, plus facsimile and telephone numbers of the author to whom correspondence about the manuscript should be sent. The present address of any author, if different from that where the work was carried out, should be supplied in a footnote.

As articles are double-blind reviewed, material that might identify authorship of the paper should be placed on a cover sheet.

**Peer review**

Pertanika follows a **double-blind peer-review** process. Peer reviewers are experts chosen by journal editors to provide written assessment of the **strengths** and **weaknesses** of written research, with the aim of improving the reporting of research and identifying the most appropriate and highest quality material for the journal.

In the peer-review process, three referees independently evaluate the scientific quality of the submitted manuscripts. Authors are encouraged to indicate in the **Referral form** using the **Manuscript Submission Kit** the names of three potential reviewers, but the editors will make the final choice. The editors are not, however, bound by these suggestions..

Manuscripts should be written so that they are intelligible to the professional reader who is not a specialist in the particular field. They should be written in a clear, concise, direct style. Where contributions are judged as acceptable for publication on the basis of content, the Editor reserves the right to modify the typescripts to eliminate ambiguity and repetition, and improve communication between author and reader. If extensive alterations are required, the manuscript will be returned to the author for revision.

**The Journal's review process**

What happens to a manuscript once it is submitted to *Pertanika*? Typically, there are seven steps to the editorial review process:

1. The executive editor and the editorial board examine the paper to determine whether it is appropriate for the journal and should be reviewed. If not appropriate, the manuscript is rejected outright and the author is informed.

2. The executive editor sends the article-identifying information having been removed, to three reviewers. Typically, one of these is from the Journal's editorial board. Others are specialists in the subject matter represented by the article. The executive editor asks them to complete the review in three weeks and encloses two forms: (a) referral form B and (b) reviewer's comment form along with reviewer's guidelines. Comments to authors are about the appropriateness and adequacy of the theoretical or conceptual framework, literature review, method, results and discussion, and conclusions. Reviewers often include suggestions for strengthening of the manuscript. Comments to the editor are in the nature of the significance of the work and its potential contribution to the literature.

3. The executive editor, in consultation with the editor-in-chief, examines the reviews and decides whether to reject the manuscript, invite the author(s) to revise and resubmit the manuscript, or seek additional reviews. Final acceptance or rejection rests with the Editorial Board, who reserves the right to refuse any material for publication. In rare instances, the manuscript is accepted with almost no revision. Almost without exception, reviewers' comments (to the author) are forwarded to the author. If a revision is indicated, the editor provides guidelines for attending to the reviewers' suggestions and perhaps additional advice about revising the manuscript.

4. The authors decide whether and how to address the reviewers' comments and criticisms and the editor's concerns. The authors submit a revised version of the paper to the executive editor along with specific information describing how they have answered' the concerns of the reviewers and the editor.

5. The executive editor sends the revised paper out for review. Typically, at least one of the original reviewers will be asked to examine the article.

6. When the reviewers have completed their work, the executive editor in consultation with the editorial board and the editor-in-chief examine their comments and decide whether the paper is ready to be published, needs another round of revisions, or should be rejected.

7. If the decision is to accept, the paper is sent to that Press and the article should appear in print in approximately three months. The Publisher ensures that the paper adheres to the correct style (in-text citations, the reference list, and tables are typical areas of concern, clarity, and grammar). The authors are asked to respond to any queries by the Publisher. Following these corrections, page proofs are mailed to the corresponding authors for their final approval. At this point, only essential changes are accepted. Finally, the article appears in the pages of the Journal and is posted on-line.

**English language editing**

Pertanika **emphasizes** on the linguistic accuracy of every manuscript published. Thus all authors are required to get their manuscripts edited by **professional English language editors**. Author(s) **must provide a certificate** confirming that their manuscripts have been adequately edited. A proof from a recognised editing service should be submitted together with the cover letter at the time of submitting a manuscript to Pertanika. **All costs will be borne by the author(s)**.

This step, taken by authors before submission, will greatly facilitate reviewing, and thus publication if the content is acceptable.

**Author material archive policy**

Authors who require the return of any submitted material that is rejected for publication in the journal should indicate on the cover letter. If no indication is given, that author's material should be returned, the Editorial Office will dispose of all hardcopy and electronic material.

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Authors publishing the Journal will be asked to sign a declaration form. In signing the form, it is assumed that authors have obtained permission to use any copyrighted or previously published material. All authors must read and agree to the conditions outlined in the form, and must sign the form or agree that the corresponding author can sign on their behalf. Articles cannot be published until a signed form has been received.

**Lag time**

A decision on acceptance or rejection of a manuscript is reached in 3 to 4 months (average 14 weeks). The elapsed time from submission to publication for the articles averages 5-6 months.

**Hardcopies of the Journals and off prints**

Under the Journal's open access initiative, authors can choose to download free material (via PDF link) from any of the journal issues from Pertanika's website. Under "Browse Journals" you will see a link entitled "Current Issues" or "Archives". Here you will get access to all back-issues from 1978 onwards.

The **corresponding author** for all articles will receive one complimentary hardcopy of the journal in which his/her articles is published. In addition, 20 off prints of the full text of their article will also be provided. Additional copies of the journals may be purchased by writing to the executive editor.

# Why should you publish in *Pertanika*?

## BENEFITS TO AUTHORS

**PROFILE**:  Our journals are circulated in large numbers all over Malaysia, and beyond in Southeast Asia. Our circulation covers other overseas countries as well. We ensure that your work reaches the widest possible audience in print and online, through our wide publicity campaigns held frequently, and through our constantly developing electronic initiatives such as Web of Science Author Connect backed by Thomson Reuters.

**QUALITY**:  Our journals' reputation for quality is unsurpassed ensuring that the originality, authority and accuracy of your work is fully recognised.  Each manuscript submitted to Pertanika undergoes a rigid originality check. Our double-blind peer refereeing procedures are fair and open, and we aim to help authors develop and improve their scientific work. Pertanika is now over 35 years old; this accumulated knowledge has resulted in our journals being indexed in SCOPUS (Elsevier), Thomson (ISI) Web of Knowledge [BIOSIS & CAB Abstracts], EBSCO, DOAJ, Google Scholar, AGRICOLA,  ERA, ISC, Citefactor, Rubriq and MyAIS.

**AUTHOR SERVICES**:  We provide a rapid response service to all our authors, with dedicated support staff for each journal, and a point of contact throughout the refereeing and production processes. Our aim is to ensure that the production process is as smooth as possible, is borne out by the high number of authors who prefer to publish with us.

**CODE OF ETHICS**: Our Journal has adopted a Code of Ethics to ensure that its commitment to integrity is recognized and adhered to by contributors, editors and reviewers. It warns against plagiarism and self-plagiarism, and provides guidelines on authorship, copyright and submission, among others.

**PRESS RELEASES**:  Landmark academic papers that are published in Pertanika journals are converted into press releases as a unique strategy for increasing visibility of the journal as well as to make major findings accessible to non-specialist readers. These press releases are then featured in the university's UK-based research portal, ResearchSEA, for the perusal of journalists all over the world.

**LAG TIME**:  The elapsed time from submission to publication for the articles averages 4 to 5 months. A decision on acceptance of a manuscript is reached in 3 to 4 months (average 14 weeks).

An **Award-Winning** International-Malaysian Journal
—MAY 2014

# About the Journal

*Pertanika* is an international multidisciplinary peer-reviewed leading journal in Malaysia which began publication in 1978. The journal publishes in three different areas — Journal of Tropical Agricultural Science (JTAS); Journal of Science and Technology (JST); and Journal of Social Sciences and Humanities (JSSH).

**JTAS** is devoted to the publication of original papers that serves as a forum for practical approaches to improving quality in issues pertaining to **tropical agricultural research-** or related fields of study. It is published four times a year in **February**, **May**, **August** and **November**.

**JST** caters for **science and engineering research-** or related fields of study. It is published twice a year in **January** and **July**.

**JSSH** deals in **research or theories in social sciences and humanities research**. It aims to develop as a flagship journal with a focus on emerging issues pertaining to the social and behavioural sciences as well as the humanities, particularly in the Asia Pacific region.  It is published four times a year in **March**, **June**, **September** and **December**.

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Original research and review articles are invited from scholars, scientists, professors, post-docs, and university students who are seeking publishing opportunities for their research papers through the Journal's three titles; JTAS, JST & JSSH. Preference is given to the work on leading and innovative research approaches.

*Pertanika* is a fast track peer-reviewed and open-access academic journal published by **Universiti Putra Malaysia**. To date, Pertanika Journals have been indexed by many important databases. Authors may contribute their scientific work by publishing in UPM's hallmark SCOPUS & ISI indexed journals.

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*Pertanika* uses online article submission, review and tracking system for quality and quick review processing backed by Thomson Reuter's ScholarOne™. Journals provide rapid publication of research articles through this system.

For details on the Guide to Online Submissions, visit http://www.pertanika.upm.edu.my/guide_online_submission.php

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# Contents