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Pertanika, the pioneer journal of UPM, began publication in 1978. Since then, it has established itself as one of the leading multidisciplinary journals in the tropics. 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 strengths of the university. These are (i) **Pertanika Journal of Tropical Agricultural Science**, (ii) **Pertanika Journal of Science and Technology** and (iii) **Pertanika Journal of Social Science and Humanities**.

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The objective of the journal is to promote advancements in the fields of anthropology, business studies, communications, economics, education, extension studies, psychology, sociology and the humanities. Previously unpublished, original, theoretical or empirical papers, analytical reviews, book

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## Gender Needs Analysis of Women Entrepreneurs

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**Keywords:** gender needs, gender analysis, women entrepreneurs.

### ABSTRAK

Satu kajian telah dijalankan dikalangan pengusaha wanita di Lembah Kelang. Kajian bertujuan untuk meneliti ciri-ciri dan profil perniagaan usahawan wanita; mengenalpasti keperluan usahawan wanita dari perspektif gender. Pengumpulan data dijalankan dengan menggunakan borang soalselidik secara pos dan seramai 33 usahawan wanita diambil sebagai responden kajian. Hasil kajian menunjukkan seramai 66.7% daripada responden terlibat dalam perniagaan kecil yang berasaskan perkhidmatan, 36.4% dalam perkhidmatan profesional, 21.2% dalam perniagaan pembuatan, dan 9.1% sebagai pemborong. Kajian juga menunjukkan bahawa keperluan utama responden ialah usahawan wanita perlu mendapat pendedahan yang sebaik-baiknya mengenai keusahawanan. Ini diikuti dengan keperluan latihan dalam kemahiran pengurusan perniagaan, sistem penasihat dan kaunseling kerjaya, pembentukan persatuan sesama usahawan, akses yang lebih baik terhadap kredit dan penglibatan yang lebih aktif dalam perniagaan yang selama ini diceburi kaum lelaki. Kajian juga mengutarakan cadangan dalam usaha untuk membangunkan usahawan wanita.

### ABSTRACT

A study was conducted on women entrepreneurs in Klang Valley to examine the characteristics and business profile of women entrepreneurs and to identify the gender needs of women entrepreneurs. The data was collected by using mailed questionnaires and 33 women entrepreneurs responded. The study revealed that 66.7% of the women were involved in retail services, 36.4% in professional services, 21.2% in manufacturing and 9.1% in wholesale. The study also showed that among the significant needs women required more exposure to entrepreneurship, business management training, system of mentoring and career counselling, networking and better access to credit facilities and better involvement in male-dominated business. Some recommendations to help develop women entrepreneurs are forth.

### INTRODUCTION

Investigation into female entrepreneurship is a recent development. The available entrepreneur analyses mainly focused on male entrepreneurs (Stevenson 1986). The specific objectives of this study are first, to identify the characteristics and business profiles of women entrepreneurs; and second to examine the gender needs of women entrepreneurs.

#### *The Background of Women Entrepreneurship in Malaysia*

An entrepreneur defined as "the organiser of economic venture" owns, organises and

assumes the risk of the business. According to McMullan and Long (1990) an entrepreneur is a self-employed person who has to face uncertainty, and will never be tied down to the traditional way of making deals. Moore (1990) defines entrepreneur as one who takes an active role in the decision making and the risk of a business in which she/he has majority ownership. There has been an increase in number of women entrepreneurs in Malaysia in the past two decades due to the economic recession and the increase rate of unemployment in the mid 1980s, resulting in many of the unemployed graduates choosing self-employment. Increasing interest in privatisa-

tion, self-employment and business-oriented employment encouraged and facilitated the growth of new enterprise in sectors such as food manufacturing, general trading, banking and financing, personal and public services, education, training and consultancy, and many others. The sixth Malaysia Plan (Table 1) shows that the role of women in business was on an increasing trend. In 1980, 40.1% of the total women labour force were in the manufacturing sector, 29.3% in the wholesale, retail, hotels and restaurants, 29.5% in the finance, insurance, real estate and business services sector. By 1990, the proportion of women's labour force in those businesses had increased to 46.4% in manufacturing, 38.6% in the wholesale, retails, hotels and restaurants, and 34.2% in finance, insurance, real estate and business services.

TABLE 1  
Percentage distribution of women's  
employment by industry

| Industry  | 1980 | 1985 | 1990 |
|---|------|------|------|
| Agriculture & Forestry                                    | 39.0 | 38.4 | 34.4 |
| Mining & Quarrying  | 10.3 | 10.5 | 12.9 |
| Manufacturing   | 40.1 | 43.1 | 46.4 |
| Electricity, Gas & Water                                  | 7.5  | 3.4  | 6.9  |
| Construction  | 7.1  | 5.6  | 4.3  |
| Wholesale & Retail Trade,<br>Hotel & Restaurants          | 29.3 | 37.7 | 38.6 |
| Transport, Storage &<br>Communications                    | 6.3  | 10.4 | 11.1 |
| Finance, Insurance,<br>Real Estate &<br>Business Services | 29.5 | 35.1 | 34.2 |
| Community, Social<br>& Personal Services                  | 29.4 | 36.8 | 37.9 |
| Average % Distribution                                    | 32.7 | 34.6 | 35.0 |

Source: Sixth Malaysia Plan, 1991-95 (1991: 463)

The participation of women in modern business could be traced from the period of women's involvement in the cooperative movement in the nineteen fifties & sixties. Manderson (1980) reports on the proliferation of cooperatives established by "women for women" to meet their credit. The

establishment of these organisations reflect the inaccessibility to credit and loan facilities which were faced by women entrepreneurs.

O'Brien (1983) noted that many women resorted to self-employment in small scale trades, services and industries. In Peninsular Malaysia in 1970, 18% of the female labour was classified as "own-account workers" and 2.3% as employers; and 13% were engaged as 'working proprietors of wholesale and retail trade'.

A study on the profile of Malay women entrepreneurs in Kuala Lumpur (Fatimah Daud, 1975) found that most of them were in the 35-44 age group, were married, came from large families and were eldest in rank, and were housewives before they started their businesses. They were motivated by the prospects of better income and received encouragement from their husbands. Majority of them were involved in hawking, retailing and wholesaling because these businesses did not require large capital on skilled manpower and were less risky.

The available studies in Malaysia and elsewhere point to a conclusion that women entrepreneurs encountered many other problems apart from those already mentioned. Example, management technicalities such as obtaining lines of credit, lack of skilled labour, and lack of knowledge in marketing, financial planning and business training. In addition, they also had to strike a balance between their personal life and career (Md. Zabid and Fariza 1992).

In the United Kingdom, Allen and Truman (1993) found that restricted access to capital and collateral remains a key barrier for women to achieve financial security. A further constraint on women's business activity is that of sectoral segregation. Throughout the world, women entrepreneurs are most likely active in food production, nutrition, health and child care industries.

A study by Scott (1986) in Georgia United States, revealed that about 40% of the women entrepreneurs perceived that it would be easier to borrow money if they were men. The same percentage of respondents also reported that balancing the needs of business and family was their greatest

problem. (Stevenson 1986). Other problems cited were the lack of skills in record-keeping, advertising and sales promotion.

#### *Gender Needs and Women Entrepreneurs*

The term gender refers to the socially defined roles, resources and responsibilities of men and women as they relate to one another (Whitehead 1971; Murray Li 1993). It is different from the term sex which is derived from biological characteristics of being male and female. The term gender relations emerges to distinguish social relations between men and women, and are based on two assumptions. First, the problems faced by women are not caused by women per se, but as a result of the relations between men and women in the social system. Second, it is assumed that the roles of men and women are actually complementary, while in fact it is not always the case. Since men and women have different roles and responsibilities, they use different approaches in getting access to resources and facilities relevant to their needs. Gender needs are those that women (or men for that matter) may develop by virtue of their social positioning and functions through gender attributes (Moser 1993).

One way to fulfill the strategic gender needs of women entrepreneurs is by solving problems they face on the basis of they 'being a woman' and in lacking the required business skills. The most significant problem however is meeting the demands of family responsibilities and career (which in most research is the least important of problems mentioned by men entrepreneurs). Gender needs should also be identified. Women entrepreneurs behave differently from men in terms of managing and leading their enterprises (Helgesen 1990). Their personality characteristics, business needs, strengths and weaknesses as business individuals are different and this study attempted to verify some of these differences.

#### **METHODOLOGY**

Data collection was conducted by using a set of questionnaires. The respondents were asked about their personal and entrepreneur-

al characteristics such as type of enterprise, length of involvement, workers employed, types of business ownership, total sales and paid-up capital and their reasons for going into business. They were also asked about their perceptions on various gender-related statements based on a five-point interval scale, ranging from strongly disagree (1) to strongly agree (5).

The questionnaires were sent by mail to 96 women entrepreneurs in the Klang Valley. The mailing lists were obtained from the National Entrepreneur Centre of the Ministry of Public Enterprise, and the Malaysian Women's Development Institute (IKWAM). They were registered under these institutions as entrepreneurs and had attended training and received advisory services from the institutions. A total of 33 respondents (34.4%) returned the questionnaires.

Women entrepreneurs' profile and needs derived from this study were compared, wherever necessary, with those of men found in the literature. The data were analysed in the SPSS-Windows programme. The reliability test was conducted for the perceptions on gender needs items and the reliability coefficient was reasonably high at 0.8531.

#### **RESULTS AND DISCUSSION**

The data below shows that women entrepreneurs were engaged in a wide range of service-oriented business, the most common was retailing (66.7%). These include tailoring, direct selling, mini-market and restaurant, and selling computer products as well as pharmaceutical goods. Next category of activities were professional services which include training, consultancy and counselling, advertising and travel agencies (36.4%); manufacturing (21.2%); and business in wholesale accounted for 9.1%. Other businesses include boutique and beauty saloon, and stockbroking (12.1%).

It was also interesting to note that 10 women entrepreneurs were engaged in two different types of business activities and three had three different types of business activities.

About 45% of the respondents had sales above RM350,000 per annum and about

TABLE 2  
Types of business activity

| Activity              | Frequency*<br>(N = 33) | Percent* |
|-----------------------|------------------------|----------|
| Retail Services       | 28                     | 66.7     |
| Professional Services | 12                     | 36.4     |
| Manufacturing         | 7                      | 21.2     |
| Wholesale             | 3                      | 9.1      |
| Others                | 4                      | 12.1     |

\* Frequencies and percentages are non-additive due to multiple responses of a respondent.

equal percentages (27.3 %) had sales in the range of RM100,000 – RM350,000 and that of below RM100,000. 60.6% had a paid-up capital of RM100,000 and below; while the rest (39.4%) had total paid-up capital of more than RM 100,000. In terms of employees, more than three-quarters had 10 staff and below, while 15.2% had 11 to 25 staff. Three enterprises had 45, 52 and 73 employees respectively. The enterprises comprised of producing transformers engine and hydraulic oil; home and office furniture, and processing burger and meat products. Ownership of the businesses 51.5% were private limited, 30.3% sole proprietorships and 18.2% were partnerships. In terms of length of involvement in the business, the data indicated that 57.6% of the enterprises were less than five years old; 18.2% were six to ten years old, 12.2% were 16 to 20 years old and 9.0% were 11 to 15 years old. One tailoring enterprise had more than 20 years of involvement. Table 3 summarises the profile of the women enterprises.

Table 4 summarises the demographic characteristics of respondents. Their mean age was 39.6 years, 75.8% were married, and about 75.8% had less than three children. About half of the respondents had tertiary education (degree and diploma), 27.3% school certificates and more than half of them were from families with business background.

#### Reasons for Starting Business

Reasons for starting business were the opportunity to increase income (66.7%), and the freedom of having control over their

working lives (42.4 %). About one third of the respondents (30.3 %) said that owning a business is the best way for a woman to maintain both domestic and career roles. 24.2% said they wanted a more rewarding job and 21.2% said they enjoyed the personal autonomy it gave them. The above data suggests that economic reason is the most motivating factor to the women entrepreneurs. This gave them a better income, economic independence and better working environment. This in general reflects the desire to have more control over their working lives. The need for greater independence suggests that the motivating force was not directly related to material needs alone but other intrinsic reasons such as personal autonomy and self-interest. For the unemployed (e.g. full housewife), involvement in small business is stimulating because it gives

TABLE 3  
Characteristics of women-owned enterprises

| Item                                | Frequency<br>(N = 33) | Percent |
|-------------------------------------|-----------------------|---------|
| <i>Total Sales</i>                  |                       |         |
| Less than RM 100,000                | 9                     | 27.3    |
| RM 100,000-RM 350,000               | 9                     | 27.3    |
| More than RM 350,000                | 15                    | 45.4    |
| <i>Total Paid-up Capital</i>        |                       |         |
| Less than RM 50,000                 | 11                    | 33.3    |
| RM 50,000-RM 100,000                | 9                     | 27.3    |
| More than RM 100,000                | 13                    | 39.4    |
| <i>Total Employees</i>              |                       |         |
| Less than 10                        | 25                    | 75.8    |
| 11 - 25                             | 5                     | 15.2    |
| More than 25<br>( $\bar{x}$ = 11.2) | 3                     | 9.0     |
| <i>Types of Ownership</i>           |                       |         |
| Sole proprietor                     | 10                    | 30.3    |
| Partnership                         | 6                     | 18.2    |
| Private Limited                     | 17                    | 51.5    |
| <i>Age of Business (years)</i>      |                       |         |
| 1 - 5                               | 19                    | 57.6    |
| 6 - 10                              | 6                     | 18.2    |
| 11 - 25                             | 3                     | 9.0     |
| 16 - 20                             | 4                     | 12.2    |
| More than 20<br>( $\bar{x}$ = 7.33) | 1                     | 3.0     |

TABLES 4  
Demographic characteristics of women entrepreneurs

| Characteristics                             | Frequency<br>(N = 33) | Percent |
|---|-----------------------|---------|
| <i>Age (years)</i>                          |                       |         |
| 20 - 30                                     | 5                     | 15.2    |
| 31 - 40                                     | 12                    | 36.3    |
| 41 - 50                                     | 15                    | 45.5    |
| 51 and above<br>( $\bar{x}$ = 39.6)         | 1                     | 3.0     |
| <i>Marital Status</i>                       |                       |         |
| Married                                     | 25                    | 75.8    |
| Single (unmarried/widow<br>divorced)        | 8                     | 24.2    |
| <i>Number of Children</i>                   |                       |         |
| 0   | 6                     | 18.2    |
| 1 - 3                                       | 19                    | 57.6    |
| 4 - 6                                       | 7                     | 21.2    |
| 7 - 9<br>( $\bar{x}$ = 24)                  | 1                     | 3.0     |
| <i>Educational Attainment</i>               |                       |         |
| Degree and higher                           | 11                    | 33.3    |
| Diploma                                     | 8                     | 24.2    |
| Higher School Certificate                   | 1                     | 3.0     |
| School Certificate                          | 9                     | 27.3    |
| Lower Certificate of Education<br>and below | 2                     | 6.1     |
| No response                                 | 2                     | 6.1     |
| <i>Family Background</i>                    |                       |         |
| Family involved in business                 | 18                    | 54.6    |
| Lived in big town                           | 13                    | 39.4    |
| Lived in small town                         | 4                     | 12.2    |
| From village                                | 10                    | 30.3    |
| No exposure in business                     | 7                     | 21.2    |

them the satisfaction of working within their households.

#### *Previous Job Experience*

About one-third of the women entrepreneurs had previous administrative experience (administrators, managers and clerks). Other previous job experience was in secretarial, education, finance and public relations sectors.

#### *Problems Encountered by Women Entrepreneurs*

Only one-third of the respondents mentioned

TABLES 5  
Reasons for starting business

| Reason  | Frequency*<br>(N = 33) | Percent* |
|---|------------------------|----------|
| Opportunity to<br>increase income                   | 22                     | 66.7     |
| Freedom   | 14                     | 42.4     |
| Flexibility   | 10                     | 30.3     |
| Interested  | 8                      | 24.2     |
| To escape from insecure and<br>low-paid occupations | 8                      | 24.2     |
| Personal autonomy                                   | 7                      | 21.2     |
| Challenging career                                  | 2                      | 6.1      |
| Family tradition                                    | 2                      | 6.1      |
| Assisting husband                                   | 1                      | 3.0      |
| Shift to a new career                               | 1                      | 3.0      |

\* Frequencies and percentages are non-additive due to multiple responses of a respondent.

TABLE 6  
Previous job experience

| Areas                          | Frequency | Percent |
|--------------------------------|-----------|---------|
| Administration                 | 10        | 30.3    |
| Business                       | 8         | 24.2    |
| Housewife                      | 5         | 15.2    |
| Secretarial                    | 4         | 12.1    |
| Education                      | 3         | 9.1     |
| Finance                        | 3         | 9.1     |
| Public Relations               | 2         | 6.0     |
| Others (doctor and technician) | 2         | 6.0     |

that they were very satisfied with their current status of business. The large majority stated they were fairly satisfied with their present business.

On the problems they face, twenty respondents cited financial-related difficulties as their greatest problem (60.6%). This includes access to credit facilities, large amount of capital or investment needed, financial management, difficulty in obtaining contracts and high rate of rent of business premises. Nineteen respondents found difficulties handling human resources needs (57.6%) such as high turnover rate, unskilled workers, lack of discipline and commitment in work among the workers and lack of manpower. Other problems were lack of distribution outlets and limited networking



TABLE 7  
Problems encountered by women entrepreneurs

| Problems                                  | Frequency* | Percent* |
|---|------------|----------|
| Financial                                 | 20         | 60.6     |
| Human resource                            | 19         | 57.6     |
| Marketing                                 | 7          | 21.2     |
| Competition                               | 6          | 18.2     |
| Lack of support from development agencies | 4          | 12.1     |
| Price fluctuation                         | 3          | 9.1      |
| Space/premise                             | 3          | 9.1      |
| Business contact                          | 2          | 6.1      |
| Lack of knowledge, skills and experience  | 2          | 6.1      |
| Others                                    | 6          | 18.8     |

\* Frequencies and percentages are non-additive

(21.2%), lack of support from government agencies (12.1%), price fluctuation (9.1%), lack of business contacts (6.1%) and lack in skills and experience in their respective businesses (6.1%).

Table 8 gives results of t-test analysis on women's total sales in two business categories: women's traditional business and male-dominated business and any significant difference categories of business. Women's traditional businesses refer to food processing and manufacturing, tailoring, boutique, restaurant and canteen, beauty saloon and direct selling. While male-dominated businesses refer to other businesses which include retail services in mini-market and wholesale, professional services in training and consultancy, medical and counselling electrical and engineering, telecommunication consultancy, sales of computer and sports equipment and stockbroking. Both t-tests results produce nonsignificant t-values. This shows that there is no significant difference in mean of total sales between entrepreneurs in women's traditional businesses and those of male-dominated.

#### *Perception on Gender Needs*

In this study, gender needs are defined as the prioritised concerns that women entrepreneurs have to fulfill. Table 9 presents the results of perception of respondents on gender needs. The items are arranged and ranked

TABLE 8  
T-value for total sale by category of business

| Variable                     | N  | Mean     | t-value | p     |
|------------------------------|----|----------|---------|-------|
| Category of Business         |    |          |         |       |
| Women's Traditional Business | 14 | 214285.7 |         |       |
| Male-Dominated Business      | 19 | 359210.5 | -2.5    | 0.338 |

according to values of mean of each item. The highest needs as perceived by the respondents in descending order were as follows: better exposure in entrepreneurship (4.727), skills training in planning, financial and business management (4.697), mentoring system for guidance and access to career counselling (4.485), networking and formation of association (4.394), better access to credit (4.364), more active involvement in male-dominated business (4.364), shared ownership of house between spouses (4.091), and provision of creche or nursery facilities (4.061).

Next, the need for partnership between spouses and the need for property ownership. Categorized under joint entrepreneurship was (3.818), joint-credit between husband and wife (3.697), and ownership of business account (3.364). The location of nursery near to wife's business premise (3.697) was seen as one of women entrepreneurs' gender needs. The last group of items which were considered least important by the women entrepreneurs were matters pertaining to property ownership with spouses.

Three major needs that could be concluded from Table 9 are first, needs which are generated from the situation of "women" themselves being the business owners. These are actually related to difficulties or problems faced more by women entrepreneurs compared to men. Second, needs valuing partnership between spouses in business. They are shown by items 7th to 12th in the rank. The last category of needs refers to concerns least needed in their business. Example, wanting ownership of business to be under the husband. It is clear that most do not have these needs as the conditions perpetuate or even make worse the condition of women

TABLE 9  
Results of respondents' perception on needs

| Need  | Mean  | Std. Dev. | Rank |
|---|-------|-----------|------|
| Better exposure in entrepreneurship                             | 4.727 | 0.452     | 1    |
| Skills training in planning, management, accounting, etc.       | 4.697 | 0.467     | 2    |
| Mentoring system for guidance and access to career counselling  | 4.485 | 0.566     | 3    |
| Networking and formation of association                         | 4.394 | 0.966     | 4    |
| Better access to credit   | 4.364 | 0.962     | 5    |
| More active involvement in male-dominated business              | 4.364 | 1.084     | 6    |
| Shared ownership of house                                       | 4.091 | 1.011     | 7    |
| Creche/nursery facilities                                       | 4.061 | 1.116     | 8    |
| Joint-type of entrepreneurship                                  | 3.818 | 1.334     | 9    |
| Creche/nursery facilities to be near to own place of work       | 3.697 | 1.723     | 10   |
| Credit to be under husband and wife's name                      | 3.576 | 1.582     | 11   |
| Business account to be jointly owned                            | 3.364 | 1.729     | 12   |
| Credit to be under own name only                                | 2.909 | 1.608     | 13   |
| Separate business account between husband and wife              | 2.697 | 1.776     | 14   |
| Business ownership under own name                               | 2.545 | 1.822     | 15   |
| House ownership under own name                                  | 2.333 | 1.963     | 16   |
| Creche/nursery facilities to be near to husband's place of work | 2.303 | 1.667     | 17   |
| Business account to be under own name                           | 2.273 | 1.892     | 18   |
| Credit to be under husband's name                               | 2.152 | 1.395     | 19   |
| Entrepreneurship to be under husband's name                     | 1.545 | 1.227     | 20   |
| Business account to be under husband's name                     | 1.515 | 1.326     | 21   |
| House ownership to be under husband's name                      | 1.485 | 1.372     | 22   |

entrepreneurs in terms of securing economic independence, personal autonomy, working flexibility and hence, role and control over their business endeavour. The data shows that the field of entrepreneurship and business should be made open to every one, male or female. For early exposure entrepreneurship should be taught in school without gender bias and it should be inculcated in the curriculum that entrepreneurship and small business ownership are attractive options for men as well as for women.

Many studies have indicated that female entrepreneurs, are weak in business management skills (Hisrich and Brush 1984; Md. Zabid and Fariza, 1992) as shown by this study. Training in business management was cited as the second most important need among the entrepreneurs. Several reasons could explain why the respondents need the training in order to upgrade their business

management skills. First, only one-fifth of the respondents had previous job experience in business. Majority of them were employees in the administrative (middle level), education or secretarial fields. Some were housewives. Second, almost two-third of the women entrepreneurs have been involved in business less than five years, and only about half of them come from families with business background. This indicates their inadequate experience in business operations and the specific skills in business management. These women entrepreneurs may not yet have the confidence in management skills and this will inhibit them from succeeding. Another important need expressed by the respondents is mentoring system for guidance and counselling. This is consistent with other studies conducted abroad (Hisrich and Brush 1984; Olson and Curfie 1992). Mentoring could expose new women entrepreneurs to the

successful female entrepreneurs as role models to build up their confidence and be a source of inspiration to them.

Another parallel need is the setting up of informal and formal networking among women entrepreneurs which was cited as the fourth priority among the respondents. A women's network would be very useful for them to have wider business institutional support system to acquire business information such as available opportunities and trainings. In general, they felt that there should be more active involvement of women in businesses that have been dominated by males. This is supported by the results of the t-test which shows no significant difference in total sales between business traditionally owned by women and in business traditionally associated with males. The fact that there are more women involved in male-dominated business today than before means that the scope of business for women have been expanded beyond the confines of the traditional female businesses. With the country is moving into industrialisation, the number of modern businesses which had previously been male-dominated are expected to increase and businesses such as advertising, banking and financing, counselling and training, tourism and travel agencies, sales and servicing, security services, and engineering could attract more female involvement in the future.

Partnership with spouses is perceived as vital to ensure the growth of the business owned by women (even though this is perceived to be of a lesser need). Firstly, husbands are compelled to become involved in the business because financial institutions often require the husbands to negotiate or co-sign the wife's business loan. Secondly, women to ensure business strength and security in terms of getting clients, establishing networking and business contacts. Thirdly, women probably feel that involving husbands as business partners would ensure a stable marital status by having similar or related business or rather similar business goals. The factor that is least crucial is the need to have single ownership, i.e. in credit, business accounts, proprietorship, or even house ownership. This means that women entrepreneurs prefer to have control

over their properties and business ventures.

## CONCLUSIONS AND RECOMMENDATIONS

The present study concludes that majority of the women entrepreneurs are involved in retail services, professional services and manufacturing. About 45% of the respondents have sales above RM 350,000 per annum, about 61% have a paid capital of RM 100,000 per annum and below. About 70% have less than 10 employees; 52% have business of private limited; and 58% have been involved in business for less than five years.

The mean age of respondents is 39.6 years, with 76% of them being married with children. A total of 58% of them have higher education with diploma or higher degrees in various disciplines. Two-thirds of the respondents mentioned that they joined business primarily for economic reasons such as the opportunity to increase income and to escape from relatively insecure and low-paid occupations, to have control over their working lives and to balance both domestic and business roles. Also mentioned were non-economic factors such as personal autonomy and self-interest. There is no significant difference in performance however, between women entrepreneurs involved in women's traditional business and those in male-dominated business.

The most important need expressed by the women entrepreneurs was more exposure in business as they were relatively weak in managerial skills compared to men, and wanted therefore better access to acquire the related skills. Women entrepreneurs also, need mentoring for guidance and career counselling, stronger networking, better access to credit lines, and active involvement in male-dominated business. The future scenario in Malaysia will be the proliferation of more businesses in various industries, and that means more opportunities for skilled women.

This study provides insights into the various women business in Malaysia, and the issues affecting women entrepreneurship. Established women organisations can play an important role in assisting the women

entrepreneurs in acquiring business skills, information and advisory services, and networking. Banks and financial institutions should also be more flexible or sensitive to the financial needs of women entrepreneurs. The setting up of the Ministry of Entrepreneurs Development recently reflects the strong concern of the government and the public on development of entrepreneurs. It is hoped, that, with the various programmes formulated by the Ministry and women organisations, the participation of women entrepreneurs in the overall national development could be enhanced.

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## Oral Skills – A Need for Acceptance of L1 Cultural Norms

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**Keywords:** cultural awareness, speech acts, cultural transfer, language teaching

### ABSTRAK

Kertas ini menyelidik ujaran jenis bantahan (the speech act of disagreement) yang digunakan oleh 248 mahasiswa di Fakulti Ekonomi, Universiti Malaya, semasa mereka mengambil peperiksaan lisan yang dijalankan selama tiga minggu. Peperiksaan dijalankan dalam kumpulan empat orang dan setiap orang diberikan satu situasi. Setiap pelajar diberi satu opsyen dan mereka mesti membincangkan kebaikan opsyen tersebut. Selepas 20 minit membentangkan ide mereka (setiap orang lima minit), mereka harus berbincang secara kumpulan untuk memilih opsyen yang terbaik. Di dalam perbincangan mereka, mereka menggunakan ujaran jenis persetujuan, bantahan, ujaran separa persetujuan, ujaran separa bantahan dan sebagainya. Kesemua jenis ujaran (speech acts) ini telah pun didedahkan kepada pelajar di dalam kelas. Secara amnya, ramai pelajar tidak menggunakan corak yang diajarkan di dalam kelas seperti "I disagree", "Your idea is ludicrous", "You are wrong" dan sebagainya. Malah mereka kurang menggunakan perkataan yang secara langsung menunjukkan bantahan yang selalunya mencerminkan norma ujaran bantahan dalam bahasa pertama yang paling nyata. Corak yang sedemikian adalah betul dari segi nahu dan diterima dari segi sosiolinguistik di persekitaran Malaysia/Asia. Penulis membuat satu kes bagi penerimaan pertukaran budaya pertama kepada bahasa kedua dan berpandangan bahawa norma tersebut harus ditonjolkan di dalam bahan-bahan pengajaran khususnya bagi pengajaran bahasa.

### ABSTRACT

The use of the first language cultural norms in the second language was tested during a three week oral examination from the language used by 248 undergraduates in the Faculty of Economics, University of Malaya. The speech act of disagreement taught in the classroom ranged from direct disagreement (emphatic and assertive) to less direct ways of disagreement such as partial disagreement, partial agreement to agreement. Each group of four students had to choose the suitable speech from disagreement options. The analysis showed that about 78% of the students used indirect means of disagreement and of the 20% who used direct disagreement only about 3% used the more assertive utterances of disagreement. The less 'assertive' statements reflecting the norm of disagreement in the first language were often used. Such patterns are grammatically correct and sociolinguistically acceptable within the Malaysian/Asian environment. In fact, the more assertive forms would be considered rude and 'kasar' (rough). The writers therefore strongly recommend the acceptance of the first language cultural norms into the second language and are of the view that such norms should be reflected in language teaching instructional materials.

### INTRODUCTION

Language is an integral aspect of culture. The cultural context consists of two components – the psychological and sociological, the former is represented by the values, beliefs and attitudes, and the latter by the sociolinguistic variables, such as who is speaking to whom, about what, where etc i.e. questions of appropriacy and correctness. Language therefore is not the same in all cultures. Malaysia is

a multiracial, multicultural nation which comprises Malays, Chinese, Indians and other indigenous groups. Research on the pragmatics of cross cultural communication in a Malaysian context indicates that Malays, Chinese and Indians appear to have assimilated cultural norms of speaking especially in the area of disagreement and indirectness (Jamaliah Mohd. Ali, 1991a). It appears therefore that "a Malaysian cultural ethos

has emerged which transcends ethnic differences" (Khemlani-David: 1992a).

The first language culture in Malaysia refers to a culture which comprises predominantly of the Malay, Chinese, and Indian cultures. In Malaysia, the notion of face is very important in interpersonal communications. Malaysians use circumlocution and indirectness in their conversational style in an attempt to "save face." Jamaliah Mohd. Ali (1991a) provides a reason for this use of indirectness. She states "one of its main intentions is conflict avoidance." On Malay language, Clifford and Swettenham (cited in Brown: 1951) state that the second language is "essentially a diplomatic language and one admirably adapted for concealing the feelings and cloaking the real thoughts." Silence is of course the ultimate recourse for avoiding conflict. Unfortunately, our students could not use this strategy in the examination and had to resort to other strategies such as indirectness.

In the Asian society, "saving face" is important in order to avoid conflict and to maintain social harmony. Indirect communication is an important aspect of Asian culture. Jamaliah Mohd. Ali (1991b) states that "only a part of meaning resides in the words spoken, the LARGEST (our emphasis) part is communicated by hints, assumptions, innuendoes, and audience filling in from context and prior knowledge."

In the second language context, it is important to determine what the goal of language teaching is. According to Nattinger (1977) "we must concern ourselves not only with the functions but also the ways and the means by which these functions are realized across cultures." If for instance, the aim is for a learner to use the second language to communicate with the native speaker it is the writers' contention that a knowledge of both the target language and the socio-pragmatic rules of that language must be taught. However, if the goal is to have a knowledge of the second language for communication within the home country, i.e. Malaysia, then we are of the view that the socio-pragmatic rules of the first language must prevail, even though the language used

may be a second language (Table 1). In a study on compliments used by speakers of Malaysian English it is found that the learners appear to display significant use of the Malaysian value system although they are not using their mother tongue (Khemlani-David, 1992b).

This paper examines the forms of disagreement found in the speech of undergraduates of the Faculty of Economics at the University of Malaya, with a view to determine whether the first language cultural norms have been transferred into the second language.

Examples of the first language with socio-cultural influence in communication were taken from local dramas broadcasted in the local television stations. The data indicate that disagreement is seldom directly expressed especially among the Malay speakers. Rather it tends to be more indirect and is expressed in several ways (Table 2).

Body language is also used to indicate disagreement and indirectness. Indirectness amongst the Malays was clearly portrayed in the T.V. dramas. In order to indicate disagreement, for instance, they would shake their heads shrugging their shoulders, or smiling and avoiding eye contact to signal disagreement.

Sociolinguistic norms are an important facet of communicative competence and when a second language is learnt, often sociolinguistic norms or ways of expressing opinions are transferred from the native culture to the second language which is English. This, at times leads to 'accusations' of non-assertiveness and cross cultural misunderstanding by native speakers of English.

The writers contend that in interlingual communication within the Asian region where common sociolinguistic norms prevail and where English is used as an international language for communication it is vital that such first language norms remain in the second language discourse. Second language teachers of English therefore should be sensitive to and aware of the first language cultural norm transfers in the second language.

TABLE I  
Socio-pragmatic rules of communication

|    |   |   |   |   |   |   |
|----|---|---|---|---|---|---|
| L2 | = | L2<br>grammar<br>syntax<br>lexical<br>items | + | L2<br>sociolinguistic<br>norms of<br>where, when,<br>what about,<br>why, etc. | = | Cross Cultural<br>Competence<br><br>(English used<br>with native<br>speakers of the<br>target language.)  |
| L2 | = | L2<br>grammar<br>syntax<br>lexical<br>items | + | L1<br>sociolinguistic<br>norms of<br>where, when,<br>what about,<br>why, etc. | = | Use of L2 in a<br>multilingual society<br>where English is a<br>medium of<br>communication<br>but not a native<br>language in the<br>Asian setting. |

L1 = first language

L2 = second language

TABLE 2  
Direct and indirect forms of disagreement

I. Direct and less direct ways of disagreement.

a) The use of apologetic preface.

Aku minta maaf jika aku terkasar tadi tetapi  
I ask forgiveness if I rough just now but

sememangnya aku tidak setuju sungguh dengan  
actually I don't agree fullheartedly with

apa yang kau cadangkan itu.  
what which you proposed that.

-I apologise if I appeared rude but actually I disagree  
completely with your proposal.

b) The use of a verb softener.

Saya rasa saya tidak setuju.  
I feel I don't agree.

-I *think*\* I don't agree.

\**think* here is used intentionally to soften the disagreement.

c) The use of initial agreement followed by a contrast (disagreement) marker in a statement.

Aku akan turutkan kehendak engkau tu tetapi ingat,  
I will obey wishes yours but remember

aku tak suka melakukannya.  
I don't like doing so.

-I will abide by your wishes but remember I don't like doing so.

Saya setuju dengan cadangan abang tu tapi kita harus  
I agree with proposal brother yours but we must

fikir tentang akibatnya nanti.  
think about consequences later.

-I agree with your proposal but we must consider future consequences.

d) The use of a question form expressing doubt.

Tidakkah kau rasa yang perbuatan mu itu akan  
Don't you think which action yours that will

mencemarkan kebersihan kampung kita?  
pollute cleanliness village ours?

-Don't you think your action will pollute our village?

Apa kata kalau mereka tak suka dengan pilihan  
What say if they don't like with choice

mak tu?  
mother your?

-What if they dislike your (the mother) choice?

e) The use of a contrast marker with a question form indicating disagreement.

Tetapi tidakkah kau terfikir yang akibat perbuatan kau tu  
But don't you think which consequences action yours

akan merosakkan nama baik keluarga kita?  
will spoil name good family ours?

-But don't you think your action will have consequences which will damage our family name.

f) The use of 'don't think' and 'because' (providing a reason).

Saya rasa perkara itu tidak menjadi masalah kerana kalau  
I feel matter that don't become problem because if

sama-sama berusaha tentunya projek itu akan berjaya.  
together work surely project that will be successful.

-I don't think that issue is a problem because if we work hard  
together definitely the project will be successful.

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II. Questioning strategies suggesting doubt or disagreement.

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a) The use of "how".

Kita tahu yang penghulu kampung ini sudah  
We know that head of the village this finish



bersubahat dengan komunis jadi bagaimana harus kita  
accomplice with communist so how will we

singkirkan dia?  
dispose him?"

- We know that the head of the village has ties with the communists so how do we dispose of him?

b) The use of "why".

Cuba kau fikir masak-masak tentang cadangan bapak tu.  
Try you think cook about proposal father your.

-Why don't you think about father's proposal carefully?

## MATERIALS AND METHODS

The objective of this study was to examine the use of the first language cultural norms in the second language by analyzing the language used by undergraduates of the Faculty of Economics, University of Malaya during an oral examination. The focus of this research was to examine and analyse the speech act of disagreement. Students had been taught a range of speech acts e.g. greetings, complimenting, agreeing, disagreeing etc. over a period of two semesters and it was hypothesized that less assertive forms of disagreement, which are a reflection of the first language culture will be used in the second language.

The speech act of disagreement of 248 undergraduates of the Faculty of Economics, University of Malaya was analysed during a three week oral examination conducted in February/March 1992. The oral examination comprised of 20% of the total examination and a written component of 80%.

Students were tested in groups of four, and in the first part of the examination they had to make a presentation for five minutes each. They had to discuss the advantages of the option offered in a case. After a five minute presentation by each student, the group concluded on the best option. The role of the examiners was to remain silent and to act as facilitators only when a need arose, for example when the student required help; in understanding a lexical term in the question or deviated completely from the option.

The aim of the oral examination was to evaluate the student's ability to choose a

specific suggestion or option from those pre-set by the examiners, and also to examine the students; ability to discuss the pros and cons of the options and come to a conclusion as to the best solution to a specific situation.

## RESULTS

A list of the range and frequency of ways the students disagreed is shown in Tables 3, 4 and 5.

Out of the 113 utterances indicating disagreement, only one-fifth was direct. About 78% of the students used indirect means of disagreement. Even among the 20% who used the direct language of disagreement, the more assertive utterances indicating disagreement were used very minimally – about 3%. For example:

I don't agree with you entirely.  
I oppose it.

Indirect speech acts of disagreement appeared in two forms:

- I. With the use of softeners – refer to Table 4.
- II. Questioning strategies – refer to Table 5.

Speakers used a number of verbal strategies to lessen the intensity or "soften" their disagreement. Note for example, the use of the less assertive and more polite model "may" in Table 4; even though during the instructional phase the whole range of forms

TABLE 3  
Direct ways of disagreement.

| WAYS OF DISAGREEMENT                                | FREQUENCY |
|---|-----------|
| A. Direct   |           |
| a) The use of "don't agree"                         |           |
| i. I don't agree with you...                        | 13        |
| ii. I don't agree with your comment/proposal/points | 4         |
| iii. I still don't agree with your suggestion.      | 2         |
| iv. I don't agree with you entirely.                | 2         |
| v. I oppose it.                                     | 1         |
| Total   | 22        |

TABLE 4  
Less direct ways of disagreement.

| WAYS OF DISAGREEMENT   | FREQUENCY |
|--|-----------|
| B. Less Direct – use of softeners  |           |
| a) The use of initial agreement followed by contrast (disagreement marker) |           |
| i. I agree but you must remember...  | 1         |
| ii. I agree with you but...  | 5         |
| iii. I also agree with you but...  | 2         |
| iv. I think the trip is interesting but...                                 | 1         |
| v. It is a very good idea but...   | 3         |
| vi. You may have a point there even though...                              | 1         |
| vii. I see this as a short term strategy, on the other hand...             | 1         |
| Total  | 14        |
| b) The use of a verb softener  |           |
| i. I think it is not advisable at this moment...                           | 3         |
| ii. I think settling loans is not a very good way.                         | 2         |
| iii. I think your suggestion is not relevant.                              | 1         |
| iv. I think your misunderstood...  | 1         |
| v. So I think the suggestion is not very good.                             | 1         |
| Total  | 8         |
| c) The use of "don't think..." and providing a reason                      |           |
| i. I don't think... because...   | 7         |
| ii. I don't think so... because...   | 4         |
| iii. So I don't think this is a good recommendation because...             | 2         |
| Total  | 13        |
| d) The use of "don't think" without providing a reason                     |           |
| i. I don't think...  | 3         |
| ii. I don't think so.  | 4         |

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|   |   |           |
|---|---|-----------|
| iii.  | I don't think we need to find...                                      | 2         |
| iv.   | I don't think it is a perfect figure.                                 | 1         |
|   | <b>Total</b>  | <b>10</b> |
| e) The use of a contrast marker in a statement          |   |           |
| i.  | But you must consider...  | 2         |
| ii.   | But the disadvantages are also many.                                  | 2         |
| iii.  | But from my point of view...  | 1         |
| iv.   | But sometimes the customers think that...                             | 1         |
| v.  | But you have to think in terms of...                                  | 1         |
| vi.   | But I think we have a lot of timber industry so we don't need others. | 1         |
|   | <b>Total</b>  | <b>8</b>  |
| f) The use of a contrast marker in a question form      |   |           |
| i.  | But what about...?  | 3         |
| ii.   | But don't you think...?   | 4         |
| iii.  | But do you think...?  | 1         |
|   | <b>Total</b>  | <b>8</b>  |
| g) The use of a question form without a contrast marker |   |           |
| i.  | Don't you think you ought to consider...?                             | 3         |
| ii.   | Don't you think that by providing...?                                 | 2         |
| iii.  | Don't you think that retrenchment should be the last resort?          | 1         |
|   | <b>Total</b>  | <b>6</b>  |
| h) The use of adverbial 'softeners'                     |   |           |
| i.  | I don't really agree with you.  | 3         |
| ii.   | I don't quite agree with you.   | 1         |
|   | <b>Total</b>  | <b>4</b>  |
| i) Providing arguments without directly disagreeing     |   |           |
| i.  | You can't use synthetic rubber because...                             | 1         |
| ii.   | We don't have to depend on... because...                              | 1         |
| iii.  | See we should consider... because...                                  | 1         |
|   | <b>Total</b>  | <b>3</b>  |
| j) The use of an apologetic preface                     |   |           |
| i.  | Excuse me, I think you are wrong.                                     | 1         |
| ii.   | Excuse me, I can't really follow your point.                          | 1         |
| iii.  | May I know why you said that...                                       | 1         |
|   | <b>Total</b>  | <b>3</b>  |

TABLE 5  
Questioning strategies suggesting doubt/disagreement.

| WAYS OF DISAGREEMENT                                      | FREQUENCY |
|---|-----------|
| C. Questioning strategies suggesting doubt/disagreement   |           |
| a) The use of "how"                                       |           |
| i. How about...?  | 2         |
| ii. How do you intend to...?                              | 2         |
| iii. So how do...?  | 1         |
| iv. We know... so how to...?                              | 1         |
| Total   | 6         |
| b) The use of "why"                                       |           |
| i. Why don't you look at it his way?                      | 1         |
| ii. Why don't you consider my point?                      | 1         |
| iii. So why must we...?                                   | 1         |
| iv. I feel we shouldn't... so why don't we...?            | 1         |
| Total   | 4         |
| c) The use of questions focusing on weakness of arguments |           |
| i. Have you ever thought of...?                           | 1         |
| ii. Have you considered...?                               | 1         |
| iii. What about sugar?                                    | 1         |
| iv. What if they don't like the sample?                   | 1         |
| Total   | 4         |
| Total number of ways of disagreement                      | 113       |

including the more assertive forms of disagreement had been taught.

Table 4 shows the range of verbal forms used to soften disagreement. It is clear that our sample of Malaysian speakers of English are ambivalent when disagreeing and show a great deal of sensitivity to the interlocutor or speaker who is making a suggestion. This is indicated by framing the speech act of disagreement, by initially agreeing with the speaker before expressing disagreement. Malaysians tend to circumlocute before coming to the point so as to save face and make the proposer feel good. The speaker then states his view which is contrary to his earlier utterance. Incidentally, it is important to highlight that contrast markers like *however*, *on the other hand*, *alternatively*, *even though*,

*although* and so forth which had been taught were not used. Instead most of the students use the contrast marker but 85% that is 12 out of 14 times. This reflects the student's limited proficiency of the target language.

The student tends to regress and slips back into using more comfortable, familiar and easier lexical items even though they have knowledge of other contrast markers such as *even though* and *on the other hand* etc which were minimally used.

### CONCLUSION

What emerged from this analysis is that the students in general avoided the use of the more emphatic *I disagree* and instead, resorted to the less assertive and indirect ways of disagreement. It is vital that in learning a

second language, especially if the goal is for internal communication that is within the society where the second language is being taught, that the first language norms prevail in the second language speech. Culture and language cannot be isolated and in Malaysian culture, the different speech acts are manifestations of the culture. The politeness strategies used by the second language speakers must be fostered and maintained. The writers recommend that local teachers be alert and sensitive to such socio-pragmatic transfers of the first language in the second language speech.

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## Educational Correlates of Ohio Agricultural Students' Career Maturity

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**Keywords:** career maturity, career development, FFA, agricultural students educational correlates

### ABSTRAK

Tujuan kajian ini adalah untuk menilai tahap kematangan kerjaya pelajar pendidikan pertanian di Ohio dan untuk mengenalpasti perhubungan antara tahap kematangan kerjaya dengan beberapa pembolehubah pendidikan. Kajian ini merupakan kajian 'descriptive correlational'. Dapatan kajian ini adalah berdasarkan kepada soal-selidik boleh guna yang telah dikembalikan oleh 495 responden. Kajian menunjukkan skor kematangan kerjaya pelajar pertanian adalah di antara 45 hingga 147 dan minnya ialah 92.84. Sebanyak 25% pelajar telah memperolehi skor di bawah persentil ke 25 dan sebanyak 25% pula memperolehi skor di atas persentil ke 75. Skor kematangan kerjaya pelajar pertanian di Ohio yang berada di gred 10, 11, dan 12 adalah lebih rendah berbanding dengan pelajar dari kumpulan norm. Namun begitu, tidak terdapat perbezaan skor kematangan kerjaya bagi pelajar yang berada di gred 9 untuk kedua-dua kumpulan. Kajian juga mendapati adanya hubungan yang signifikan antara kematangan kerjaya dan penglibatan di dalam FFA, penglibatan di dalam aktiviti kerjaya, penglibatan di dalam aktiviti ko-kurikulum, pencapaian akademik, dan aspirasi pekerjaan. Kelima-lima pembolehubah ini telah menyumbang sebanyak 19% daripada keseluruhan varian kematangan kerjaya pelajar pendidikan pertanian.

### ABSTRACT

The purposes of the study were to assess the level of career maturity of agricultural students in Ohio and to determine the relationships between students' career maturity and several educational correlates. The study employed a descriptive correlational research design. The analysis was based on 495 respondents who returned the useable instrument. The study showed that career maturity scores of agricultural students ranged from 45 to 147 and the mean was 92.84. About one-fourth of the students scored below the 25th. percentile and about one-fourth of the students scored above the 75th. percentile. The career maturity measures of agricultural students in Ohio were significantly lower than students of the norm group at grades 10, 11, and 12. The career maturity measures of the 9th. Graders did not differ for both groups. There were significant relationships between career maturity and: participation in the FFA; participation in career development activities; participation in extracurricular activities; academic achievement; and occupational aspirations. Five significant educational correlates uniquely explained about 19% of the total variance of agricultural student's career maturity.

### INTRODUCTION

High school students in Ohio have the choice to either enroll in college preparatory programs or vocational programs while they are still in high school. This is a tough decision for any high school student. Some students choose to enroll in a very specific program like an agricultural program. But, are they ready or do they make the right decision to enroll in such a program? If students are not ready, what can be done to help them?

Students' readiness can be ascertained by assessing their career maturity. Thus, a study was conducted to measure agricultural students readiness in making the decision to enroll in agricultural program This inquiry was guided by these main questions: (1) What was the level of career maturity of agricultural students in Ohio? (2) Were there any relationships between students' career maturity and selected educational variables? and (3) How much variance in students' career

maturity can be explained by the selected educational variables?

One has to have a certain level of career maturity before one can make rational educational and career choices. Without which, these decisions are made haphazardly. What is career maturity? A review of the definitions by Super (1955), Jarvis (1990), Super and Thompson (1979) indicates that career maturity is one's readiness to make educational and occupational decisions that are expected of them. He is actively involved in career exploration and planning, has a great amount of knowledge about the world-of-work, and the preferred occupations.

What are the correlates of career maturity? Studies have identified many correlates of career maturity, some are under one's control while others are beyond one's control (Vriend, 1969). Some variables that are under one's control include occupational aspiration, academic achievement, participation in school activities. Variables that are beyond one's control include parent educational status, socio-economic status, and the environment one is living in. Besides classifying variables in this way, researchers have classified them into educational, social, and psychological correlates (Pautler, 1988); biosocial, environmental, vocational, personality, and achievement (Super and Overstreet, 1960); and biological, social, psychological, educational, and vocational (Jyung, 1989). Knowing the correlates one can control will be very helpful in the adolescents' career development. For example, if participation in youth activities is positively related to one's career maturity, then one would participate in youth activities or encourage youths or adolescents to participate in such youth activities.

The purpose of the study was to determine the level of career maturity of agricultural students in Ohio. The objectives were to determine the relationships between career maturity and selected educational variables and to determine the amount of variance that is uniquely accounted for by the selected educational variables.

The possible correlates investigated in this study were: participation in the Future

Farmer of America (FFA) organization, participation in supervised agricultural experience (SAE) program, participation in extra-curricular activities, academic achievement as measured by the grade point average, participation in career development activities, and occupational aspiration.

## MATERIALS AND METHODS

### *Population and Sample*

The assessible population for this study consisted of about 16,000 Ohio high school agricultural students who were enrolled in the 1991-1992 school year. A cluster random sampling was used to select the sample. Nineteen agricultural teachers that formed the clusters were randomly drawn from the 1991-1992 list of agricultural teachers in Ohio. Three criteria guided the determination of sample size. They were the level of precision, the risk level, and the degree of variability. In this study the level of precision of 5%, the risk level of 95%, and the degree of variability of .5 were chosen. To compensate for the inefficiency of the cluster sampling procedure and ensure that randomization works (Singleton, Straits, Straits, and McAllister, 1988) the sample size had to be larger than the minimum and a sample size of 530 was chosen. To obtain 530 students, 19 agricultural teachers were selected. All agricultural students (529 instead of 530) were taught by the selected teachers.

### *Intrumentation*

The Career Development Inventory (CDI) developed by Thompson, Lindeman, Super, Jordaan, and Myers (1984) was used to assess students' career maturity. The reliability of the instrument according to researchers ranged from .70 to .88. As part of the bigger survey, students were asked to indicate their participation in the FFA, SAE programs, extra-curricular activities, career development activities, their grade point averages, and occupational aspiration; grade-level; and part-time job experience. These variables were classified as educational-related variables.

The instrument used to collect information on educational-related variables was

developed by the researcher, and reviewed by a panel of seven experts who were agricultural educators in the Department of Agricultural Education at the Ohio State University, Columbus, Ohio. Changes were made based on the recommendations of the panel. The instrument was pilot tested for its reliability using a test-retest procedure. A test-retest results with a group of 30 agricultural students who were not in the sample showed that there were 80% agreement for the educational-related variables.

#### *Data Collection and Analysis*

Survey questionnaires related to demographic variables were mailed to selected teachers a week before the scheduled administration of the CDI. Teachers were requested to administer the survey instruments in advance of the researcher's visit to the school to administer the CDI. Data were analyzed using the Statistical Packages for the Social Science. Statistics which included means, frequencies, standard deviations, correlation coefficients, and t-test were used to describe the findings.

### RESULTS

Although the sample size was 529, only 495 students returned completed and usable questionnaires. To determine if usable and unusable instruments differ significantly, a t-test was performed. The career maturity mean scores of those who returned usable instruments ( $n = 495$ ; mean = 92.84) and those who returned non-usable instruments ( $n = 34$ ; mean = 86.03) were compared. The result of the t-test ( $t = 1.93$ ;  $p > .05$ ) indicated that the two groups of students did not differ significantly. Therefore, the findings of this study could be generalized to the accessible population of agricultural students in Ohio.

About 73% ( $n = 359$ ) of the agricultural students who participated in this study were male and 27% ( $n = 135$ ) were female. Their ages ranged between 14 years and 20 years (mean = 16.2). One hundred and thirty-eight of the students were ninth-graders, 134 were tenth-graders, 113 were eleventh-graders, and 110 were twelfth-graders. Students came from families with the SES mean scores

of 30.4 (Steven and Cho, 1985).

Students' grade point averages, an indicator for students' academic ability ranged from less than 1.0 to 4.0 (mean = 2.57). The levels of students' participation in the FFA, extracurricular activities, and career development activities were determined by the accumulated scores of related activities. The scores for students' participation in the FFA ranged between zero and 23 with a mean of 7.43. The scores for students' participation in extracurricular activities were between zero and 18 (mean = 3.35.) The scores for students' participation in career development activities were between zero and seven (mean = 3.43.) The types of students' occupational aspirations were categorized by SES index (Steven and Cho, 1985). This study showed that the SES index of students' occupational aspirations ranged between 16.90 and 88.80 with a mean of 46.2 (Table 1).

The career maturity scores of Ohio agricultural students ranged from 45 to 147 (mean = 92.84.) About 25% of the students were below the 25th percentile, 26.3% were between the 25th. and 50th percentile, 24% were between the 50th. and 75th. percentile,

TABLE 1  
Means and standard deviations of significant selected educational correlates

| Educational Correlates                         | Mean  | Sd.   |
|--|-------|-------|
| Participation in the FFA                       | 7.43  | 4.95  |
| Participation in extracurricular activities    | 3.35  | 3.98  |
| Academic achievement                           | 2.57  | .84   |
| Participation in career development activities | 3.43  | 1.86  |
| Occupational aspiration                        | 46.20 | 21.73 |

$n = 494$

TABLE 2  
Percentiles of Ohio agricultural students' career maturity scores

| Percentiles    | %    |
|----------------|------|
| Below 25th.    | 25.3 |
| 25th. to 50th. | 26.3 |
| 50th. to 75th. | 24.0 |
| Above 75th.    | 24.4 |



TABLE 3  
Means and standard deviations of career orientation of Ohio agricultural students and students from the norm group

| Grade levels | Ohio Ag. Students |      |     | Norm Group's Students |      |      |         |
|--------------|-------------------|------|-----|-----------------------|------|------|---------|
|              | Mean              | Sd.  | n   | Mean                  | Sd.  | n    | t       |
| 9th.         | 91.7              | 21.8 | 138 | 93.8                  | 19.1 | 1249 | .18     |
| 10th.        | 91.1              | 18.3 | 134 | 100.2                 | 17.8 | 1402 | 5.70*** |
| 11th.        | 96.5              | 19.7 | 113 | 104.0                 | 20.0 | 1269 | 4.04*** |
| 12th.        | 92.7              | 18.9 | 110 | 104.9                 | 21.3 | 1047 | 6.70*** |

\*\*\* significant at  $p < .001$

and 24.4% were above the 75th. percentile (Table 2). This study also showed that career maturity measures of agricultural students in Ohio were significantly lower than students of the norm group (United States norm group) at grades 10, 11, and 12. However, the career maturity measures of ninth-graders of both groups did not differ significantly (Table 3).

#### Multiple Regression Analysis

The results of multiple regression analysis showed the existence of the following significant relationships between career maturity and (1) participation in the FFA ( $r = .22$ ); (2) participation in extracurricular activities ( $r = .26$ ); (3) academic achievement ( $r = .32$ ); (4) participation in career development activities ( $r = .21$ ); (5) occupational aspiration ( $r = .30$ ). No significant relationships were observed between career maturity and participation in Supervised Agricultural Experience Programs; type of school; grade-level; and part-time job experience. Together, the five significant educational variables (academic achievement, occupational aspiration, participation in extracurricular activities and FFA, and career development activities) explained 18.7% of the total variance of students' career maturity [ $R^2 = .187$ ;  $F_{(4,459)} = 22.23$ ;  $p < .001$ ].

A step-wise entry procedure was used to determine how much variance of career maturity was contributed by each of the significantly related variable. A unique contribution of each of the variables significantly correlated with career maturity is displayed in Table 5. An equation for predicting the career maturity of Ohio

agricultural students' can be written as:

$$Y = 4.96(\text{GPA}) + 0.19(\text{OCC.ASP}) + 1.20(\text{CAREER}) + 0.41(\text{XSCORE}) + 0.43(\text{FSCORE}) + 62.76$$

#### DISCUSSION

Career or vocational maturity is a construct primarily important during adolescents (Super, 1955, 1957). It has been widely studied for not less than 40 years. The vocationally mature adolescents are those who are ready to make educational and career related decisions. Jordaan and Heyde (1979) and Super (1984) indicated that career development theory and research showed that students who have access to many of the antecedents of vocational maturity (part-time jobs, extracurricular activities, and systematic vocational exploration) are able to maintain effective progress in their career development.

This study illustrated several significant relationships between career maturity and educational-related variables. A significant relationship exists between career maturity and participation in school activities. This finding is similar to those of Super and Overstreet (1960), Vriend (1969), Pautler (1988), Robbins (1978), and Connel (1978). They reported that participation in school activities such as youth organizations and extracurricular activities was related to one's career maturity. Students who were highly involved in those activities were more career mature as compared to those who are less involved.

Participation in school activities plays a very important role in a student's develop-

TABLE 4

Summary data: regression of career maturity (CMTOT) on selected educational-related variables (n = 464)

| Variables    | Intercorrelations |     |     |     |     |     | Mean  | Sd.  |
|--------------|-------------------|-----|-----|-----|-----|-----|-------|------|
|              | Y                 | X1  | X2  | X3  | X4  | X5  |       |      |
| CMTOT (Y)    | 1.0               | .26 | .30 | .32 | .22 | .21 | 93.50 | 20.0 |
| XSCORE(X1)   |                   | 1.0 | .21 | .32 | .36 | .28 | 3.35  | 3.9  |
| OCC. ASP(X2) |                   |     | 1.0 | .24 | .06 | .07 | 46.20 | 21.7 |
| GPA(X3)      |                   |     |     | 1.0 | .26 | .08 | 2.57  | .8   |
| FFA(X4)      |                   |     |     |     | 1.0 | .32 | 7.43  | 4.0  |
| CAREER(X5)   |                   |     |     |     |     | 1.0 | 3.43  | 1.9  |

TABLE 5

Regression of career maturity (CMTOT) on participation in extracurricular activities, FFA, and career development activities occupational aspiration, and academic performance (Step-wise)

| Variables | B     | R <sup>2</sup> | R <sup>2</sup> Change | b    | t   | p     |
|-----------|-------|----------------|-----------------------|------|-----|-------|
| GPA       | 4.96  | .100           | .100                  | 0.20 | 4.4 | <.001 |
| Occ. Asp. | 0.19  | .151           | .051                  | 0.21 | 4.8 | <.001 |
| Career    | 1.20  | .178           | .027                  | 0.11 | 2.5 | <.01  |
| Xscore    | 0.41  | .188           | .011                  | 0.10 | 2.0 | <.05  |
| FFAscore  | 0.43  | .196           | .071                  | 0.09 | 2.0 | <.05  |
| Constant  | 62.76 |                |                       |      |     |       |

Standard error = 18.10

R<sup>2</sup> = .196Adjusted R<sup>2</sup> = .187

For Model: F = 22.23; p &lt; .001

n = 464

ment. The number of activities a person engages in may suggest self-confidence, readiness to encounter and explore new experiences, and need to achieve, or the capacity to become involved (Jordaan and Heyde, 1979). Since participation in school activities is related to career maturity and those with higher level of participation are more career mature as compared to those with low level of participation it is recommended that students should actively participate in school activities. If students themselves are not interested, some encouragement should be provided. Through such participation it may help students see the world of work in a realistic way. Participation will expose them to various activities that may enable them to explore their strengths

and weaknesses with regard to the job requirements.

Many researches showed that career maturity is significantly related to academic achievement (Ludmer, 1988; Butler, 1980; Super and Thompson, 1979; and Jyung, 1989) and participation in career development activities (Pavlak and Kammer, 1985 and Fuller, 1989). The finding of this study is consistent with those of other researches. This study shows that students with high grade point averages obtain a significantly higher career maturity scores and students who are actively involved in career development activities also obtain a significantly higher career maturity score as compared to students with lower grade point averages and less involvement in career development activities.

This finding would indicate that academic ability and participation in career development activities have some significant roles in a student's career development. Thus, it is the role of all teachers to motivate students to spend time in education and participate actively in career development activities. Through career development activities by way of industrial visit, career forum, career projects and many more activities, students can be exposed to the real world-of-work.

Studies by Alvi and Khan (1983), Stomer (1967), Levins (1972), and Jyung (1989) showed that career maturity is related to occupational aspiration. Similarly, the results of this study also showed that career maturity is related to occupational aspiration. Agricultural students who aspire for occupations with high SES index were significantly more career mature as compared to students who aspire for occupations with lower SES index.

One of the objectives of this study was to determine the amount of variance that could be explained by significant educational variables. The finding of this study showed that educational correlates investigated explained 18.7% of the total variance of agricultural students' career maturity. It means that educational correlates investigated are not the only factors that may help students attain a certain level of career maturity. It is only a part of the factors that help students attain the desired level of career maturity. It also suggests that other variables should be investigated. One may want to consider teaching approaches, types of activities conducted in schools, and the availability of career information materials.

The study was done in Ohio, United States of America. Thus, no generalization can be made to students in Malaysia. However, the existence of positive correlations between career maturity and participation in youth organization; participation in extracurricular activities; participation in career development activities; and academic achievement would indicate that Malaysian students, like their counterparts in Ohio should be encouraged to get involved in not only academic activities but also non-academic activities.

## CONCLUSION

This study illustrates that career maturity differs among students and it is modifiable. It is the role of all people in education to provide opportunities for high school students to modify their career maturity. Students' career maturity should be determined the latest is when they are in junior years. Educators need to know how ready students are to make both educational and vocational decisions that are expected by schools and the world of work. If they are not ready, help should be provided before they finish their high school education to enable them to enter the job market without much problem.

Career maturity plays an important role in career choice and planning. Immature students tend to dwell more upon fantasies and delay making choices. By knowing the level of students' career maturity, school counselors and vocational agricultural teachers can plan activities that can help students attain the desired level of career maturity.

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## Ecological Predictors of the Parenting Behaviour of Malay Mothers

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**Keywords: parenting behaviour, maternal characteristics, child characteristics, family context, child-care, home environment**

### ABSTRAK

Objektif utama kajian ini adalah untuk mengenalpasti faktor yang berkaitan dengan kualiti tingkah laku keibubapaan di kalangan ibu Melayu. Sampel kajian terdiri daripada 128 ibu Melayu bersama anak mereka yang berumur di antara 8 hingga 9 tahun, yang telah dipilih secara persampelan sistematik untuk kajian ini. Data telah dikumpulkan secara temubual dan pemerhatian di rumah responden. Kualiti tingkah laku keibubapaan telah diukur menggunakan 'Home Observation for Measurement of the Environment (HOME)' (Caldwell dan Bradley 1984). Hasil kajian menunjukkan terdapat perkaitan di antara ciri ibu, ciri anak dan faktor kontekstual dengan tingkah laku keibubapaan ibu Melayu. Ibu yang mempunyai tahap pendidikan, penghargaan sendiri dan pendapatan keluarga yang lebih tinggi menunjukkan tingkah laku keibubapaan yang lebih berkualiti berbanding dengan ibu lain dalam kajian. Walau bagaimanapun, ibu yang mempunyai bilangan anak yang ramai dan mempunyai persepsi bahawa anak sukar untuk dijaga menunjukkan tingkah laku keibubapaan yang kurang menyokong. Hasil daripada kajian ini menunjukkan bahawa pelbagai faktor dalam ekologi keluarga bergabung untuk mempengaruhi kualiti penjagaan ibubapa terhadap anak. Hasil kajian ini mempunyai implikasi penting untuk perancangan program keibubapaan dan pendidikan kehidupan keluarga.

### ABSTRACT

The primary purpose of this study was to identify factors related to the quality of the parenting behaviour of Malay mothers. The sample comprised 128 Malay mothers with children aged 8 to 9 years. The respondents were identified using a systematic sampling procedure. Data were collected by interviews and observation in the homes of the respondents. Parenting behaviour was assessed using the Home Observation for Measurement of the Environment (HOME) (Caldwell and Bradley 1984). Results of the study show that maternal characteristics, child characteristics, and contextual factors are all related to the parenting behaviour Malay mothers provide for their school-age children. Mothers with higher levels of education, self-esteem, and family income showed better quality parenting than other mothers in the study. However, mothers with a larger number of children, and those who perceive their children as difficult to care for demonstrated less supportive parenting behaviour. Findings from the study suggest that numerous factors within the ecology of the family may combine to influence the quality of care parents provide for their children. The findings, therefore, have important implications for planning parenting and family life education programmes.

### INTRODUCTION

Numerous studies have documented the influence of parenting practices on children's cognitive and socio-emotional development (Rollins and Thomas 1979; Maccoby and Martin 1983). However, very few studies have focused on why parents rear their children the way they do. Thus, the central question

addressed by the present study is why parents differ in their approaches to child-rearing.

According to Belsky (1984) the quality of care that parents provide for their children is influenced by multiple factors within a family's ecosystem. Belsky suggested that these factors could be grouped into three broad categories: maternal characteristics,

contextual factors and child characteristics. Of the three factors, Belsky argued that parent's personal characteristics are the most important factor, followed by social support and characteristics of the child.

Belsky predicted that a child would be more likely to experience low quality care or an unsupportive home environment if his parents lack personal resources, his family is in high levels of stress and low social support, and he is perceived by his parents as difficult to care for. Although the three sets of factors interact in systematic ways to influence parental behaviour, Belsky argued that they are not equally influential. Stress in one subsystem may be buffered by support in other systems.

All three ecological factors in Belsky's process model of parenting were used in this study as predictors of parenting behaviour. The maternal characteristics focused on in this study included age, level of education and self-esteem. Consistent with past research on parenting, the present study expects that mothers would provide a higher quality rearing environment if they were older and had higher levels of education and self-esteem. Numerous studies found that older mothers were more satisfied with their parenting role and demonstrated more optimal parental behaviour than younger mothers (Field *et al.* 1980; King and Fullard 1982; Ragozin *et al.* 1982).

Parents with higher educational qualifications have been found to have positive parental values (Kohn 1963; Luster and Rhoades 1989). They are also more likely to value educational activities and structure their home environment in ways that are cognitively stimulating for their children (Caldwell and Bradley 1984; Gottfried and Gottfried 1984; Menaghan and Parcel 1991). In addition, past studies have indicated that parents with high self-esteem construct better quality home environments and behave positively toward their children (Luster and Dubow 1990; Hannan and Luster 1991; Menaghan and Parcel 1991). A positive self-regard and maternal behaviour are likely to produce favourable outcomes in children (Ricks 1985; Small 1988).

The contextual factors examined in this study were family income, number of children, and marital quality. Research has consistently shown that low-income parents, on average, provide less cognitively stimulating home environments than middle- or high-income parents (Elder and Caspi 1988; Luster and Dubow 1990; Hannan and Luster 1991; Menaghan and Parcel 1991). Living in poverty can produce life stresses that may affect parental behaviour. The quality of care the parents provide may also be affected by the number of children in the family. Families with fewer children have been shown to provide a more supportive home environment than families with many children (Blake 1989; Luster and Dubow 1990; Menaghan and Parcel 1991).

For a variety of reasons, one would expect that parents with a satisfying, supportive marital relationship would provide a more responsive and affective climate in the home than those in unsatisfying marriages (Belsky *et al.* 1984; Easterbrooks and Emde 1988; Simons *et al.* 1990). Belsky (1984) argued that the marital relationship is the principal support system for parents. Thus, parents with good marriages will provide better quality parenting.

The third factor in Belsky's model of the determinants of parenting is the characteristics of the child. The present study focused on three child characteristics: age, gender, and difficulty level. Past studies have shown that parents change their child-rearing behaviour as their children mature (Roberts *et al.* 1984; Steinberg 1987). However, more recent findings indicated that the child's age had no effect on parental behaviour (Hannan and Luster 1991; McNally *et al.* 1991).

The child's gender has been found to have an inconsistent effect on parents. Some researchers have found that parents interact differently with their sons and daughters (Bronfenbrenner *et al.* 1984; Bradley *et al.* 1988), while others have found the child's gender has little effect on the quality of the home environment (Hannan and Luster 1991; Menaghan and Parcel 1991).

Consistent with Belsky's (1984) model, the present study expects that a child's

chances of experiencing a low-quality home environment are higher if he/she displays a behavioural style that makes him/her hard to parent. Recent studies found that children with a difficult temperament received less supportive care than easier children (Hannan and Luster 1991; Simons *et al.* 1990).

The primary purpose of this study was to predict factors related to the quality of care mothers provide for their 8- to 9-year-old children. More specifically, the study determined what maternal characteristics (age, level of education and self-esteem), contextual factors (family income, number of children, and marital quality), and child characteristics (age, gender, and difficulty level) influence mothers' parenting behaviour. The present study differs from earlier studies in that it examined the combined effects of parent, child, and contextual factors on parenting in a single study. This approach is consistent with the ecological perspective on parent-child interaction (Bronfenbrenner 1979; Belsky 1984; Bubolz and Sontag 1993), which suggest that numerous factors within the ecosystem of the family may simultaneously influence the way parents behave towards their children.

## METHODOLOGY

### *Subjects*

The sample for the study was 128 mothers and their 8-to 9-year-old children from Bandar Tun Razak, Cheras, Kuala Lumpur. These mothers were systematically selected via children in Standard 2 and 3 of Sekolah Kebangsaan Bandar Tun Razak I. Table 1 shows the background characteristics of the sample.

The mean age of the 128 mothers sampled was 39.0 years; the age range was 27-52 years. The number of years of education completed by the mothers ranged from 0 to 18 years; the average was 8.7 years of education (i.e., secondary-level education). Most (97.5%) of the mothers were married, and were not employed (55.7%) outside the home at the time of the study. Those who were employed engaged in a variety of occupations. Clerical workers formed the

largest group (16.4%). Employed mothers reported an average income of \$408 per month. The mean family income of the sample was determined by combining the income of the mother and her spouse with other financial resources they received (such as from their employed children or part-time jobs) per month was RM1429.60.

The average number of children in the family was 4.9, with a range from 2 to 11. The number of male and female children in this study were almost equal. Their ages ranged from 90 to 100 months with a mean of 93.9 months (7.8 years).

### *Dependent Variables*

The mother's parenting behaviour was assessed using the elementary version of the Home Observation for Measurement of the Environment (HOME) developed by Caldwell and Bradley (1984). The HOME was designed to measure the quality of children's rearing environment by means of direct observation and interviews with parents. In general, the HOME assessed how parents organized the physical (e.g., books and other learning materials in the home), and the social environment (e.g., parent reading to a child, use of physical punishment) of the home for their children. The HOME scale contains 59 items divided into eight subscales: 1. emotional and verbal responsiveness, 2. encouragement of maturity, 3. emotional climate, 4. growth fostering materials and experiences, 5. provision for active stimulation, 6. family participation in developmentally stimulating experiences, 7. paternal involvement, and 8. aspects of the physical environment. Each item is scored "1" for presence of quality stimulation in the home, and "0" for absence of quality stimulation. All the items in the HOME are added to produce a total score, with higher scores indicating the availability of high quality stimulation in the home.

HOME has been used in several countries, and with a variety of ethnic groups (Bradley *et al.* 1989). Caldwell and Bradley reported a reliability coefficient of .90 for the elementary version of the HOME. Cronbach's alpha for this measure in the present

TABLE 1  
Descriptive statistics of sample (n = 128) and predictor variables

|                                 | %    | Mean     | Std. Dev. |
|---------------------------------|------|----------|-----------|
| <i>Maternal Characteristics</i> |      |          |           |
| Age                             |      | 39.0     | 5.2       |
| Years of education              |      | 8.7      | 3.3       |
| Self-esteem                     |      | 28.6     | 2.2       |
| <i>Marital status:</i>          |      |          |           |
| Married                         | 97.5 |          |           |
| Divorced                        | 2.5  |          |           |
| <i>Occupation:</i>              |      |          |           |
| Professional and Technical      | 2.5  |          |           |
| Administrative and Mgt          | 5.5  |          |           |
| Clerk                           | 16.4 |          |           |
| Sales                           | 5.5  |          |           |
| Services                        | 9.0  |          |           |
| Self-employed                   | 4.5  |          |           |
| Unemployed                      | 55.7 |          |           |
| <i>Contextual Factors</i>       |      |          |           |
| Family income                   |      | RM1429.6 | RM1097.5  |
| Number of children              |      | 4.9      | 1.9       |
| Marital happiness               |      | 2.3      | 0.5       |
| Marital communication           |      | 10.6     | 1.6       |
| Marital conflict                |      | 28.7     | 5.1       |
| <i>Child Characteristics</i>    |      |          |           |
| Age (in months)                 |      | 93.9     | 9.9       |
| Gender: Male                    | 49.3 |          |           |
| Female                          | 50.7 |          |           |
| Difficulty level                |      | 1.8      | 0.4       |
| HOME Inventory Scores           |      | 41.7     | 6.3       |

study was 0.77. This indicates that the HOME is generally acceptable in measuring the quality of care the Malaysian respondents provide for their children. The mean score on the HOME for this sample was 41.7 (SD = 6.3), with a range of 23 to 54.

#### *Independent Variables*

Three *maternal characteristics* were examined in the study: 1. Mother's age – her age at the time of the interview. 2. Level of education – the number of years of formal education completed by the mother. 3. Self-esteem – mother's score on the Rosenberg (1965) 10-item self-esteem scale; an established measure with evidence of validity and reliability (Baker and Mott 1989). The self-esteem

scale was designed to measure an individual's feeling of self-worth. The respondent indicates whether he or she strongly agrees, disagrees or strongly disagrees with each item on the scale. A sample item is, "I am as capable as others". A high score on this scale indicates high/positive self-esteem. Reliability analysis found an alpha of .52 for this scale for the present study sample. Scores ranged from 20 to 36, with a mean of 28.6 (SD = 2.2).

Three contextual factors included in the analyses were: 1. Family income – the combined monthly income of the mother and her spouse and other financial resources the family received (such as from their employed children or part-time jobs). 2. Number of children – the number of children



living with the mother. 3. Marital quality – assessed using three sets of items: marital happiness, marital communication and marital conflict (Baker and Mott 1989). Marital happiness was the mother's assessment of her marital relationship, from 1 (not too happy) to 3 (very happy). The study found that marital happiness correlated significantly with marital communication ( $r = .47, p < .001$ ), and marital conflict ( $r = -.38, p < .001$ ). Marital communication was mother's score on 3 items concerning her pattern of communication with her husband. Responses to these items ranged from 1 (less than once a month) to 4 (almost every day). A sample item is, "How often do you and your husband tell each other about your day?" A cronbach alpha of .70 was found for this scale. Marital conflict was assessed using 9 items with responses ranging from 1 (never) to 4 (often). A sample item is, "How often do you and your husband argue about chores and responsibilities?" Coefficient alpha for this scale was .74. The decision to use separate indicators of marital quality was assured by the smaller reliability coefficient (.61) of all the 13 marital quality items combined.

Three child characteristics were included in the analyses of this study: 1. Age of child – the child's current age in months. 2. Gender of child – recorded as 1 (male) or 0 (female). 3. Difficulty level – the mother's response to a question regarding how 'easy' or 'difficult' it was to raise her child. Responses to this item ranged from 'very easy to raise' to 'very difficult to raise' (Simons *et al.* 1990). A high score on this measure indicates that the child is perceived by the mother as being difficult to care for.

## RESULTS

### *Relations Among the Predictor Variables*

Although determining the extent of associations among the predictor variables was not one of the objectives of the study, it was interesting to find that there were several significant correlations among the variables. Table 2 shows the results of the correlational analyses computed among the predictor

variables. Generally the correlations among the variables were low to moderate in magnitude. The signs of the correlation coefficients were typically in the expected direction.

Consistent with expectations, mothers who completed more years of education had higher family income, higher levels of self-esteem and fewer children than mothers who completed fewer years of education. These mothers were also found to be younger, and tended to have younger children than the less educated mothers.

Results of the analyses also show that mothers who obtained more favourable scores on the self-esteem scale tended to be happier in their marriage and have good communications with their spouse. These mothers also perceived their child as 'easy' to care for compared to mothers with lower self-esteem.

As expected, mothers who were unhappy in their marriage experienced more marital conflict than other mothers in the study. Mothers with an unhappy marital relationship were also shown to communicate less well with their husbands. In addition, the results show that the mothers tended to perceive their child as difficult to care for when they were more involved in marital conflict.

### *Correlates of Parenting Behaviour*

Table 3 presents the zero-order correlations between each of the predictor variables and the quality of the mothers' parenting behaviour as assessed by HOME. Small to moderate correlations were found between the predictor variables and the dependent variable. Of all the predictor variables included in the analyses, only mothers' education, self-esteem, family income and number of children were significantly related to the mothers' parenting behaviour.

These findings show that at the bivariate level, mothers who provided a better quality home environment had higher levels of education and self-esteem. Mothers who scored higher on the HOME also had a higher family income. Furthermore, these mothers had fewer children.

TABLE 2  
Relations among predictor variables

|                             | 1       | 2      | 3      | 4      | 5    | 6       | 7     | 8     | 9    | 10   | 11   |
|-----------------------------|---------|--------|--------|--------|------|---------|-------|-------|------|------|------|
| 1. Age of mother            | 1.00    |        |        |        |      |         |       |       |      |      |      |
| 2. Years of education       | -.39*** | 1.00   |        |        |      |         |       |       |      |      |      |
| 3. Self-esteem              | -.17    | .21*   | 1.00   |        |      |         |       |       |      |      |      |
| 4. Family income            | -.14    | .56*** | .16    | 1.00   |      |         |       |       |      |      |      |
| 5. Number of children       | .38***  | -.22*  | -.10   | -.25** | 1.00 |         |       |       |      |      |      |
| 6. Marital happiness        | -.05    | .08    | .32**  | .04    | .06  | 1.00    |       |       |      |      |      |
| 7. Marital communication    | -.04    | .05    | .23**  | .12    | -.10 | .21*    | 1.00  |       |      |      |      |
| 8. Marital conflict         | .05     | -.02   | -.17   | .01    | -.05 | -.25*** | -.03  | 1.00  |      |      |      |
| 9. Age of child (in months) | .22*    | -.13   | .05    | .09    | .04  | .08     | .10   | .09   | 1.00 |      |      |
| 10. Gender of child         | -.05    | .21*   | .07    | .12    | .12  | .08     | .10   | -.01  | -.15 | 1.00 |      |
| 11. Child difficulty level  | .14     | -.07   | -.29** | .02    | .03  | -.15    | -.23* | .29** | -.02 | .10  | 1.00 |

Note: Gender of child is a dummy variable coded as 0 = female, 1 = male. \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

TABLE 3  
Zero-order correlations between predictor variables and HOME

| Variables                       | HOME             |      |
|---------------------------------|------------------|------|
|                                 | r                | p    |
| <i>Maternal Characteristics</i> |                  |      |
| Age                             | -.01             | .909 |
| Years of education              | .23**            | .008 |
| Self-esteem                     | .18*             | .040 |
| <i>Contextual Factors</i>       |                  |      |
| Family income                   | .25**            | .005 |
| Number of children              | -.27**           | .002 |
| Marital happiness               | .05              | .556 |
| Marital communication           | .14              | .112 |
| Marital conflict                | -.06             | .485 |
| <i>Child Characteristics</i>    |                  |      |
| Age                             | -.07             | .459 |
| Gender                          | .04              | .676 |
| Difficulty level                | .16 <sup>+</sup> | .063 |

Note: Gender of child is a dummy variable coded as 0=female, 1=male. <sup>+</sup> p < .10, \* p < .05, \*\* p < .01

#### *Multiple Predictors of Parenting Behaviour*

As indicated earlier, multiple factors may combine to influence the way parents behave towards their children. To examine the combined effects of the predictor variables on the outcome of interest, and to identify which of the variables are related to the dependent variable when other variables are controlled, several multiple regression analyses were conducted. A chance probability level of less than .10 was used in these analyses to reduce the risk of making a Type II error (Kerlinger 1973; Bronfenbrenner 1979).

In the first series of the regression analyses, all independent variables in each of the three categories identified earlier were entered simultaneously. The results of these analyses are presented in column 1 of Table 4.

Two of the three maternal characteristics included in the analyses were found to be predictive of the mothers' care-giving behaviour. Mothers with higher levels of education and self-esteem scored higher on the HOME inventory. Age was not a significant

predictor of the mothers' parenting behaviour when other maternal characteristics were statistically controlled. These predictor variables accounted for 8% of the variance in the HOME scores.

The five contextual factors accounted for 12% of the variance in the HOME scores. Levels of family income and number of children in the family were significant predictors of maternal behaviour when other contextual factors were controlled. None of the marital quality items was found to be a significant predictor of HOME when other contextual factors were partialled out.

The difficulty level measure of the child was the only significant predictor of the mother's parenting behaviour at the .10 level. Together, the child characteristics accounted for a very small percentage (3%) of the variance in the HOME scores.

To determine which of the five significant predictors uniquely contribute to the outcome variable, a second set of regression analysis was computed. Column 2 in Table 4 shows results of this analysis. At the .10 level, number of children and level of child's

TABLE 4  
Multiple regression analyses: predictors of HOME

| Variables                       | HOME        |             |
|---------------------------------|-------------|-------------|
|                                 | $\beta$     | $\beta$     |
| <i>Maternal Characteristics</i> |             |             |
| Age                             | .11         |             |
| Years of education              | .25**       | .10         |
| Self-esteem                     | .15 +       |             |
|                                 | $R^2 = .08$ |             |
| <i>Contextual Factors</i>       |             |             |
| Family income                   | .18*        | .15         |
| Number of children              | -.21*       | -.20*       |
| Marital happiness               | .02         |             |
| Marital communication           | .09         |             |
| Marital conflict                | -.07        |             |
|                                 | $R^2 = .12$ |             |
| <i>Child Characteristics</i>    |             |             |
| Age (in months)                 | -.06        |             |
| Gender                          | .04         |             |
| Difficulty level                | -.17 +      | -.15 +      |
|                                 | $R^2 = .03$ | $R^2 = .14$ |

Note: Gender of child is a dummy variable coded as 0 = female, 1 = male. The first column shows the standardized regression coefficients that were obtained when variables in each of the three categories of predictors were entered simultaneously. The second column shows the standardized regression coefficients of the full model. +  $p < .10$ , \*  $p < .05$ , \*\*  $p < .01$

difficulty to care for were significantly related to the mother's parenting behaviour. The two variables accounted for 14% of the variance in the HOME scores. Overall, the regression model's performance was rather modest.

## DISCUSSION

Findings from this study show that characteristics of the mother, child and family are all related to the quality of care Malay mothers provide for their 8- to 9-year-old children. The characteristics of the mother found to be predictive of HOME when other factors were controlled were levels of education and self-esteem. Two contextual variables that were significant predictors of HOME were family income and number of children. The child's characteristic that uniquely contributed to the mothers' HOME scores was the child's level of difficulty. Results of this study are, therefore, consistent with Belsky's ecological view of parenting which indicates that

individual differences in parenting are multi-determined. In addition, the findings parallel those of earlier investigations on the factors that shape parental behaviour.

Based on the results, the present study emphasizes the importance of considering the characteristics of the parent, the child, and the context in which the parent and child interact when working with families. This consideration is necessary to ensure that efforts at changing parenting behaviour and enhancing family functioning can be truly effective. Furthermore, examining several potential influences of parental behaviour concurrently may help those who work with families (e.g., counsellors, family life educators, community development agents) to easily identify which parents are at risk for suboptimal parenting (Luster and Okagaki 1993). Less supportive parents can, therefore, be helped as early as possible. In addition, parenting programmes will be more appro-

priately and effectively designed if based on a more global understanding of the whole family system and its interaction with the environment. Such ecologically designed parenting education will recognize the personal psychological needs of the parents and the child as well as the social context in which they are embedded. Thus, results of the present analysis provide useful information to educators, practitioners, policy makers and programme planners of the multiple influences of parenting, and of the importance of formulating parenting education programmes that focus on the broader aspects of the family environment.

Although the present study was able to demonstrate the value of using the ecological perspective in understanding parenting behaviour, several other variables which would have been useful in explaining variations in the way parents behave were not included in the study. For example, mother's age at birth of first child may be a better predictor of maternal behaviour than her current age. The extent to which other network members (e.g., spouse, in-laws, domestic helpers) provided support for the mother was also not included in the analysis. The child's age and gender are probably not good measures of the child characteristics, and therefore were not significant predictors of parenting behaviour in this study. Despite these limitations, the present study provides useful information on the determinants of parenting behaviour.

More research is needed to fully understand how characteristics of child, parent and context combine to influence the parent-child relationship. Additional research is also necessary to establish the validity and reliability of the instruments used in the present study for Malaysian samples. Future studies may include other predictor variables, for example, parent's developmental history, and parent's concerns and goals for the child. The effects of other contextual factors, such as the presence of other adults in the household, the levels of tension of cohesion in the family, and neighbourhood quality may be of interest to future researchers. Child characteristics that it may be productive to examine in future studies are child's health or medical

history, and the child's ability to evoke responses from the caregiver (Scarr and McCartney 1983). Finally, an ethnographic research design which focuses on the impact of factors discussed earlier on maternal behaviour may also increase the ability to explain individual differences in parenting.

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## **Feedback Seeking Practices of Agricultural Extension Agents in West Java, Indonesia**

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### **ABSTRAK**

Pencarian maklum balas di kalangan pegawai pengembangan merupakan hal penting untuk menjamin tersedianya maklum balas yang diperlukan untuk memastikan kegiatan penyelidikan, pengembangan, penerimaan teknologi dan keterkaitan di antara pengembangan, penyelidikan dan petani secara lebih efektif. Penyelidikan ini bertujuan melihat kaitan faktor komunikasi, sikap dan organisasi dengan amalan pencarian maklum balas yang dilakukan oleh pegawai pengembangan pertanian di Jawa Barat, Indonesia. Hasil kajian mendapati bahawa faktor komunikasi, sikap dan organisasi mempunyai kaitan yang signifikan dengan pencarian maklum balas pegawai pengembangan. Faktor komunikasi dan organisasi merupakan faktor yang menentukan amalan pencarian maklum balas di kalangan pegawai pengembangan.

### **ABSTRACT**

Feedback seeking practices of agricultural extension agents are important for the effectiveness of research and extension programmes; This study to determine the relationship of feedback seeking practices of agricultural extension agents in West Java with some selected factors namely communication, attitude, and organisation-related factors. The results revealed that communication, attitude, and organisation-related factors were associated with the extension agents' feedback seeking practices. The communication and organisation-related factors were found to be better predictors of the feedback seeking practices among extension agents as compared to attitude-related factors.

### **INTRODUCTION**

For effective agricultural extension work, feedback from clients to extension agencies and from extension agencies to research centres is necessary. The feedback is to determine clients needs and problems which is useful in shaping agricultural extension programmes and producing technologies which are specifically designed for them (Rivera and Schram, 1987). As such, feedback has long been recognized as a key factor in enhancing the overall effectiveness of organizations as well as individuals connected with such organisations.

The Ministry of Agriculture in Indonesia has made special efforts to ensure that extension forms a vital link between farmers

and research. An extension agent is responsible not only for disseminating information on new farming techniques but also to gather feedback information on problems and needs of for research institutions (Ministry of Agriculture, 1988). On a similar exphasis, Salmon Padmanagara (1985) noted that subject-matter specialists (SMSs) in agricultural extension organisations form the prime channels of communication between research and extension, in linking research and clients, which is vital to the success of research and extension work.

According to Salmon Padmanagara (1985) one of the principal constraints in the extension and research systems in Indonesia is the lack of feedback from farmers and

monitoring. In a more recent study, Schumacher et. al. (1991) also found that the lack of feedback from farmers is an important drawback in identifying the research agenda in Indonesia.

Groot (1971) mentioned that in less-developed countries, one might expect relatively little information given by the public.

Very few studies have been conducted on feedback seeking practices, especially among extension agents. Most of these studies were conducted in the United States, and their emphases were mainly on the members of business organisations (Ashford, 1986; Ashford and Cummings, 1983) and trainees (Fedor et. al., 1992).

There is no empirical study on the extension agents' feedback seeking practices and associated factors in Indonesia. Therefore, this study was conducted to determine the relationship of feedback seeking practices of extension agents with some selected factors namely communication, attitude and organisation-related factors.

This study adapted Ashford's (1986), feedback seeking model. According to this model, individual will seek feedback after considering two factors, the first is conditions that make feedback beneficial and the other is the cost of feedback. In other words, conditions that make feedback beneficial will lead the individual to seek feedback but conditions that will be costly will reduce the individuals' efforts in seeking feedback. The variables used in the Ashford's model for conditions that make feedback beneficial to individuals included importance of goal attainment, uncertainty self-confidence, organizational tenure and job tenure. Variables that are costly included negative beliefs about goal attainment, effort in feedback seeking, risk in feedback seeking and amount of feedback recently received. In extension work, extension agents are required to be able to adapt to the clients and organisational goals and policies and provide feedback to the organisation pertaining to recommended technologies.

In this study based on Ashford's model and on relevant literature the variables influencing feedback seeking practices are

categorised into communication, attitude and organisation related factors and in each category there are factors which could be identified as beneficial or costly to feedback seeking. This study attempted to answer the following questions:

- a. What is the nature of the relationship between communication, attitude and organisation-related factors and feedback seeking practices of agricultural extension agents?
- b. To what extent could communication, attitude and organisation-related factors be utilised as determinant factors in feedback seeking practices?
- c. Would some selected variables in the Ashford Conceptual Model provide a useful framework in explaining feedback seeking practices among extension agents?

The relationships between feedback seeking practices and those factors are summarised in Figure 1.

#### *Objectives*

Specifically, the objectives of the study frame:

1. To determine the nature of feedback seeking practices among extension agents;
2. To determine the relationship between extension agents' feedback seeking practices and some selected communication, attitude and organisation-related variables; and
3. To determine the major determinant variables that influence extension agents' feedback seeking practices.

#### **METHODOLOGY**

Ashford (1986) views feedback seeking as part of the individual's adaptation to his environment. The feedback helps the individual in his adaptation to his environment. Some selected factors possibly related to the extension agents' feedback seeking practices. These factors are; the perceived uncertainty about the relevance of technology and its potential (Ashford, 1986; Atkin, 1973), perceived

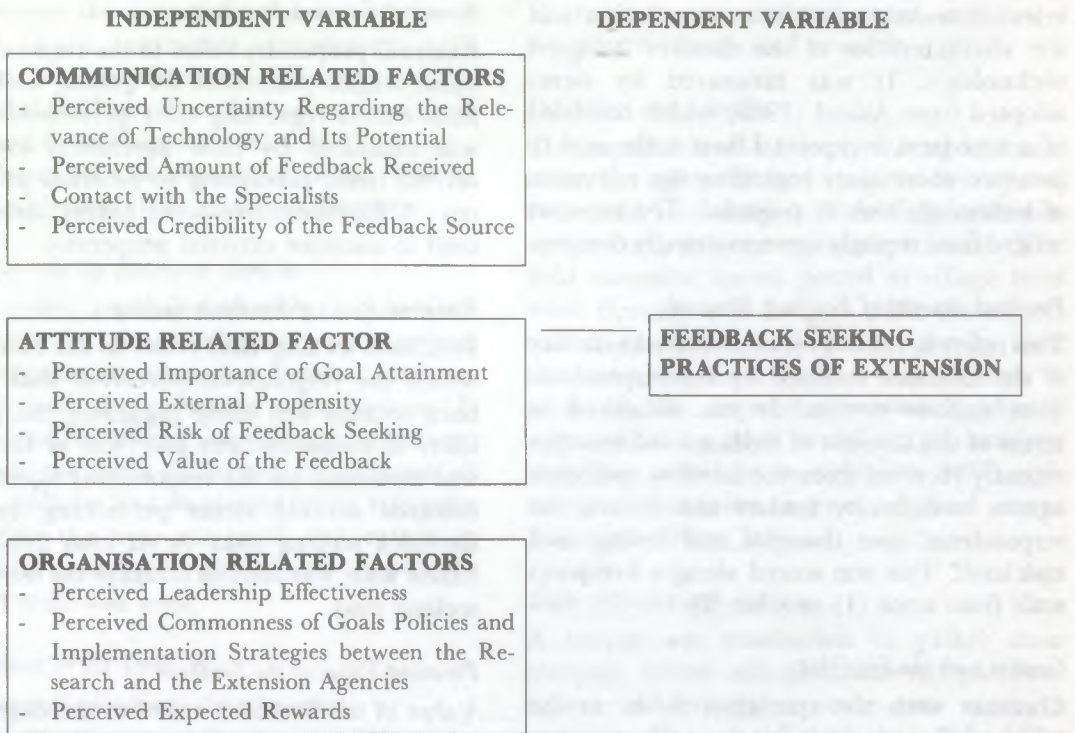


Figure 1: Conceptual framework of extension agents' feedback seeking practices

amount of feedback received (Ashford, 1986; Chafee and Mcload, 1976; Samsudin Abdul Rahim, 1989), contact with the superiors, researchers and subject-matter specialists (Atkin, 1972), and perceived credibility of feedback source (Fedor et. al., 1992; Cusella, 1982). Other factors were the perceived importance of goal attainment (Ashford, 1986), perceived external propensity (Fedor et. al., 1992), perceived risks of feedback seeking (Ashford, 1986; Fedor et.al., 1990 and 1992; Festinger, 1957), perceived leadership effectiveness (Likert, 1961), perceived expected rewards (Vroom, 1964), and the perceived commonness of goals, policies and implementation strategies between the research and the extension organisations. These variables were organised into communication, attitude and organizational related variables as shown in Figure 1.

*Feedback Seeking Practices*

The dependent variable of this study was feedback seeking practices. It was operationalized as the frequency of the respondent seeking

feedback regarding the relevance of a technology for the farmers within two-year period (1992-1993) using the inquiry and the monitoring methods. The inquiry method is an attempt to obtain feedback information by directly asking the feedback source. The monitoring method is conducted to obtain feedback information indirectly (Ashford, 1986), for example, through ways of comparing, observing, listening, viewing, reading, attending, overhearing and giving attention. Items measuring feedback seeking were adopted from Ashford (1986) and Fedor et. al. (1992). To ensure a high validity of the instrument, 'rice technology package-D' was used as a frame of reference for the respondents in giving their responses to the statements.

*Perceived Uncertainty Regarding the Relevance of Technology and Its Potential*

In this study, uncertainty was defined as the degree of the extension worker's perceived lack of knowledge regarding the potential adoption of the technological recommendation, the suitable process of producing



relevant technological recommendation and the characteristics of the farmers' adopted technology. It was measured by items adopted from Asford (1986) which consisted of a nine-item five-point Likert scale used to measure uncertainty regarding the relevance of technology and its potential. The responses ranged from strongly agree to strongly disagree.

#### *Perceived Amount of Feedback Received*

This refers to the degree of perceived quantity of the feedback received by the respondents from various sources. It was measured in terms of the amount of feedback information recently received from the farmers, extension agents, community leaders and others, the respondents' own thoughts and feelings and task itself. This was scored along a five-point scale from none (1) to a lot (5).

#### *Contact with the Specialists*

Contact with the specialists refers to the number of visits made by the subject-matter specialists, researchers and superiors to the respondents and vice versa, and the number of the respondents' involvement in discussions with the subject-matter specialists and the researchers.

#### *Perceived Feedback Source Credibility*

Feedback source credibility refers to the individuals' perception of the reliability of the feedback source. It was measured by the respondents' agreement towards the six items reflecting the credibility of the source of feedback. A six-item five-point Likert scale was used to measure the feedback source credibility.

#### *Perceived Importance of the Goal Attainment*

The importance of the goal attainment is defined as the extent in which adoption of the recommended technologies by the farmers is considered important by the respondents. This was determined by asking the respondents to state their agreements towards five statements reflecting the importance of the goal attainment. Their agreements were measured along a five-point Likert scale from "strongly disagree" (1) to "strongly agree" (5).

#### *Perceived External Propensity*

External propensity refers to the respondents' value and/or preference for getting feedback from others regarding their performance. It was measured by their agreement towards several items pertaining to external propensity. A four-item five-point Likert scale was used to measure external propensity.

#### *Perceived Risks of Feedback Seeking*

Feedback seeking risks refers to the extent in which the respondents perceived that feedback seeking will bring regarding the possibility of embarrassment and 'loss of face'. It was measured by the respondents' agreement towards several items pertaining to the feedback seeking risks. A six-item five-point Likert scale was used to measure the feedback seeking risks.

#### *Perceived Value of the Feedback*

Value of the feedback refers to the degree to which the respondents perceive the feedback as helpful in achieving their goals. The respondents were asked to state their agreements towards four statements reflecting the value of feedback. This was measured using five-point Likert scale from "strongly disagree" (1) "strongly agree" (5).

#### *Perceived Leadership Effectiveness*

Leadership effectiveness refers to the leadership qualities such as directing, guiding, influencing or controlling the thoughts of others as perceived by the respondents. To investigate the perceived leadership effectiveness, a ten-item five-point Likert scale was used. The scale ranged from "strongly disagree" (1) to "strongly agree" (5). This measurement was adopted from the Pothimamaka's (1993) study on community outreach work performance among academic staffs.

#### *Perceived Expected Rewards*

This refers to the respondents' desired outcome in return for their feedback practices. It was measured in terms of the respondent's agreement in favour of items indicating the expected intrinsic and extrinsic rewards. A fourteen-item five-point Likert scale was used

to measure the expected rewards in terms of extra salary increment, promotion, self-esteem, self-contribution, challenge and responsibility. The items of measurements were adopted from Pothimamaka (1993).

#### Perceived Commonness of Goals, Policies and Implementation Strategies between

##### *Research and the Extension Agencies*

This refers to the respondent's perceived similarity in terms of goals, policies and implementation strategies between the research and the extension organisations. It was measured by the respondent's agreement towards the items indicating commonness of goals, policies and implementation strategies between the research and the extension organisations. An eight-item five-point Likert scale was used.

##### *Hypotheses of the Study*

The hypotheses formulated were:

1. Feedback seeking practices of extension agents are positively related to the:
  - a. perceived uncertainty regarding the relevance of technology and its potential,
  - b. perceived amount of feedback received,
  - c. contact with the specialists, and
  - d. perceived credibility of the feedback sources.
  
2. Feedback seeking practices of the extension agents
  - (I) are positively related to the:
    - a. perceived importance of goal attainment,
    - b. perceived value of feedback, and
    - c. perceived external propensity
  - (II) is negatively related to the:
    - a. perceived risks of feedback seeking.
  
3. Feedback seeking practices of the extension agents are positively related to:
  - a. perceived effectiveness of the organisational leadership,
  - b. perceived commonness of goals, policies and implementation strategies between

- research and extension agent, and
- c. perceived expected rewards.

##### *Population and Sample*

The population of the study was agricultural extension agents of food crops in West Java, Indonesia and comprised the field extension agents and subject matter specialists. The field extension agents posted at village level work directly with farmers while the subject matter specialists work at the district level and have less direct contact with farmers. A total of 254 respondents were randomly selected using the multi stage random sampling technique to represent 2497 agricultural extension agents of food crops throughout West Java.

##### *Data collection and Analysis*

A survey was conducted to gather data through group self-administered questionnaires. A five-point scale was used to measure the variables of the study. The instrument of the study was adapted from the previous studies by Ashford (1986), Fedor et. al. (1992), and Pothimamaka (1993). The reliability of the instruments ranged from .70 to .90 Cronbach alpha. Pearson's correlation and multiple regression were used to analyse the data.

## RESULTS

The minimum educational level of the respondents was vocational/high school while the highest was bachelor degree. Their mean age was 37.8 years old with 15.3 years working experience. The majority of the respondents (77.6%) were male.

##### *Feedback Seeking Practices*

The extension agents' feedback seeking practices were found to be moderately high (72%). The mean score of this variable was 75.6 with a standard deviation of 7.3 and with the score ranged from 48.0 to 90.0 (Table 1). A majority of the respondents sought feedback by "asking farmers about the comparative advantages of the recommended technology" (82%), "asking farmers regarding the relevance of the recommended

TABLE 1

Distribution of respondents and summary statistics of level of feedback seeking practices (n = 254)

| Level of Feedback Seeking | Frequency | Percent |
|---------------------------|-----------|---------|
| Low (less than 51)        | 2         | .8      |
| Moderate (51-81)          | 183       | 72.0    |
| High (above 81)           | 69        | 27.2    |
| Total                     | 254       | 100     |

Mrsn = 75.64; S.D. = 7.28; Range = 48.00-90.00

technology" (80%), and "discussing with farmers regarding problems faced in practicing the recommended technology" (76%).

*Communication-Related Factors and Feedback Seeking Practices*

The study supported the hypothesis that the extension agents' feedback seeking practices were positively related to the perceived amount of feedback they received, contact with the specialists, and perceived feedback source credibility. The Pearson's Product Moment Correlation Coefficients (r) of these variables were .32, .36, and .21 respectively

and were all significant at .05 level (See Table 2). This result indicated that the extension agents who received more feedback sought feedback more frequently, extension agents who have more contact with subject-matter specialists were more active in feedback seeking practices and those who perceived their feedback source as more credible sought feedback more actively. The communication-related factors contributed 21% of the variance of the extension agents' feedback seeking practices (F value = 18.7, p = 0.00). This indicates that the explanatory power of the model is significant and the relationship between the independent and the criterion variables in linear (Table 3). Results from Table 3 also show the 'contact with the specialists was the most influential (beta = 2.31).

*Attitude-Related Factors and Feedback Seeking Practices*

The extension agents' feedback seeking practices were positively related to the perceived importance of goal attainment, perceived external propensity and perceived

TABLE 2

Summary of correlation coefficient between extension agents' feedback seeking practices and independent variables (n = 254)

| Independent Variables   | r     | Significant Probability |
|---|-------|-------------------------|
| <b>COMMUNICATION-RELATED FACTORS</b>  |       |                         |
| Uncertainty regarding the relevance of technology and its potential   | .08   | .11                     |
| Amount of feedback received   | .32*  | .00                     |
| Contact with the specialists  | .36*  | .00                     |
| Feedback source credibility   | .21*  | .00                     |
| <b>ATTITUDE-RELATED FACTORS</b>   |       |                         |
| Perceived importance of goal attainment   | .11*  | .04                     |
| Perceived external propensity   | .11*  | .04                     |
| Perceived risks of feedback seeking   | -.17* | .00                     |
| Perceived value of feedback   | .13   | .02                     |
| <b>ORGANISATION-RELATED FACTORS</b>   |       |                         |
| Perceived leadership effectiveness  | .35*  | .00                     |
| Perceived expected rewards  | .12*  | .03                     |
| Perceived commonness of goals, policies and implementation strategies between the research and the extension agencies | .40*  | .00                     |

\* One-tailed significant at .05

TABLE 3  
Multiple regression between extension agents' feedback seeking practices and communication-related variables (n = 254)

| Communication-Related Variables                                     | Dependent Variables        |      |       |
|---|----------------------------|------|-------|
|   | Feedback Seeking Practices |      |       |
|   | B                          | Beta | T-sig |
| Contact with the specialists  | .11                        | .31  | .00   |
| Amount of feedback received   | .50                        | .27  | .00   |
| Uncertainty regarding the relevance of technology and its potential | .20                        | .12  | .03   |
| Feedback source credibility   | .15                        | .07  | .21   |
| (Constant)  | 49.36                      |      | .00   |

R = .47                      Rsquare Adjusted = .21  
Ff = .18.07                  F-sig = .00

value of feedback. The results from Table 2 show that all hypotheses were supported with correlation coefficients (r) of .11..11. and .13 respectively and significant at .05 level. It means that extension agents who preceived goal attainment as important were more active in feedback seeking practices, those with higher external propensity tend to be more active in feedback seeking and those that perceived high value on feedback would be more likely to seek them. The other hypothesis which stated that the perceived risk of feedback seeking was negatively related to the extension agents' feedback seeking practices was also supported (r = -.17). It means that the higher the risk of

feedback seeking as perceived by extension agents, the less frequent feedback seeking.

The results of multiple regression analysis from Table 4 revealed that the attitude-related variables explained only 3% of the variance of the extension agents' feedback seeking practices. Only one of these factors was a significant determinant of feedback seeking practices, namely, the perceived risk of feedback seeking (beta = .14).

*Organisation-Related Factors and Feedback Seeking Practices*

The study supported the hypotesis that feedback practices were positively related to the perceived leadership effectiveness, per-

TABLE 4  
Multiple regression between extension agents' feedback seeking practices and attitude-related variables (n = 254)

| Communication-Related Variables         | Dependent Variables        |      |       |
|---|----------------------------|------|-------|
|   | Feedback Seeking Practices |      |       |
|   | B                          | Beta | T-sig |
| Perceived risks of feedback seeking     | -.37                       | -.14 | .03   |
| Perceived external propensity           | .26                        | .07  | .29   |
| Perceived importance of goal attainment | .32                        | .07  | .31   |
| Perceived value of feedback             | .35                        | .06  | .41   |
| (Constant)                              | 63.93                      | .00  |       |

R = .21                      Rsquare Adjusted = .03

TABLE 5  
Multiple regression between extension agents' feedback seeking practices and organisation-related variables (n = 254)

| Communication-Related Variables   | Dependent Variables        |      |       |
|---|----------------------------|------|-------|
|   | Feedback Seeking Practices |      |       |
|   | B                          | Beta | T-sig |
| Perceived commonness of goals, policies and implementation strategies between the research and the extension agencies | .81                        | .32  | .00   |
| Perceived leadership effectiveness  | .32                        | .24  | .00   |
| Perceived expected rewards  | .11                        | .10  | .07   |
| (Constant)  | 34.01                      |      | .00   |
| R = .47                      Rsquare Adjusted = .21   |                            |      |       |
| F = 23.73                    F-sig                        = .00   |                            |      |       |

ceived expected rewards, and perceived commonness of goals, policies and implementation strategies between research and extension organisations. The correlation coefficients of the three variables were .35, .12, and .40 respectively (Table 2). Results of the multiple regression analysis revealed that 21% of the extension agents' feedback practices could be explained by organisation-related variables. Among the three organization-related variables, two variables contributed significantly to the feedback seeking practices. The two variables were perceived commonness of goals, policies and implementation strategies between research and extension agencies, and the perceived leadership effectiveness. The first variable exhibiting the best predictor of feedback seeking practices of the extension agents was the commonness of goals, policies and implementation strategies between research and extension agencies (beta value = .32) (Table 5).

*Feedback Seeking Practices and Overall Independent Variables*

Among the 11 independent variables in the study six variables contributed significantly to the extension agents' feedback seeking practices, as shown by beta values at .05 significance level (Table 6). The variables were; contact with the specialists; perceived

commonness of goals, policies and implementation strategies between the research and the extension agencies; amount of feedback received; perceived leadership effectiveness; uncertainty of the relevance of technology and its potential; and perceived risks of feedback. All these variables represent the three major factors, communication-related factors, attitude-related factors and organisation-related factors. This means that these factors are important predictors of feedback seeking practices. If the extension organisations intend to motivate extension agents to actively seek for feedback, these variables should be taken as important considerations.

The beta value of the independent variable 'contact with the specialists' (beta = .31) indicates that this variable provides the greatest explanation of the variance in the extension agents' feedback practices. The second dominant variables 'perceived commonness of goals, policies and implementation of strategies between the research and the extension agencies' (beta = .30), followed by 'the amount of feedback received' (beta = .19).

Tables 7 shows the result of step-wise multiple regression. The contribution of each variables towards the R-square is indicated by its R-square change. The results revealed that six variables contribute significantly towards the R-square value. The largest

TABLE 6

Multiple regression between extension agents' feedback seeking practices and overall independent variables (n = 254)

| Communication-Related Variables   | Dependent Variables        |      |       |
|---|----------------------------|------|-------|
|   | Feedback Seeking Practices |      |       |
|   | B                          | Beta | T-sig |
| Contact with the specialists  | .11                        | -.31 | .00   |
| Perceived commonness of goals, policies and implementation strategies between the research and the extension agencies | .78                        | .30  | .00   |
| Amount of feedback received   | .36                        | .19  | .00   |
| Perceived leadership effectiveness  | .23                        | .18  | .00   |
| Uncertainty regarding the relevance of technology and its potential   | .24                        | .15  | .01   |
| Perceived risks of feedback seeking   | -.39                       | -.15 | .01   |
| Perceived external propensity   | .17                        | .05  | .41   |
| Feedback source credibility   | -.08                       | -.04 | .49   |
| Perceived importance of goal attainment   | .17                        | .03  | .53   |
| Perceived value of feedback   | -.13                       | .02  | .71   |
| Perceived expected rewards  | .01                        | .01  | .88   |
| (Constant)  | 25.18                      |      | .01   |

R = .63      Rsquare Adjusted = .37

F = 14.31      F-sig = .00

contribution came from the perceived commonness of goals, policies and implementation strategies between the research and the extension organisations (R-square change = .159), followed by contact with the specialist, researchers and superiors (R-square change = .109), perceived amount of feedback received (R-square change = .055), perceived leadership effectiveness (R-square change = .026), perceived uncertainty regarding the relevance of the technology and its potential (R-square change = .021) and finally, perceived risks of feedback seeking (R-square change = .020). The six variables could explain 38% of the variance in the extension agents' feedback seeking practices.

When the explanatory values of the stepwise and standardised regression methods were compared, the results were not very different. Through the standardised method, all eleven variables were able to explain about 37% of the variance in the extension agents' feedback seeking practices. On the other hand, the stepwise method explained

about 38% of the variance by including only six selected variables. The rest of the variables failed to be included in the regression equation.

## DISCUSSION

Feedback seeking practices among extension agents are very important to secure information that could be used as a basis of designing technologies relevant to the needs of the users and in planning strategies for disseminating the technologies. This study revealed that extension agents in Indonesia were not highly active in seeking feedback from their clients and other sources. The finding supports the statement of the former Director General of the Agency of the Agency for Agricultural Education Training and Extension, Indonesia that lack of feedback among research and extension agencies is related to the lack of feedback seeking efforts of the extension agents (Salmon Padmanagara, 1985).

Such level of feedback seeking practices indicated that feedback information could not be sufficiently available to be used as a basis

TABLE 7

Multiple regression between extension agents' feedback seeking practices and some selected independent variables (n = 254)

| Communication-Related Variables   | Dependent Variables        |      |           |       |       |
|---|----------------------------|------|-----------|-------|-------|
|   | Feedback Seeking Practices |      |           |       |       |
|   | Cum R2                     | R2   | R2 Change | Beta  | T-sig |
| Perceived commonness of goals, policies and implementation strategies between the research and the extension agencies | .398                       | .159 | -         | .309  | .0000 |
| Contact with the specialists  | .518                       | .268 | .109      | .311  | .0000 |
| Amount of feedback received   | .569                       | .323 | .055      | .192  | .0003 |
| Perceived leadership effectiveness  | .591                       | .349 | .026      | .164  | .0028 |
| Uncertainty regarding the relevance of technology and its potential   | .608                       | .370 | .021      | .156  | .0022 |
| Perceived risks of feedback   | .624                       | .390 | .020      | -.146 | .0045 |
| (Constant)  |                            |      |           |       | .0000 |

R = .624 Rsquare Adjusted = .38

F = 26.301 F-sig = .000

in producing relevant information for the farmers. This also implied that feedback information has not been used to plan effective strategy for disseminating information. It further suggests that some efforts need to be done to facilitate extension agents to be more active in seeking feedback. The findings on the relationships between feedback seeking practices and some selected communication, attitude, and organisation-related factors could provide important information for policy makers and leaders of the extension and research organisations in addressing the above problems.

The relationships between the communication-related factors and feedback seeking practices provide support to the previous studies. For example, the findings supported Ashford's (1986) study that individuals who received more feedback were more active in conducting feedback seeking practices. This study also supported Chafee and McLeod's (1987) and Samsudin Abdul Rahim's (1989) findings that information adequacy or acquired knowledge was positively related to information seeking. The relationship between contact with specialists and feedback seeking practices supported the suggestion of Atkin's (1972) Information Communicatory

Utility that individuals who make frequent contact with the specialists would consider feedback as having high communicatory utility which further motivate them to seek it.

On the attitude-related factors, the relationships between feedback seeking practices and the perceived importance of goal attainment, perceived risks of feedback seeking and perceived value of feedback provided support for Ashford's (1986) findings. On the other hand, the relationship between feedback seeking practices and perceived external propensity provided support for Fedor's (1992) study.

Organisational-related factors were found to be related with the extension agents' feedback seeking practices. The relationship between the perceived commonness of research and extension organisations and feedback seeking practices supported argument that similarity of the two organisations in term of goals, policies, and implementation strategies is related to the increased possibility of the extension agents to get relevant technology to fulfill farmers' needs and problems as a return to their feedback seeking practices. In relation to the perceived expected rewards, this study supported the argument that feedback seeking practices is

related to the extension agents' expectation on the outcome that could be achieved in return to the feedback seeking practices. The relationship between perceived leadership effectiveness and feedback seeking practices is in accordance with Vroom's (1961) suggestion that effective leadership could motivate subordinate to work towards achieving the organisation's objective.

The above discussions indicate that extension agents feedback seeking practices were associated with several factors. However, for practical purposes, the efforts to promote feedback seeking practices among extension agents need to focus on the critical factors. This study identified six factors as major determinants of feedback seeking practices. Three variables are in the communication-related group namely; (i) contact with the specialists, researchers and superiors, (ii) amount of feedback received, and (iii) perceived credibility of the feedback sources. Two variables represented organisation-related factors. They are (i) the perceived commonness of goals, policies and implementation strategies between research and extension organisations and (ii) the perceived leadership effectiveness. Only the perceived risks of feedback seeking was associated with attitude-related factors.

The organisation and communication-related factors were found to be dominant predictors of the extension agents' feedback seeking practices and as such, they should be treated more critically by extension and research organisations in order to ensure success of research and extension work.

### CONCLUSION

Based on the foregoing findings and discussions, the following conclusions could be made concerning the extension agents' feedback seeking practices:

1. Agricultural extension agents in West Java, Indonesia perceived that they were moderately active in feedback seeking practices in relation to their work.
2. The feedback seeking practices were related to several factors including communication, attitude and organisation-

related variables. Of the communication-related variables, the study revealed that extension agents who have positive perception on the credibility of feedback sources are more likely to carry out feedback seeking practices and extension agents also tend to conduct feedback seeking practices when they perceive that there is a high amount of feedback received from various sources. Extension agents who have high interaction with the subject-matter specialists, researchers and superiors tend to be more active in feedback seeking practices.

3. For attitude-related variables goal attainment, comments from others and feedback value are perceived to have positive impact on extension agents' feedback seeking practices. The trend of feedback seeking practices among the extension agents also appears to increase as the risks of feedback seeking is perceived to decrease.
4. Among organization-related variables effective organisational leadership, high expectations of rewards and high perception on commonness of goals, policies and implementation strategies between research and extension agencies seem to have a positive impact on feedback seeking practices.
5. Communication and organisation-related factors are better predictors compared to attitude-related factors in determining the feedback seeking practices of the extension agents.
6. Finally, it can be concluded that the Ashford's (1986) model of feedback seeking (with some modifications) was relevant and could be used in explaining feedback seeking practices among extension agents in Indonesia.

### *Implications and Recommendations*

Several implications and recommendations could be made from the findings and conclusions:

1. **Extension Performance** Feedback seeking practices are important to ensure the effectiveness of extension organisation



especially in its efforts to increase adoption rate of recommended technologies among its clients. From this study, it can be implied that the moderately active feedback seeking practices by the extension agents is not adequate to improve extension organisations effectiveness in meeting its goals. According to Larson (1981), feedback about performance of individuals and groups in an organisation is an important factor in ensuring organisational effectiveness. For the extension agents, the desired goal performance is the adoption of technological recommendations by the farmers (McDermott, 1987). In other words, if the recommended technology is adopted by farmers, it indicates that the extension agents are able to perform their tasks. To achieve this, the extension agents must have continuous and adequate information regarding the needs and problems faced by farmers. This would only be possible if extension agents themselves are active in carrying out feedback seeking. In order to encourage feedback seeking practices it is recommended that extension organisations should provide a supportive atmosphere for their agents such as giving credit points on the reported feedback of the innovations and organising regular fora and discussions for extension agents to report their feedback information.

2. **Research Performance** Without a continuous feedback mechanism between research and extension agencies, research will not be socially or economically relevant (Swaminathan, 1979). This is because feedback provides researchers with information regarding the needs and problems faced by the farmers. With feedback, researchers would be able to reorient their research efforts to meet the client's needs. In a system where research, extension and farmers are separately organised but interdependently linked, the extension agents should be able to provide feedback for the research organisations. This could be put into reality if

the extension agents actively carry out feedback seeking practices. With such important role of feedback seeking in research works, there is a need to promote feedback seeking practices among the extension agents. Based on the findings and implications above, it is recommended extension organisations should organise activities that provide opportunities for the extension agents to interact with the researchers. These activities may include:

- i. The involvement of extension agents in technology development such as technology testing, technology adaptation and technology intergration.
  - ii. To hold more meetings and discussions between the researchers and the extension agents.
  - iii. Organising visits to research centres either during field-days or other events.
  - iv. Establishing a policy for joint-publication between the researchers and extension agents on research findings and technological breakthroughs.
3. **Research-Extension-Farmer Linkage** Based on the concept of linkage by Havelock (1979), the degree of mutuality and inter-relatedness indicates the quality of research-extension-farmer linkage. One of the indicators that can be used to determine effective linkage among research, extension and farmers is the rate of adoption of technology recommended to farmers (McDermott, 1987). Such adoption indicates that the technology produced by research and the technology recommended or disseminated by extension is related to the needs and problems faced by farmers. In other words, research, extension and farmers have a mutual concern. Such situation would possibly occur when research and extension organisations adequately and continuously receive feedback.

One of the significant findings on the study was that high perception on commonness of

goals, policies and implementation strategies between research and extension agents seen to have positive impact on feedback seeking practices of extension agents. Extension and research organisations therefore should organise activities that would enhance a positive perception on the commonness of goals, policies and implementation strategies. Some recommendations towards this are:

- i. Trainings and workshops for extension agents and researchers as well as their respective superiors should be organised in such a way so that they could be together as participants.
- ii. Publications by the Agricultural Information Centres (AIC) that are usually received by the extension agents should include information on current goals, policies and implementation strategies of research and extension organisations.
- iii. Time slots should be provided for researchers to explain and discuss the tasks and functions of research organisations during trainings participated by the extension agents.
- iv. Meetings should be organised to enable researchers and extension agents to be informed of the current policies and implementation strategies of research and extension organisations.

#### 4. Technology Adoption by Farmers

Extension agents would not be able to precisely determine the needs and problems faced by farmers, unless they are actively involved in feedback seeking practices. This is important to increase adoption rate of recommended technology by clients. As Rogers (1983) noted that clients are willing to adopt technology which is perceived to be highly compatible with their needs, better than the previous practices, relatively easy to understand and to use, observable, and possible to be experimented with on a limited basis. The information are all based on the clients' perspective which they could be obtained only when the extension agents are actively seeking feed-

back. The clients or farmers as feedback sources should be encouraged to give feedback on their needs and problems. In order to encourage clients it is recommended that extension organisations should create an awareness among the feedback sources on the importance of feedback for improving extension work and farmers' conditions. They must be willing to share their experiences, especially those related to the relevancy of certain innovations. For example, farmers could be invited in participatory field workshop on technological development. They could also be invited in television programmes to discuss certain technological issues from the perspective of the feedback source.

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## **Keberkesanan Penilaian Prestasi Kerja di Kalangan Kakitangan Perkeranian**

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**Katakunci: penilaian prestasi, pengkadaran prestasi, kesilapan pengkadaran, kesahan kandungan, ketepatan pengkadaran, kepraktisan.**

### **ABSTRAK**

Kajian ini bertujuan untuk menentukan kesahan kandungan dan kepraktisan alat pengukuran prestasi kerja Sistem Baru Penilaian Prestasi Perkhidmatan Awam (SBPPPA) serta mengenal pasti jenis-jenis kesilapan pengkadaran dan faktor-faktor yang mempengaruhi ketidaktepatan pengkadaran prestasi kerja kakitangan perkeranian. Kajian dijalankan melalui soal selidik terhadap 38 orang pegawai yang dinilai dan 19 Pegawai Penilai dalam perkhidmatan Pembantu Tadbir (perkeranian dan operasi) di Kementerian Pertanian Malaysia. Hasil kajian mendapati bahawa alat pengukuran prestasi mempunyai kesahan kandungan yang sederhana dan praktikal. Beberapa jenis kesilapan pengkadaran dan faktor-faktor individu, alat dan konteks telah dianggap mempunyai pengaruh terhadap ketidaktepatan pengkadaran prestasi.

### **ABSTRACT**

The purpose of this study was to determine the content validity and practicality of performance measurement instrument of The New Performance Appraisal of Public Service as well as to identify various rating errors and factors that effect performance rating inaccuracy among clerical staff. This study was conducted on 38 raters and 19 raters of The Administrative Assistant Service (operational and clerical) in The Ministry of Agriculture. The results indicated that the performance measurement instrument was practical and had moderate content validity. There were some rating errors and individual rating instrument and contextual factors had been perceived affecting performance rating inaccuracies.

### **PENGENALAN**

Kebolehpercayaan dan kesahan masih menjadi masalah utama dalam kebanyakan sistem penilaian prestasi terutama sistem yang baru. Umumnya, penilaian prestasi yang berkesan masih belum dapat direalisasikan sepenuhnya (Banks dan Murphy 1985). Walau bagaimanapun, keperluan untuk mempertingkatkan keberkesanan penilaian prestasi semakin bertambah penting. Penilaian prestasi kini menjadi salah satu strategi utama pengukuhan produktiviti manusia dalam organisasi. Arah aliran perkembangan penilaian prestasi menunjukkan peranan yang dimainkan olehnya semakin meningkat (Bernardin dan Russell 1993).

Selepas dilaksanakan di dalam sesebuah organisasi, sesuatu sistem penilaian prestasi

patut dinilai bagi memastikan sejauh manakah ia mencapai matlamatnya dengan berkesan. Walau bagaimanapun, sangat sedikit organisasi menilai keberkesanan sistem penilaian prestasi berbanding dengan sistem pengurusan sumber manusia yang lain (Bernardin dan Russell 1993). Sebagai konsep pengukuran prestasi kerja, keberkesanan penilaian prestasi boleh dinilai dengan menggunakan petunjuk kecukupan pengukuran seperti kesahan, kebolehpercayaan, ketepatan, kesilapan psikometrik dan kepraktisan (Landy dan Farr 1983 dan Jacobs *et al.* 1980).

Kesahan kandungan menyediakan satu ukuran perhubungan antara butir-butir dalam alatan ujian (borang penilaian prestasi) dan ciri sebenar alatan ujian yang dibentuk

untuk mengukurnya (Henderson 1984). Dari segi operasinya kesahan kandungan didefinisikan sebagai setakat mana persamaan atau pertindihan wujud antara prestasi dalam ujian yang sedang dijalankan dengan kebolehan berfungsi dalam domain prestasi kerja yang telah diberi defmisi (Lawshe 1975).

Ketepatan ialah konsep yang paling menonjol dalam pengukuran prestasi, terutamanya yang menggunakan kaedah pengkadaran. Ketepatan pengkadaran ialah hubungan antara tingkah laku sebenar pekerja (skor sebenar) dengan tingkah laku pekerja yang direkod oleh penilai (pengkadaran prestasi) (Heneman *et al.* 1987). Semakin kuat hubungan antara skor sebenar dengan pengkadaran prestasi, semakin tepatlah pengkadaran prestasi. Walau bagaimanapun, ketepatan adalah sukar untuk diukur kerana tiada cara yang objektif untuk penilai menilai prestasi sebenar (Landy dan Farr 1983). Oleh itu kesilapan pengkadaran atau penilai digunakan sebagai salah satu pengukuran tidak langsung dalam menentukan ketepatan pengkadaran. Kesilapan pengkadaran ialah kesilapan yang berlaku dengan cara yang sistematik apabila seseorang individu memerhati dan menilai seseorang yang lain (Latham dan Wexley 1982).

Terdapat beberapa jenis kesilapan pengkadaran yang kerap berlaku, antaranya ialah kesan halo, kecenderungan memusat, murah hati dan terlalu lokek. Pengkadaran prestasi juga dipengaruhi oleh pelbagai faktor individu, alat dan konteks yang boleh mengurangkan ketepatannya (Landy dan Farr 1980, Heneman *et al.* 1987, Ilgen dan Feldman 1990, Murphy dan Cleveland 1991 dan Ferris *et al.* 1994).

Kepraktisan merupakan salah satu daripada keperluan keberkesanan sebuah sistem penilai prestasi apabila ia dilaksanakan (Cascio 1992). Kepraktisan bermaksud alat penilaian prestasi mestilah mudah diguna, ditadbir dan difahami oleh majikan dan pekerjanya. Sekiranya pengguna mengangap alat penilaian prestasi sebagai sukar dan rumit untuk ditadbir, ianya tidak akan dapat memenuhi tujuan pembentukannya (Latham dan Wexley 1982).

### *Sistem Baru Penilaian Prestasi Perkhidmatan Awam (SBPPPA)*

SBPPPA diperkenalkan pada 1 Januari 1993. Sistem ini digubal berasaskan prinsip Sistem Saraan Baru (SSB). Antara prinsip yang diambil kira ialah kadar upahan dan pemberian insentif berasaskan prestasi, penilaian dilaksanakan secara objektif dan adil, dan prestasi diasaskan kepada penghasilan pekerja. Beberapa elemen baru telah diperkenalkan dalam SBPPPA. Pertimbangan dijadikan kaedah utama penilaian dan sumber penilaian ialah penyelia.

Sejak dilancarkan, pelbagai pihak individu dan kesatuan dalam perkhidmatan awam telah menyuarakan ketidakpuasan hati terhadap keberkesanan pelaksanaan SBPPPA. Isu-isu yang dibangkitkan mencerminkan bahawa SBPPPA menghadapi masalah dalam memastikan keberkesanan sistem pengukurannya, terdedah kepada pelbagai kesilapan pengkadaran dan faktor-faktor ketidaktepatan pengkadaran yang boleh menjejaskan matlamat penggubalannya untuk mewujudkan satu penilaian yang adil dan objektif. Dari itu, kajian ini cuba menjawab beberapa persoalan: (i) Adakah alat pengukuran prestasi kerja SBPPPA mewakili aspek penting prestasi kerja? (ii) Apakah jenis kesilapan pengkadaran dan faktor-faktor individu (penilai dan pegawai yang dinilai), alat (borang penilaian prestasi dan konteks (persekitaran dalam organisasi) dianggap mempengaruhi ketidaktepatan pengkadaran prestasi? (iii) Adakah alat pengukuran prestasi SBPPPA praktikal?

## **METODOLOGI**

### *Populasi dan Sampel*

Populasi kajian ialah kakitangan perkeranian dan penyelia mereka yang berkhidmat di ibu pejabat Kementerian Pertanian Malaysia. Sampel terdiri daripada 38 pegawai yang dinilai dan 19 pegawai penilai dalam perkhidmatan Pembantu Tadbir (perkeranian dan operasi). Kajian menggunakan soal selidik.

### *Alat Ukuran*

Kesahan kandungan alat pengukuran prestasi kerja (borang penilaian prestasi 4/93)

diukur dengan menggunakan prosedur pengukuran kuantitatif "kesahan kandungan" yang dibentuk oleh Lawshe (1975).

"Kesahan kandungan" ditentukan berdasarkan pertimbangan ahli-ahli panel kesahan kandungan (Pembantu Tadbir dan Penyelia) dengan meminta mereka menilai tahap kepentingan butir-butir dalam borang penilaian prestasi mengenai prestasi kerja Pembantu Tadbir.

Jawapan menggunakan skala tiga poin iaitu "tidak perlu" (1) "berguna tetapi kurang penting" (2) dan "sangat penting" (3). Kesahan kandungan ditentukan dengan menggunakan formula  $CVR = Ne - N/2 / N/2$  di mana  $Ne$  ialah bilangan ahli panel yang menyatakan sangat penting dan  $N$  ialah jumlah bilangan ahli panel.

Jenis kesilapan pengkadaran dan faktor-faktor yang mempengaruhi ketidaktepatan pengkadaran diukur dengan meminta responden menyatakan tanggapan mereka mengenai kekuatan pengaruh setiap pernyataan yang mengandungi jenis kesilapan pengkadaran (berasaskan definisi operasi) dan faktor ketidaktepatan pengkadaran (penemuan-penemuan penyelidikan) terhadap ketidaktepatan pengkadaran prestasi Pembantu Tadbir. Jawapan menggunakan skala lima poin "tiada langsung" (1) hingga "amat kuat" (5) (Bernardin dan Villanova 1986).

Kepraktisan alat pengukuran prestasi kerja diukur dengan menggunakan skala lima poin jawapan dari "amat tidak bersetuju" (1) hingga "amat bersetuju" (5) (Wiersma dan Latham 1986) terhadap setiap pernyataan yang mengandungi kriteria kepraktisan.

#### *Analisis Data*

Daripada 86 soal selidik yang dihantar, sebanyak 57 atau 66% borang telah dikembalikan. Data dianalisis dengan menggunakan program SPSS. Statistik deskriptif seperti taburan frekuensi, min, peratus, skor minimum dan maksimum digunakan untuk menganalisis data. Ujian  $t$  digunakan untuk menentukan perbezaan tanggapan antara pegawai yang dinilai dengan pegawai penilai. Nilai CVR dikira bagi setiap butir kriteria penilaian prestasi. Contohnya, bagi

butir mutu kerja, nilai  $Ne = 56$  (bilangan ahli panel yang menyatakan mutu kerja sangat penting) dan  $N = 57$  (jumlah bilangan ahli panel)  $N/2 = 28.5$ . Oleh itu, nilai CVR bagi mutu kerja ialah  $56 - 28.8/28.5 = 0.96$ . Kesemua butir-butir yang mempunyai nilai CVR melebihi keperluan minimum 5% (mengikut jadual Lawshe 1975) akan dikira puratanya untuk mendapatkan nilai Indeks Kesahan Kandungan atau CVI.

## HASIL KAJIAN DAN PERBINCANGAN

### *Maklumat Latar Belakang*

Majoriti responden terdiri daripada wanita (60%). Umur kebanyakan responden (50%) adalah di antara 30 hingga 39 tahun. Lebih 61% memiliki kelulusan peringkat menengah (SPM/SPVM) manakala 16% berkelulusan ijazah. Nisbah pegawai yang dinilai dengan pegawai penilai ialah 3:1. Seramai 34% pegawai yang dinilai mempunyai pengalaman dalam perkhidmatan perkeranian di antara 11 hingga 15 tahun, sementara 47% pegawai penilai mempunyai pengalaman menyelia kurang daripada lima tahun. Responden bertugas di enam bahagian dan cawangan dengan 80% daripada mereka melaksanakan fungsi pentadbiran, personel, kewangan dan akaun.

### *Kesahan Kandungan Alat Pengukuran Prestasi Kerja*

Nisbah Kesahan Kandungan (CVR) yang diperolehi bagi setiap butir aspek penilaian prestasi dalam borang penilaian prestasi seperti yang dikemukakan dalam Jadual 1 menunjukkan bahawa daripada 24 butir yang dianalisis, sebanyak 10 butir (tidak termasuk aspek kualiti peribadi) mengandungi darjah kesahan kandungan, sementara lapan butir lagi tidak signifikan. Butir-butir yang mengandungi kesahan kandungan yang paling besar ialah mutu kerja, dan yang paling kecil ialah kuantiti hasil kerja dan kebolehan membuat keputusan. Butir yang paling tidak signifikan ialah kegiatan dan sumbangan di luar tugas rasmi. Butir-butir yang mempunyai CVR 0.30 menggambarkan bahawa butir-butir tersebut dianggap sangat penting oleh lebih daripada separuh ahli panel kesahan kandungan. Butir yang

JADUAL 1  
 Nilai CVR bagi butir-butir (kriteria penilaian) dalam borang penilaian prestasi

| Aspek Penilaian                | Butiran                                 | Nilai CVR |
|--------------------------------|---|-----------|
| Hasil kerja                    | Kuantiti hasil kerja                    | 0.33      |
|                                | Mutu kerja                              | 0.96      |
|                                | Keberkesanan kos                        | -0.05*    |
|                                | Ketepatan masa                          | 0.51      |
|                                | Pelaksanaan peraturan                   | 0.68      |
| Pengetahuan & kemahiran        | Pengetahuan                             | 0.68      |
|                                | Kemahiran                               | 0.65      |
|                                | Kebolehan mengelola                     | 0.68      |
|                                | Kebolehan membuat keputusan             | 0.33      |
|                                | Keberkesanan komunikasi                 | -0.02*    |
|                                | Kebolehan menyelesaikan masalah         | 0.12*     |
| Kualiti peribadi               | Integriti                               | 0.93      |
|                                | Komitmen                                | 0.40      |
|                                | Ikram                                   | 0.05*     |
|                                | Adil dan saksama                        | 0.58      |
|                                | Berdisiplin                             | 0.75      |
|                                | Kepimpinan                              | -0.05*    |
|                                | Potensi Proaktif                        | -0.05*    |
|                                | Daya kreatif                            | -0.19*    |
|                                | Inovasi                                 | -0.30*    |
|                                | Kebolehan menghadapi cabaran            | 0.02*     |
| Daya pemikiran                 | 0.44                                    |           |
| Jalinan Hubungan dan Kerjasama | Jalinan hubungan dan kerjasama          | 0.61      |
| Kegiatan/sumbangan             | Kegiatan dan sumbangan luar tugas rasmi | -0.79*    |

\* Butir-butir yang tidak signifikan dan digugurkan dari pengiraan Indeks Kesahan Kandungan (CVI) iaitu purata CVR. Aspek kualiti peribadi dikeluarkan dari pengiraan kesahan kandungan kerana ia lebih sesuai dinilai dari segi kesahan konstruk/gagasan.

paling tidak signifikan iaitu kegiatan dan sumbangan di luar tugas rasmi yang menunjukkan nilai CVR negatif yang paling besar (-0.79). Ini membuktikan bahawa butir ini sangat tidak berkaitan dengan prestasi kerja.

Indeks Kesahan Kandungan (CVI) seterusnya dikira bagi butir-butir yang signifikan, tidak termasuk kualiti peribadi. Butir-butir yang signifikan ialah butir-butir yang memenuhi keperluan minimum 5% atau 0.30 berdasarkan jadual yang disediakan oleh Lawshe (1975). Nilai CVI mengikut aspek penilaian ialah hasil kerja 0.62, pengetahuan dan kemahiran 0.58, potensi 0.44 dan jalinan hubungan dan kerjasama 0.61. Nilai CVI bagi keseluruhan borang ialah 0.58. Ini bermakna ahli-ahli panel kesahan kandungan mendapati purata

0.58% wujud pertindihan atau persamaan antara butir-butir dalam borang dan domain prestasi kerja Pembantu Tadbir. Dengan ini, dapatlah dirumuskan bahawa butir-butir dalam alat pengukuran prestasi kerja mewakili secara sederhana aspek-aspek kepentingan kerja Pembantu Tadbir. Dilihat dari aspek penilaian, didapati bahawa aspek hasil kerja dan jalinan hubungan dan kerjasama mempunyai peratus persamaan antara butir-butir dalam borang dengan domain prestasi kerja yang agak tinggi.

#### *Jenis-jenis Kesilapan Pengkadaran*

Hasil kajian mendapati lebih daripada 60% responden menganggap kesilapan pengkadaran mempengaruhi ketidaktepatan pengkadaran prestasi secara kuat dan amat kuat.

JADUAL 2  
Tanggapan pengaruh kesilapan pengkadaran terhadap ketidaktepatan pengkadaran prestasi mengikut jenis

| Jenis kesilapan       | Tahap pengaruh (%) |             |            |             |           |      |       |
|-----------------------|--------------------|-------------|------------|-------------|-----------|------|-------|
|                       | TL<br>(1)          | SDKT<br>(2) | SED<br>(3) | KUAT<br>(4) | SK<br>(5) | Min  | SP    |
| Kesan halo            | 3.6                | 3.6         | 39.3       | 26.8        | 26.8      | 3.70 | 1.025 |
| Kecenderungan memusat | 0                  | 9.4         | 50.9       | 30.2        | 9.4       | 3.40 | .793  |
| Murah hati            | 7.0                | 40.4        | 28.1       | 15.8        | 8.8       | 2.79 | 1.081 |
| Terlalu lokek         | 5.3                | 9.3         | 52.5       | 15.8        | 7.0       | 3.00 | .926  |
| Kesan kebelakangan    | 1.8                | 15.8        | 15.8       | 45.6        | 21.1      | 3.68 | 1.038 |
| Serupa-seperti-saya   | 5.3                | 7.0         | 28.1       | 40.4        | 19.3      | 3.61 | 1.048 |
| Berbeza-daripada-saya | 10.5               | 15.8        | 24.6       | 33.3        | 15.8      | 3.28 | 1.221 |
| Kesan perbandingan    | 5.3                | 10.5        | 33.3       | 35.1        | 15.8      | 3.46 | 1.053 |
| Kesan pertama         | 5.3                | 24.6        | 36.8       | 19.3        | 14.0      | 3.12 | 1.103 |

TL = Tiada langsung  
SDKT = Sedikit  
SED = Sederhana

KUAT = Kuat  
SK = Sangat kuat  
SP = Sisihan Piawai

Jenis-jenis kesilapan pengkadaran yang mempengaruhi ketidaktepatan pengkadaran prestasi Pembantu Tadbir ditunjukkan dalam Jadual 2.

Kajian ini mendapati bahawa daripada sembilan kesilapan pengkadaran yang diuji, sebanyak lima jenis dianggap oleh responden mempunyai pengaruh yang kuat terhadap ketidaktepatan pengkadaran prestasi. Kesilapan-kesilapan berkenaan ialah kesan halo, kesan kebelakangan, serupa-seperti-saya, kesan perbandingan dan kecenderungan memusat. Dua jenis kesilapan yang lumrah berlaku dalam penilaian prestasi, iaitu murah hati dan terlalu lokek, dianggap tidak mempunyai pengaruh yang kuat. Kewujudan kesan halo yang kuat menunjukkan bahawa pegawai penilai cenderung memberi penilaian secara global kepada setiap pegawai yang dinilai tanpa mengambil kira perbezaan antara dimensi prestasi yang berbeza. Pengaruh kesan kebelakangan yang kedua kuatnya menggambarkan bahawa pegawai penilai menilai pegawai yang dinilai lebih berasaskan tindakan semasa yang baru berlaku berbanding dengan tingkah laku keseluruhan dalam tempoh penilaian. Wujudnya pengaruh kesilapan serupa-seperti-saya menunjukkan bahawa pegawai penilai cenderung memberikan pengkadaran

yang tinggi kepada Pembantu Tadbir yang mempunyai tingkah laku yang serupa dengannya. Kesan perbandingan pula membuktikan bahawa penilai lebih cenderung menilai Pembantu Tadbir dengan cara membuat perbandingan antara sesama Pembantu Tadbir dalam satu unit atau unit yang berlainan atau membandingkan prestasi semasa dengan prestasi tahun yang lalu dan bukannya membandingkannya dengan piawai prestasi dalam borang. Kesilapan kecenderungan memusat pula mencerminkan bahawa pegawai penilai lebih selesa memberi pengkadaran secara pertengahan dengan mengelak daripada memberi pengkadaran yang terlalu tinggi atau terlalu rendah. Dua daripada kesilapan yang dianggap kuat mempengaruhi ketidaktepatan pengkadaran, iaitu kesilapan kesan halo dan kecenderungan memusat, merupakan kesilapan yang paling lumrah berlaku dalam penilaian prestasi yang menggunakan kaedah skala pengkadaran bergraf (Hodgetts dan Kroeck 1992) yang turut dipakai dalam SBPPPA.

#### *Faktor Ketidaktepatan Pengkadaran*

Hasil kajian mendapati bahawa 56% responden menganggap faktor individu mempengaruhi ketidaktepatan pengkadaran secara sederhana, 44% menganggap faktor alat



pengkadarannya mempengaruhi dengan kuat dan 52% menganggap faktor konteks mempengaruhi ketidaktepatan secara sederhana. Min bagi faktor individu, alat pengkadarannya dan konteks yang dianggap mempengaruhi ketidaktepatan pengkadarannya prestasi Pembantu Tadbir dengan kuat adalah seperti dalam Jadual 3.

Faktor individu keseluruhannya, walaupun dianggap mempunyai pengaruh yang sederhana tetapi faktor yang berkaitan dengan kerja penilai (seperti gaya kepimpinan, tahap prestasi penilai dan pengalaman penilai) dan faktor pengetahuan kerja penilai (seperti kebiasaan dan kefahaman tentang kerja pegawai yang dinilai) merupakan antara

faktor yang dianggap kuat mempengaruhi ketidaktepatan pengkadarannya. Faktor Demografi seperti umur, bangsa dan jantina bagi kedua-dua individu penilai dan pegawai yang dinilai tidak dianggap mempengaruhi ketidaktepatan pengkadarannya prestasi Pembantu Tadbir.

Dari segi faktor alat pengkadarannya, butir faktor yang dianggap kuat mempengaruhi ketidaktepatan pengkadarannya ialah skala (iaitu tafsiran skala yang berbeza, jenis dan kategori skala) dan kriteria yang digunakan (seperti sifat kriteria yang umum, tidak mewakili prestasi kerja dan kriteria berbentuk *trait*). Faktor-faktor ini merupakan ciri-ciri kelemahan umum yang biasa terdapat

JADUAL 3

Butir-butir faktor individu, alat pengkadarannya dan konteks yang mempunyai pengaruh yang kuat terhadap ketidaktepatan pengkadarannya prestasi berdasarkan tanggapan responden

| Faktor/butir                       | Min  | Sisihan piawai |
|------------------------------------|------|----------------|
| <b>Individu</b>                    |      |                |
| Gaya kepimpinan penilai            | 3.84 | .797           |
| Peringkat penyeliaan penilai       | 3.49 | 1.002          |
| Kebiasaan dengan kerja pekerja     | 3.47 | 1.071          |
| Tahap prestasi penilai             | 3.36 | .879           |
| Kefahaman dengan kerja pekerja     | 3.32 | 1.105          |
| Pengalaman penilai                 | 3.10 | .994           |
| <b>Alat Pengkadarannya</b>         |      |                |
| Tafsiran skala berbeza             | 4.07 | .904           |
| Bilangan kategori skala            | 3.64 | 1.203          |
| Jenis skala                        | 3.63 | 1.096          |
| Kriteria terlalu umum              | 3.50 | .966           |
| Kriteria kualiti peribadi          | 3.25 | 1.014          |
| Kriteria tidak mewakili prestasi   | 3.21 | 1.140          |
| <b>Konteks</b>                     |      |                |
| Prestasi dikait dengan gaji        | 3.90 | 1.175          |
| Kecenderungan penilai              | 3.79 | 1.098          |
| Perbandingan antara pekerja        | 3.77 | .887           |
| Menonjol tingkah laku pekerja      | 3.63 | .919           |
| Tiada latihan cara menilai         | 3.63 | 1.144          |
| Menonjol cekap bekerja             | 3.59 | 1.050          |
| Mengampu                           | 3.58 | 1.267          |
| Gaji berasaskan penilaian prestasi | 3.57 | 1.204          |
| Tiada pengetahuan kesilapan        | 3.51 | .984           |
| Tiada peluang memerhati            | 3.47 | 1.071          |
| Prestasi tahun lalu                | 3.45 | 1.119          |
| Tiada pengalaman menilai           | 3.46 | .965           |
| Perasaan suka                      | 3.37 | 1.263          |
| Bilangan pekerja bawahan           | 3.31 | 1.152          |
| Kuota pergerakan gaji              | 3.10 | 1.410          |

pada kaedah penilaian prestasi yang menggunakan Skala Pengkadaran Bergraf yang turut digunakan dalam SBPPPA.

Di bawah faktor konteks, beberapa faktor yang dikenal pasti mempengaruhi ketidaktepatan pengkadaran prestasi ialah faktor sistem ganjaran (sistem bayaran berasaskan prestasi), faktor latihan (tiada latihan cara menilai, tiada pengetahuan mengenai kesilapan pengkadaran dan tiada pengalaman menilai kaedah baru) dan faktor kesan (kecenderungan penilai, menonjol tingkah laku berkaitan kerja, menonjol lebih cekap bekerja, mengampu dan perasaan suka).

Pengenalpastian faktor-faktor yang mempengaruhi ketidaktepatan pengkadaran daripada sumber-sumber individu, alat konteks, menerangkan dengan lebih jelas bahawa isu dan masalah dalam penilaian prestasi adalah kompleks dan perlu dilihat dengan lebih komprehensif. Ini bermakna bahawa usaha menangani pelbagai isu dalam penilaian prestasi perlu lebih terbuka dan tidak wajar ditumpukan kepada sumber tertentu sahaja seperti mana pendekatan tradisional dalam penyelidikan penilaian prestasi.

#### *Kepraktisan Alat Pengukuran*

Hasil kajian mendapati 74% responden menganggap bahawa alat pengukuran prestasi kerja Pembantu Tadbir adalah praktikal. Taburan kepraktisan alat pengukuran me-

ngikut aspek adalah seperti dalam Jadual 4.

Jadual 4 menunjukkan bahawa aspek penggunaan yang mudah bagi butir kriteria mempunyai tahap praktikal yang tinggi (min 2.81) diikuti dengan aktiviti penilaian (min 2.78) dan kegunaan maklumat (min 2.60). Beberapa aspek yang mempunyai tahap praktikal yang agak rendah ialah aspek objektiviti (min 2.17) dan penggunaan yang mudah dari segi kaedah Sasaran Kerja Tahunan (SKT) (min 2.01). Sungguhpun tahap kepraktisan alat pengukuran adalah tinggi, tetapi beberapa aspek kepraktisan tertentu, seperti penggunaan borang SKT, masa pengisian borang dan kebolehan skala membeza prestasi, perlu diberi perhatian dipertingkat kepraktisannya kerana terdapat hampir 30% daripada responden menganggap aspek berkenaan tidak praktikal.

Ujian *t* juga dijalankan bagi mengetahui perbezaan tanggapan pengaruh-pengaruh kesilapan pengkadaran, faktor individu, alat, konteks terhadap ketidaktepatan penilaian prestasi dan aspek-aspek kepraktisan alat pengukuran antara pegawai penilai dan pegawai yang dinilai. Hasil ujian *t* menunjukkan kebarangkalian lebih besar daripada .5 bagi semua pengaruh dan aspek di atas. Ini membuktikan bahawa tiada perbezaan tanggapan pengaruh-pengaruh dan aspek berkenaan antara Pembantu Tadbir dan Penye- liannya.

JADUAL 4  
Taburan kepraktisan alat pengukuran mengikut aspek

| Aspek Kepraktisan Tidak | Tahap Praktikal (%) |       |           | Min  | S.P  |
|-------------------------|---------------------|-------|-----------|------|------|
|                         | Tidak Praktikal     | Pasti | Praktikal |      |      |
| Aktiviti penilaian      | 1.9                 | 25.9  | 72.2      | 2.78 | .500 |
| Objektiviti             | 12.3                | 57.9  | 29.8      | 2.17 | .630 |
| Kegunaan maklumat       | 1.8                 | 36.4  | 61.8      | 2.60 | .531 |
| Penggunaannya mudah:    |                     |       |           |      |      |
| Kriteria                | 0                   | 18.5  | 81.5      | 2.81 | .392 |
| Format                  | 5.5                 | 50.9  | 43.6      | 2.38 | .593 |
| Kaedah SKT              | 28.1                | 42.1  | 29.8      | 2.01 | .767 |
| Masa pengisian borang   | 28.1                | 28.1  | 43.9      | 2.15 | .841 |
| Kebolehan membeza       | 26.8                | 35.7  | 37.5      | 2.10 | .802 |

SKT = Sasaran kerja tahunan

### IMPLIKASI

Penemuan kajian ini memberi implikasi bahawa alat pengukuran prestasi kerja SBPPPA untuk kakitangan perkeranian, sungguhpun praktikal, kurang mempunyai kesahan kandungan. Kriteria pengukuran didapati mewakili secara sederhana domain prestasi kerja perkeranian. Ia juga mengandungi kriteria *trait* peribadi yang sukar diukur dengan tepat dan boleh mendorong berlakunya kesilapan pengkadaran yang tidak disengajakan. Beberapa jenis kesilapan dan faktor-faktor alat pengkadaran yang dikenal pasti mencerminkan kelemahan penggunaan kaedah pengkadaran Skala Pengkadaran Bergraf. Kewujudan kesilapan kesan kebelakangan menunjukkan bahawa penggunaan kaedah SKT belum cukup berkesan dalam merekod pencapaian hasil kerja sepanjang tahun. Kewujudan beberapa faktor konteks membuktikan pengaruh faktor konteks terhadap ketidaktepatan pengkadaran prestasi tidak boleh dianggap ringan dan perlu diberi perhatian yang serius sekiranya SBPPPA ingin mencapai matlamat penilaian yang adil dan objektif.

### CADANGAN

Bagi mempertingkatkan keberkesanan SBPPPA disarankan supaya kesahan kandungan alat pengukuran dipertingkatkan dengan diadakan proses analisis kerja bagi membolehkan domain prestasi kerja sesuatu kerja ditentukan. Penilaian prestasi perlu mengandungi hanya butir-butir yang berkaitan dengan kerja. Kehadiran butir yang tidak berkaitan dengan aspek kerja boleh mengurangkan kesahan kandungan. Kesemua jenis kesilapan pengkadaran yang dikenal pasti adalah kesilapan yang tidak disengajakan. Oleh itu, semua pegawai penilai perlu diberi latihan bagi mempertingkatkan ketepatan pemerhatian dan pertimbangan serta kemahiran mengenal pasti kesilapan-kesilapan pengkadaran yang berlaku. Penggunaan buku catatan mengenai hasil dan proses kerja yang dinilai bagi tempoh sepanjang tahun yang dinilai boleh mengurangkan kesilapan Kesan Kebelakangan.

Untuk penyelidikan yang akan datang,

dicadangkan supaya digunakan kaedah gabungan pendekatan tradisional (alat pengukuran) dan semasa (proses kognitif, situasi, sosial dan afektif) kerana masalah dalam penilaian prestasi adalah kompleks. Pendekatan gabungan yang dijalankan ke atas kajian ini ternyata memperolehi hasil yang lebih luas dan komprehensif. Selain itu, kajian ini hanya memberi tumpuan kepada satu jenis pekerjaan sahaja. Oleh itu pada masa akan datang penyelidikan dibidang ini, khususnya terhadap peralatan SBPPPA, patut dilakukan terhadap jenis kerja yang lain, terutama jenis-jenis kerja yang berorientasikan perkhidmatan dan penyelidikan serta kumpulan perkhidmatan yang berbeza.

### PENUTUP

Berdasarkan perbincangan, dapatlah dirumuskan bahawa keberkesanan SBPPPA dari segi kesahan kandungan, ketepatan pengkadaran dan kepraktisan alat pengukuran dalam menilai prestasi kerja kakitangan perkeranian adalah pada tahap yang sederhana. Alat pengukuran walaupun praktikal tetapi dari segi kandungannya didapati mewakili secara sederhana aspek penting prestasi kerja. Pengkadaran prestasi pula boleh dipengaruhi oleh beberapa jenis kesilapan pengkadaran yang tidak disengajakan dan berbagai-bagai faktor individu, alat konteks turut menyumbang kepada pengurangan ketepatan pengkadaran.

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## Optimal Bioeconomic Exploitation of the Demersal Fishery in Northwest Peninsular Malaysia

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### ABSTRAK

Kadar eksploitasi bioekonomi optimum bagi perikanan demersal di barat daya Semenanjung Malaysia (BDSM) ditentukan dalam kertas ini. Sebuah model bioekonomi dibentuk dan dianggarkan. Keputusan kajian menunjukkan walaupun kadar eksploitasi perikanan demersal kini diperbaiki sedikit berbanding tahap penggunaan terbuka, stok demersal telah ditangkap secara berlebihan dari segi biologi dan ekonomi. Suatu keputusan penting ialah pembaikan yang amat besar bagi perikanan demersal di BDSM dapat dicapai jika usaha penangkapan dikurangkan sebanyak 60 hingga 78 peratus daripada tahap kini. Ini bermakna perlunya pembentukan polisi pengurangan usaha penangkapan yang sesuai supaya dapat memperolehi faedah maksimum daripada perikanan tersebut.

### ABSTRACT

The optimal bioeconomic rate of exploitation of the demersal fishery in northwest Peninsular Malaysia (NWPM) is determined in this paper. A bioeconomic model for the fishery is developed and estimated. The results show that even though present rate of exploitation of the demersal fishery shows slight improvement compared to the open access level, the demersal stock is overfished biologically and economically at this rate. An important result is that tremendous improvement for the demersal fishery in NWPM can be achieved if fishing effort is reduced by 60 to 78 percent from the present level. This implies an urgent need to formulate appropriate effort reduction management policies in order to derive maximum benefits from the fishery.

### INTRODUCTION

The need to manage fisheries resources is well established (Gordon 1954). Fisheries resources are renewable and common property resources. Without management, these resources will be exploited to the extent that the rate of catch will surpass the maximum yields that the resources can sustain, leading to biological overfishing. In addition, economic rent obtainable from the fisheries resources will be completely dissipated, causing economic losses.

The fisheries resources in Malaysia, in particular those on the west coast of Peninsular Malaysia are alleged to be biologically overexploited (Jahara and Yamamoto, 1988). This allegation stems from the fact that total catch and catch per unit of effort have been

declining; proportion of trash fish in landings has been increasing; and there is disappearance of certain commercially valuable species from the catch, notably *Lactarius lactarius* (Ch'ng and Chee 1983). Thus, there is a need to manage the fisheries resources. It is crucial in fishery management to determine the level of exploitation commensurate with the objectives of management. The main objectives of this paper were to determine the optimal bioeconomic levels of exploitation for the demersal fishery in the Northwest Peninsular Malaysia and to compare the present and optimal states of exploitation of the fishery.

A description of the demersal fishery system in Northwest Peninsular Malaysia is presented in the next section, followed by

bioeconomic model and the derivation of the conditions for optimal level of management based on vious alternative management objectives. The results of the bioeconomic analyses will be presented followed by discussion and conclusion.

*Demersal Fishery System*

The Northwest Peninsular Malaysia (NWPM) encompasses four states, namely Perlis, Kedah, Pulau Pinang and Perak. Historically, the area is an important fishing region in the country, being the centre for fishing technologies adoption (Yap 1977). An important characteristic of the fishery resources in NWPM is the presence of a large number of species (about seventy species or species groups have been listed in the Annual Fisheries Statistics published by the Department of Fisheries Malaysia). The demersal species or species groups, which number more than forty, are among the most important species harvested in NWPM. Between 1980 and 1992, the proportion of demersal species to total marine production and total finfish catch ranged from 8 to 26 percent and 19 to 37 percent, respectively (Ministry of Agriculture 1980-92). In terms of average landings between 1980 and 1992, the important demersal species or species groups in NWPM are Kerisi (*Namipterus spp/Pristipomoides typus*), Gelama (*Sciaena spp/Johnius spp/Otolithus spp/Otolithoides spp*), Pari (*Gymnura spp/Dasyatis spp*), Timah (*Trichiurus lepturus*) and Duri/Pulutan/Utek (*Tachysurus spp/Arius spp/Osteogenius spp*). These species constituted about half the demersal landings in the area during the period. Owing to the presence of a large number of species and the biological interactions among these species are not exactly known these relationships are not considered in the analyses and a bioeconomic model of a mixed species demersal fishery is adopted here.

Another important characteristic of the demersal fishery in NWPM is the use of many fishing gear types and various sizes of vessels. Traditional fishing gears, notably gill or drift nets are dominant in NWPM. Others include handlines, portable traps, barrier nets, bag nets, lift nets, stationary traps and push or

scoop nets. Majority of the vessels using traditional gears are below 25 gross registered tonnage (GRT) and are fitted with outboard engines (Ministry of Agriculture 1980 – 1992). The proliferation of the small sized vessels is mainly due to the narrow strip of fishing area along the Straits of Malacca. Trawl nets are the most important commercial gear used in exploiting demersal fishery in NWPM. These trawlers are of various sizes, but a majority of them are small trawlers less than 40 GRT. Seine nets, in particular the beach seines, are also used in catching demersal fish species. The various gear types and vessel sizes will have differential impacts on the demersal stock. Thus there is a need to standardize these impacts through the standardization of fishing effort, which will be discussed later.

*Bioeconomic Model*

The bioeconomic model comprises the biological and economic components. In the biological component, it is assumed that the demersal species in NWPM are biologically and ecologically independent. The overall biomass of the demersal stock is assumed to be adequately represented by a state variable  $X(t)$ . The instantaneous rate of change in biomass is given by

$$\dot{X} = dX(t)/dt = F(X(t)) - h(t) \tag{1}$$

where  $\dot{X}$  is the time derivative of the stock biomass,  $F(X(t))$  is net natural growth and  $h(t)$  is commercial harvest.

The economic component takes into account the revenues and costs of fishing operations. Denoting the constant price of fish as  $p$  and the cost of harvest which depends on stock abundance as  $C(X(t))$ , the net revenues,  $\pi(t)$ , from commercial harvest  $h(t)$  can be represented by

$$\pi(t) = [p - C(X(t))]h(t) \tag{2}$$

The present value of the net revenue is thus

$$PV = \int \pi(t)e^{-\delta t} dt \tag{3}$$

where  $\delta$  is the instantaneous discount rate.

The optimal bioeconomic solution can be

derived by employing the Maximum Principle (Pontryagin et al. 1962), that is, maximizing (3) subject to equation (1) and an initial condition on the biomass  $X(0) = X_0$ . The current value Hamiltonian for this problem is

$$\mathcal{H}(t) = \{[p - C(X(t))]h(t)\}e^{-\delta t} + \lambda(t)[F(X(t)) - h(t)] \quad (4)$$

where  $\lambda(t)$  is the current value shadow price associated with an incremental change in the biomass. The first-order conditions for a maximum require

$$\frac{\partial \mathcal{H}(t)}{\partial h(t)} = [p - C(X(t))]e^{-\delta t} - \lambda(t) = 0 \quad (5)$$

$$\dot{\lambda}(t) = C'(X(t))h(t)e^{-\delta t} - \lambda(t)F'(X(t)) \quad (6)$$

$$\dot{X}(t) = F(X(t)) - h(t) \quad (7)$$

In steady state  $\dot{X}(t) = 0$ . Solving equations (5) and (6) together with the steady state condition, the fundamental equation for the basic optimal bioeconomic solution is (Clark and Munro 1975):

$$\delta = F'(X(t)) - \frac{[C'(X(t))F(X(t))]}{[p - C(X(t))]} \quad (8)$$

where  $F'(X(t))$  is the rate of change in net growth associated with an increment in the fish stock. The second term on the right-hand side of (8) is the marginal stock effect. The steady state optimal solution as represented in (8) equates the market rate of return obtainable on other assets to the resource's own rate of return (Clark and Munro 1975).

*Objectives of Fisheries Management*

The optimal exploitation of the demersal fishery in NWPM will depend on the objective of management to be achieved. Over the years, various objectives of fishery management have been proposed and declared. They include biological, economic and social objectives (Charles, 1988).

The biological objectives are concerned

mainly with resource conservation and maximizing sustainable yield (MSY) from a fish stock. Harvesting at effort levels exceeding the MSY level will cause reductions in the population level of the stock and constitute biological overfishing. The condition for obtaining the MSY level of exploitation for the demersal fishery in NWPM is

$$F'(X(t)) = 0 \quad (9)$$

The economic objective of fishery management is concerned with maximizing the economic wealth obtainable from the fishery by equating the marginal revenue to marginal cost of fishing. Levels of exploitation in which the marginal cost of fishing exceeds marginal revenue will constitute economic overfishing. The condition for obtaining the maximum economic yield (MEY) level of fishery exploitation depends on whether future benefits are discounted or not. If benefits in all future periods are equally important, then the benefit in each period is maximized. This is the static maximum economic yield (SMEY). The SMEY implies that  $\delta = 0$ . Then equation (8) becomes

$$F'(X(t)) = \frac{C'(X(t))F(X(t))}{[p - C(X(t))]} \quad [10]$$

However, if future benefits are discounted, then the dynamic maximum economic yield (DMEY) is the appropriate objective to pursue. The DMEY implies that  $\delta$  is positive, then equation (8) is the condition for obtaining DMEY level of exploitation.

Since the early seventies, it was felt that fishery management objectives based solely on biological or economic criteria are too narrow. Reference is made to the fact that real world fishery systems are extremely complex since there is a myriad of social, cultural, political and institutional factors which impact on fishery management (Rothschild 1983). As a result, the optimum social yield (OSY) which incorporates some or all the factors above was proposed. However, much confusion and difficulties exist in defining and estimating OSY as indicated by the plethora of methods developed (Roedel 1975; Larkin 1977). Due to the

above reason, the OSY level of fishery exploitation will not be discussed in this paper.

In addition to the biological and bioeconomic optima, it will be useful to note the open-access equilibrium level of exploitation of the demersal fishery in NWPM. The open-access equilibrium (OAE) occurs when a fishery is not subjected to any form of management which results in total revenue being equal to total costs of harvesting, leading to complete dissipation of resource rent from the fishery. OAE implies  $\delta = \alpha$  and from (8), the condition for OAE is

$$p = C(X(t)) \tag{11}$$

*Empirical Model Specification and Data*

*Biological Model*

The surplus production model is used to specify the biological relationship of the demersal fish stock in NWPM because only time-series data on catch and effort are available (Sparre et al. 1989). Two types of functional forms, the logistic and the Gompertz forms are commonly used for the surplus production models. With the logistic form, the growth rate of the stock is

$$\dot{X} = rX[1 - (X/K)] - h \tag{12}$$

where  $r$  is the intrinsic growth rate,  $K$  is the environmental carrying capacity and  $h$  is the catch rate. The Gompertz form for the stock growth rate is

$$\dot{X} = rX \ln(K/X) - h \tag{13}$$

The basic difference between the two functional forms is that the logistic form is symmetrical while the Gompertz form is not, implying, in extreme cases, the potential extinction of the fisheries. The estimation of the parameters in equations (12) and (13) requires nonlinear techniques. If we define  $U = h/E$  and assume that  $h = qEX$ , where  $E$  is the fishing effort,  $q$  is the catchability coefficient and  $U$  is the catch per unit of effort, equations (12) and (13) can be linearized by using  $U$  such that ordinary

least squares method can be used. The transformation of the logistic function has been performed by Schaefer (1957) while the Gompertz form has been transformed by Fox(1970). Using the finite difference approximation  $dU/dt \approx (U_{t+1} - U_{t-1})/2$ , where  $U_t$  is the average catch per unit of effort for a given year  $t$ , the Schaefer and Fox models become respectively

$$(U_{t+1} - U_{t-1})/2U_t = a - b_1U_t - b_2E_t \tag{14}$$

where  $a = r$ ,  $b_1 = r/(qK)$  and  $b_2 = q$ .

$$(U_{t+1} - U_{t-1})/2U_t = a - b_1 \ln U_t - b_2E_t \tag{15}$$

where  $a = r \ln(qK)$ ,  $b_1 = r$  dan  $b_2 = q$ .

Even though the Schaefer and Fox models have been used in many bioeconomic studies, they have been criticized on two grounds (Schnute 1977). First, the finite difference approximation used in these models may not be valid for non-equilibrium conditions and may not represent the dynamic nature of fishery yield and effort interactions. Second, they can predict next year's catch per unit of effort without specifying next year's anticipated effort. Due to these shortcomings, these models will not be used in this study.

Schnute (1977) modified the Schaefer model using an integration procedure and the resultant Schnute model is as follows:

$$\ln(U_{t+1}/U_t) = a - b_1(U_t + U_{t+1})/2 - b_2(E_t + E_{t+1})/2 \tag{16}$$

where  $a = r$ ,  $b_1 = r/(qK)$  and  $b_2 = q$ .

In a similar vein, Clarke, Yoshimoto and Pooley (1992) modified the Fox model using a Taylor approximation and derive the CYP model as follows:

$$\ln(U_{t+1}) = a \ln(qK) + b_1 \ln(U_t) - b_2(E_t + E_{t+1}) \tag{17}$$

where  $a = 2r/(2+r)$ ,  $b_1 = (2-r)/(2+r)$  and  $b_2 = q/(2+r)$ .

Thus,  $r = 2(1 - b_1)/(1 + b_1)$ ,  $q = -b_2(2+r)$ , and  $K = e^{a(2+r)/(2r)}$ .



*Fishing Effort*

An important variable in the surplus production model is fishing effort, which is a composite input used in catching fish. It comprises the gears, the vessels and all other inputs such as labour, fuel, ice, etc. As discussed earlier, a variety of gears and different sizes of vessels are used in catching the demersal fish in NWPM. These vessels and gears will exert different impacts on the fish stock. Thus, appropriate choice and standardization of units of fishing effort is essential to reflect the relative change in the fishing power of vessels and gears.

The relative fishing power for the vessels and gears used in catching the demersal fish is estimated using an approach outlined by Gulland (1983). First, the ratio of the average catch per vessel using gear type *j* and the average catch per small trawler vessel (less than 40 GRT), which is used as the standard vessel, is estimated. Once the fishing power is calculated, the standard fishing effort in number of small-trawler days (standard days) can be computed by summing the product of fishing power, average fishing days and the number of operating vessels of gear type *j*.

The data used for estimating standardized effort and the surplus production models are obtained from the Annual Fisheries Statistics. However, the data available in the official statistics are highly aggregated. Fortunately, disaggregated data are mostly available from the reports of the Department of Fisheries of the relevant states. The catch,

standardized effort and catch per unit of standardized effort for the demersal fishery in NWPM from 1969 to 1991 are shown in Figure 1. In general, landings and catch per unit of effort show slight increasing trend over the years while fishing effort does not show any clear trend. Using these data, the empirical estimates of the biological relationships and parameters were obtained and these will be discussed in later sections.

*Harvesting Cost*

Total cost of harvesting is equal to

$$C(E) = cE_t, \tag{18}$$

where *c* is the constant harvesting cost per standard day. If it is assumed that the catch function takes the form  $h = qEX$ , then  $E = (h/(qX))$ , and the cost function in terms of fish stock, *C(X)* becomes

$$C(X) = c[h/(qX)] \tag{19}$$

Data on cost per standard day *c* are not available in the Annual Fisheries Statistics, but they can be obtained and adapted from studies by various authors. In estimating the cost per standard day, the costs pertaining to small trawler vessels have been used since effort of other gear types have been converted to small trawler day equivalent.

Fishing costs comprise operating, fixed, labour and opportunity costs. Operating costs include expenses on fuel, ice, food and maintenance of vessels and gears. Include in the fixed costs are items such as depreciation of fixed assets, insurance premia and license fees. The operating and fixed costs per trawl vessel are obtained from a survey in 1989 by Md. Ferdous. These costs are adjusted to per standard small trawler day equivalent. Crew members of trawl vessels are remunerated based on sharing (50%) of the net proceeds from sales of fish (Md. Ferdous 1990). The net sale proceed is equivalent to revenues from sales of fish minus the operating costs. The per vessel labour cost is converted to per standard day equivalent. The opportunity cost is obtained from an estimate by Tai (1993). However, the estimate was RM 9.07 per standard drift-net day and the conversion

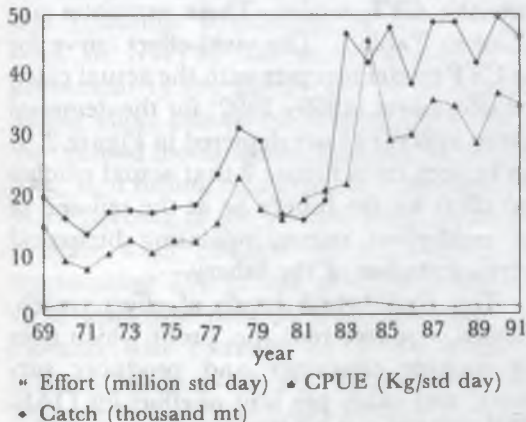


Fig. 1: Standardized effort, catch and catch per unit effort for the demersal fishery in NWPM, 1969-1991

to per standard small trawl day yields an opportunity cost of RM 114.83.

The cost per standard day is the sum of the costs discussed above. However the gears used in exploiting demersal fish also catch other species as well. Therefore, the cost has to be apportioned such that it reflects only the cost relevant to demersal fish catch. The cost is apportioned based on the ratio of demersal to total fish landed in 1989 (i.e. 17%). After taking into account the rate of inflation, the cost per unit of standard day in 1992 is estimated at RM 122.56.

*Price of Fish*

Ex-vessel price of demersal fish is used in this study since it is the price directly received by fishers. It is assumed that price changes at other levels of the marketing chain will be transmitted to the ex-vessel level in the long-run. The ex-vessel price remains constant in this study because individual fishers are considered as price takers whose landings are insignificant to affect prices. Data on ex-vessel prices of selected demersal fishes are published in the Annual Fisheries Statistics. The average of these prices for the year 1992 is RM 4.15 per Kg.

**RESULTS**

The Schnute and CYP production models (equations 16 and 17 respectively) are estimated by OLS using catch and effort data from Figure 1. The estimated results are shown in Table 1. The Schnute model has a poor fit with a low R<sup>2</sup> value even though the parameters have the correct signs. The poor fit was probably due to the problem as pointed out by Schnute (1977) that it is unclear whether to use  $\ln(U_{t+1}/U_t)$  or  $((U_t + U_{t+1})/2)$  as the regressand. The estimated results of the CYP model give a good fit of the data. However, first-order autocorrelation appears to be present in the model based on the Durbin-Watson statistic. This problem can be corrected using the Cochrane-Orcutt procedure (Maddala 1992). The results of the first-order autocorrelation corrected CYP model as presented in Table 1 show that all the coefficients have the proper

TABLE 1  
Empirical estimates of the surplus production model for the demersal fishery in NWPM.

|                     | Model                                   |   |
|---------------------|---|---|
|                     | Schnute                                 | CYP <sup>#</sup>                        |
| a                   | 0.2855<br>(0.2372)                      | 1.8485<br>(1.5700)                      |
| b <sub>1</sub>      | -0.4013 × 10 <sup>-2</sup><br>(-0.4987) | 0.7799<br>(6.637)*                      |
| b <sub>2</sub>      | -0.7772 × 10 <sup>-7</sup><br>(-0.1079) | -0.3783 × 10 <sup>-6</sup><br>(-1.2590) |
| R <sup>2</sup>      | 0.0265                                  | 0.8593                                  |
| R <sup>2</sup> -bar | -0.1033                                 | 0.8406                                  |
| DW                  | 2.4474                                  | 2.0276                                  |
| D-h                 | -1.0892                                 | -0.8018                                 |

\*P = 0.01.

# = Cochrane-Orcutt procedure for correcting first-order autocorrelation.

Figures in parentheses show t-ratio.

signs. However, only the coefficient b<sub>1</sub> is significant at the 1% level. This may probably be due to data problem and/or the assumptions made in deriving the CYP model (Clarke et al., 1992). Nevertheless, the high R<sup>2</sup> values of CYP model show that the model fits the data better compared to the Schnute model. Thus the estimates of the CYP model were used in this study.

The biological parameters r, q and K for the demersal fishery in NWPM are estimated from the CYP model. These estimates are shown in Table 2. The yield-effort curve for the CYP model together with the actual catch and effort data (1969 - 1992) for the demersal fishery in NWPM are depicted in Figure 2. It can be seen from Figure 2 that actual catches and effort for the fishery lie at the tail-end of the yield-effort curve, indicating biological overexploitation of the fishery.

The equilibrium levels of effort, catch, biomass, resource rent (i.e. profit which does not include consumer and producer surpluses) and catch per unit of effort for OAE, MSY, SMEY and DMEY are shown in Table 3. As expected, no rent is generated at OAE.

TABLE 2

Definitions and values of biological parameters estimated by the CYP Model for the demersal fishery in NWPM.

| Parameter | Definition  | Value                   |
|-----------|---|-------------------------|
| r         | Intrinsic growth rate per year                        | 0.2474                  |
| q         | Catchability coefficient per standardized fishing day | $0.8502 \times 10^{-6}$ |
| K         | Maximum biomass in MT                                 | 5,216,471               |

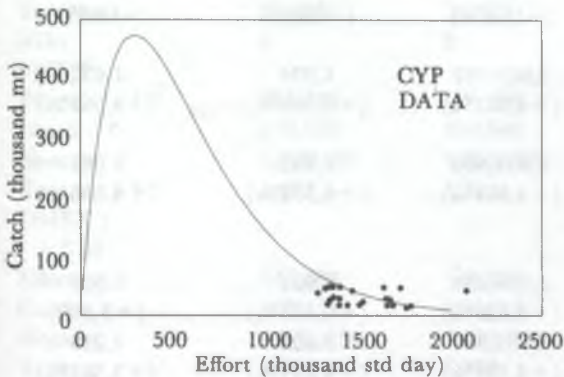


Fig. 2: Yield-Effort relationship for the CYP Model

At this point, yield is approximately 6.7 percent lower while fishing effort is 10.3 percent higher compared to the yield and effort in 1991. These figures indicate that the present (1991) level of exploitation of the demersal fishery in NWPM shows slight improvement over the OAE level.

Comparisons of the present level of exploitation with the MSY and the optimal bioeconomic levels confirm that biological and economic overfishing of the demersal stock in NWPM has occurred. Great improvement in the fishery can be achieved if fishing effort can be reduced to the MSY or the optimal bioeconomic level of exploitation. That is, if fishing effort can be reduced by 62 to 78 percent of the present level, yield will increase from 394,080 mt to 474,682 mt, representing 754 to 928 percent increase in yield from the present level. Likewise, the biomass will increase by 2,131 to 4,614 percent, while catch per unit of effort will increase by 2,126 to 4,646 percent from the present level with the same quantum of effort reduction. More importantly, tremendous

increase in resource rent can be achieved by reducing effort. With a 62 percent reduction of present level of fishing effort, resource rent increases from RM 29 million to RM 1,573 million, representing an increment of 5,324 percent. If fishing effort is reduced to the SMEY level, resource rent increases to RM 1,935 million or an increment of 6,572 percent.

Various discount rates used result in different DMEY levels of exploitation. As discount rate increases from 5 to 20 percent, fishing effort increases from 342,189 days to 506,204 days respectively. However, these levels of effort are still much lower than the 1991 level. On the other hand, discount rate increases will reduce DMEY level of yield, biomass, catch per unit of effort and resource rent.

Increases in cost per unit of effort and ex-vessel price will have significant effects on the optimal levels of exploitation of the demersal fishery in NWPM. When cost per unit of fishing effort is raised from the present (base-case) cost of RM 122.56 per standard day, equilibrium fishing effort and resource rent will be reduced while biomass will be increased for OAE, SMEY and various DMEY (Table 4). However, catches for OAE and DMEY will be increased while catch levels for SMEY are reduced slightly. On the contrary with increases in ex-vessel price, fishing effort and resource rent will be increased while biomass will be decreased for OAE, SMEY and DMEY levels (Table 5). Yield will be decreased for OAE and DMEY but will be increased slightly for SMEY level with increases in ex-vessel prices.

## CONCLUSIONS AND DISCUSSION

A requisite for managing the demersal fishery in NWPM is to determine the optimal level of

TABLE 3

Open access, MSY and optimal bioeconomic levels of effort, yield, biomass, rent and catch per unit effort for demersal fishery in NWPM.

|                     | Effort<br>(SD)        | Catch<br>(MT)      | Biomass<br>(MT)        | Rent<br>(RM mill.) | CPUE<br>(MT/SD)    |
|---------------------|-----------------------|--------------------|------------------------|--------------------|--------------------|
| Present<br>(1991)   | 1,322,494             | 46,154             | 41,048                 | 29                 | 0.035              |
| OAE <sup>1</sup>    | 1,458,094<br>(+10.3%) | 43,061<br>(-6.7%)  | 34,735<br>(-15.4%)     | 0<br>(-100%)       | 0.030<br>(-14.3%)  |
| MSY <sup>1</sup>    | 290,931<br>(-78.0%)   | 474,682<br>(+928%) | 1,919,032<br>(+4,575%) | 1,934<br>(+6,569%) | 1.632<br>(+4,563%) |
| SMEY <sup>1</sup>   | 285,758<br>(-78.4%)   | 474,606<br>(+928%) | 1,953,460<br>(+4,614%) | 1,935<br>(+6,572%) | 1.661<br>(+4,646%) |
| DMEY <sup>1</sup> : |                       |                    |                        |                    |                    |
| $\delta = 0.05$     | 342,189<br>(-74.1%)   | 468,125<br>(+914%) | 1,609,034<br>(+3,820%) | 1,901<br>(+6,455%) | 1.368<br>(+3,809)  |
| $\delta = 0.08$     | 375,698<br>(-71.6%)   | 458,051<br>(+892%) | 1,433,984<br>(+3,393%) | 1,855<br>(+6,297%) | 1.219<br>(+3,383%) |
| $\delta = 0.10$     | 397,868<br>(-69.9%)   | 449,489<br>(+874%) | 1,328,769<br>(+3,137%) | 1,817<br>(+6,166%) | 1.130<br>(+3,129%) |
| $\delta = 0.12$     | 419,888<br>(-68.3%)   | 439,787<br>(+853%) | 1,231,907<br>(+2,901%) | 1,744<br>(+5,914%) | 1.047<br>(+2,891%) |
| $\delta = 0.15$     | 452,610<br>(-65.8%)   | 423,630<br>(+818%) | 1,100,860<br>(+2,582%) | 1,703<br>(+5,772%) | 0.936<br>(+2,574%) |
| $\delta = 0.20$     | 506,204<br>(-61.7%)   | 394,080<br>(+754%) | 915,646<br>(+2,131%)   | 1,573<br>(+5,324%) | 0.779<br>(+2,126%) |

Note: Figure in parentheses represent percentage increase (+) or decrease (-) from the present (1991) level.

<sup>1</sup> OAE = open access equilibrium, MSY = maximum sustainable yield, SMEY = static maximum economic yield, and DMEY = dynamic maximum economic yield.

exploitation based on some pre-determined objectives of management. These objectives may include maximizing the biological sustainable yield or maximizing economic yield from the fishery. There are two kinds of maximum economic yields: (1) the static economic yield which treats the planning horizon to be myopic and (2) the dynamic economic yield which takes account of the welfare of future generations into the planning horizon.

In fisheries management, resource managers are frequently forced to make management decisions based on relatively limited biological and economic data. In such situations, surplus production models may be useful because they require relatively

limited data, although some (e.g. Townsend 1986) question their applicability. The surplus production model specified following the procedure developed by Clarke, Yoshimoto and Pooley has the best fit of the catch and effort data for the demersal fishery in NWPM. Thus the CYP model is used as the basis for computing the biological parameters for estimating the optimal bioeconomic levels of exploitation.

A comparison of the optimal bioeconomic and current levels of exploitation of the demersal stock in NWPM indicates that the stock has been biologically and economically overfished even though present level of exploitation shows slight improvement compared to the open access level. The results also

TABLE 4

Effects of increases in cost per unit effort on OAE and optimal bioeconomic level of exploitation for demersal fishery in NWPM

|                          | Cost per unit effort(RM/SD) |           |           |           |           |
|--------------------------|-----------------------------|-----------|-----------|-----------|-----------|
|                          | Base case                   | +5%       | +10%      | +15%      | +20%      |
| <b>OAE<sup>1</sup>:</b>  |                             |           |           |           |           |
| Effort                   | 1,458,094                   | 1,443,895 | 1,430,357 | 1,417,441 | 1,405,055 |
| Catch                    | 43,061                      | 44,775    | 46,468    | 48,138    | 49,793    |
| Biomass                  | 34,735                      | 36,473    | 38,210    | 39,944    | 41,682    |
| Rent                     | 0                           | 0         | 0         | 0         | 0         |
| <b>SMEY<sup>1</sup>:</b> |                             |           |           |           |           |
| Effort                   | 285,758                     | 285,504   | 285,250   | 284,997   | 284,745   |
| Catch                    | 474,606                     | 474,599   | 474,591   | 474,582   | 474,573   |
| Biomass                  | 1,953,460                   | 1,955,167 | 1,956,872 | 1,958,572 | 1,960,274 |
| Rent                     | 1,935                       | 1,933     | 1,931     | 1,929     | 1,928     |
| <b>DMEY<sup>1</sup>:</b> |                             |           |           |           |           |
| $\delta = 0.05$          |                             |           |           |           |           |
| Effort                   | 342,189                     | 341,822   | 341,455   | 341,090   | 340,725   |
| Catch                    | 468,125                     | 468,214   | 468,301   | 468,388   | 468,474   |
| Biomass                  | 1,609,034                   | 1,611,068 | 1,613,100 | 1,615,126 | 1,617,153 |
| Rent                     | 1,901                       | 1,899     | 1,897     | 1,896     | 1,894     |
| $\delta = 0.10$          |                             |           |           |           |           |
| Effort                   | 397,868                     | 397,354   | 396,841   | 396,331   | 395,822   |
| Catch                    | 449,489                     | 449,702   | 449,914   | 450,124   | 450,333   |
| Biomass                  | 1,328,769                   | 1,331,120 | 1,333,467 | 1,335,807 | 1,338,146 |
| Rent                     | 1,817                       | 1,815     | 1,814     | 1,812     | 1,811     |
| $\delta = 0.15$          |                             |           |           |           |           |
| Effort                   | 452,610                     | 451,909   | 451,212   | 450,520   | 449,829   |
| Catch                    | 423,630                     | 423,994   | 424,356   | 424,714   | 425,071   |
| Biomass                  | 1,100,860                   | 1,103,514 | 1,106,161 | 1,108,798 | 1,111,433 |
| Rent                     | 1,703                       | 1,701     | 1,700     | 1,699     | 1,698     |
| $\delta = 0.20$          |                             |           |           |           |           |
| Effort                   | 506,204                     | 505,273   | 504,347   | 503,429   | 502,514   |
| Catch                    | 394,080                     | 394,616   | 395,148   | 395,676   | 396,200   |
| Biomass                  | 915,646                     | 918,582   | 921,509   | 924,423   | 927,333   |
| Rent                     | 1,573                       | 1,573     | 1,572     | 1,571     | 1,570     |

<sup>1</sup> OAE = open access equilibrium, SMEY = static maximum economic yield, and DMEY = dynamic maximum economic yield.

highlight the need to reduce fishing effort by as much as 60 to 78 percent from the present level. With this quantum of effort reduction, catches of demersal fish can be increased by as much as 7 to 9 times while resource rent can be increased by 53 to 65 times using current ex-vessel prices and per unit cost of effort. The implication is that there is an urgent need to formulate appropriate effort reduction management policies for the fishery in order to derive maximum benefits. These effort reduction policies may include non-replacement of

aging vessels, implementing a vessel buy-back scheme to accelerate attrition of vessels, allowing the use of fishing vessels on a rotating basis, and encouraging and facilitating fishermen to seek alternative employment outside the fishery sector.

Fishing effort reduction which leads to increased catch and resource rent provides incentives for fishers to increase participation in the fishery, thereby eroding the rent accruable from the fishery. Thus in addition to the biological dynamics of fish stock, the

TABLE 5  
Effects of increase in ex-vessel prices on OAE and optimal bioeconomic level of exploitation for demersal fishery in NWPM

|                          | Ex-vessel Price (RM/Kg.) |           |           |           |           |
|--------------------------|--------------------------|-----------|-----------|-----------|-----------|
|                          | Base case                | + 5%      | + 10%     | + 15%     | + 20%     |
| <b>OAE<sup>1</sup>:</b>  |                          |           |           |           |           |
| Effort                   | 1,458,094                | 1,472,456 | 1,486,141 | 1,498,603 | 1,511,137 |
| Catch                    | 43,061                   | 41,391    | 39,856    | 38,505    | 37,190    |
| Biomass                  | 34,735                   | 33,062    | 31,543    | 30,220    | 28,946    |
| Rent                     | 0                        | 0         | 0         | 0         | 0         |
| <b>SMEY<sup>1</sup>:</b> |                          |           |           |           |           |
| Effort                   | 285,758                  | 286,003   | 286,226   | 286,420   | 286,607   |
| Catch                    | 474,606                  | 474,613   | 474,619   | 474,625   | 474,629   |
| Biomass                  | 1,953,460                | 1,951,816 | 1,950,321 | 1,949,020 | 1,947,764 |
| Rent                     | 1,935                    | 2,034     | 2,134     | 2,229     | 2,329     |
| <b>DMEY<sup>1</sup>:</b> |                          |           |           |           |           |
| $\delta = 0.05$          |                          |           |           |           |           |
| Effort                   | 342,189                  | 342,544   | 342,867   | 343,149   | 343,421   |
| Catch                    | 468,125                  | 468,040   | 467,961   | 467,892   | 467,826   |
| Biomass                  | 1,609,034                | 1,607,072 | 1,605,289 | 1,603,735 | 1,602,236 |
| Rent                     | 1,901                    | 1,999     | 2,097     | 2,190     | 2,288     |
| $\delta = 0.10$          |                          |           |           |           |           |
| Effort                   | 397,868                  | 398,365   | 398,818   | 399,213   | 399,595   |
| Catch                    | 449,489                  | 449,282   | 449,094   | 448,928   | 448,768   |
| Biomass                  | 1,328,769                | 1,326,501 | 1,324,438 | 1,322,640 | 1,320,905 |
| Rent                     | 1,817                    | 1,910     | 2,003     | 2,092     | 2,186     |
| $\delta = 0.15$          |                          |           |           |           |           |
| Effort                   | 452,610                  | 453,287   | 453,905   | 454,445   | 454,967   |
| Catch                    | 423,630                  | 423,277   | 422,955   | 422,673   | 422,400   |
| Biomass                  | 1,100,860                | 1,098,300 | 1,095,969 | 1,093,937 | 1,091,975 |
| Rent                     | 1,703                    | 1,790     | 1,877     | 1,960     | 2,048     |
| $\delta = 0.20$          |                          |           |           |           |           |
| Effort                   | 506,204                  | 507,107   | 507,931   | 508,652   | 509,350   |
| Catch                    | 394,080                  | 393,560   | 393,084   | 392,668   | 392,264   |
| Biomass                  | 915,646                  | 912,810   | 910,228   | 907,975   | 905,798   |
| Rent                     | 1,573                    | 1,654     | 1,734     | 1,811     | 1,891     |

<sup>1</sup> OAE = open access equilibrium, SMEY = static maximum economic yield, and DMEY = dynamic maximum economic yield.

response of fishing effort to resource rent and other social, cultural and psychological factors are also important considerations in determining the optimal exploitation of the fishery. Moreover, social objectives such as maintaining the viability of fishing communities and improving income distributions are important in practical fishery management. These aspects need to be incorporated into the model to determine the biosocioeconomic optimal levels of exploitation (Charles 1989).

Even though the CYP model appears to

have a good fit, the analysis treats the demersal fishery as one aggregated stock rather than separating into various major species. At the same time, there is noticeable, although not quantifiable, targeting behaviour on different species by the major gear types. A more accurate representation of the bioeconomics of the demersal fishery could be obtained if a model is developed that integrates the biological and economic differences of the major species.

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## **Estimating Economic Efficiency in Paddy Farms: A Case of Northwest Selangor IADP**

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**Keywords:** frontier production function, allocative efficiency, technical efficiency and economic efficiency.

### **ABSTRAK**

Kecekapan ekonomi boleh dibahagikan kepada kecekapan alokatif dan teknikal. Kecekapan teknikal didefinisikan sebagai kadar output sebenar terhadap kemungkinan teknikal output maksimum pada paras sumber-sumber yang ada, dan kecekapan alokatif dinyatakan sebagai kadar kemungkinan teknikal output maksimum pada paras sumber-sumber yang diberi terhadap output yang diperolehi pada paras sumber-sumber yang optimum. Objektif kajian ini ialah untuk mengukur kecekapan-kecekapan teknikal, alokatif dan ekonomi dengan menggunakan fungsi pengeluaran frontier berkebarangkalian terhadap penanaman padi di Selangor. Keputusan kajian menunjukkan sampel petani padi di dalam kajian tidak mempunyai kecekapan ekonomi. Kerajaan sepatutnya memainkan peranan penting di dalam pendidikan, pengembangan, perubahan sosial dan memberikan sokongan institusi supaya petani dapat memperbaiki kecekapan teknikal dan alokatif.

### **ABSTRACT**

Economic efficiency can be measured as allocative and technical efficiency. A study to measure the technical, allocative and economic efficiency of paddy farms using the probabilistic frontier production function was carried out. Results showed that the sample paddy farmers under study are economically inefficient. There is still in technical efficiency a 15 percent potential for increasing the output of farmers, and a 35 percent potential in allocative efficiency to increase output optimally. The government should therefore play a part in directing education, extension, and social change and provide institutional support in order to improve the farmers' efficiency technically and allocatively.

### **INTRODUCTION**

The relative efficiency in agricultural production is an important aspect in developing countries. Farm efficiency has long been an area of interest in the investigation of farm operations as inefficiency can have important implications in economic survival, the size distribution of farms, technological adoption, and the overall levels of input.

Economic efficiency can be decomposed into two components namely, allocative and technical efficiency. A farm is said to be allocative or price efficient if it maximizes profits by equating the value of marginal product of each variable input to its price. It

is technically efficient if it produces a higher level of output from the same level of inputs as compared to another farm. Moreover, technical efficiency and price efficiency are necessary, and when they occur jointly, are sufficient conditions for economic efficiency to exist (Yotopoulos and Nugent, 1976).

The concept of efficiency as a measure of economic performance and hence as a guide to policy formulation has often been questioned. At the same time there has been a considerable amount of theoretical and applied econometric research on the measurement of efficiency using the concept of frontier production function. Frontier production



functions assume the existence of technical efficiency in different farms involved in production, such that, for specific values of factor inputs, the level of production are less than what would be the case if the farms are fully technically efficient. The objective of this paper is to analyze the extent to which a sample of paddy farmers in Northwest Selangor Integrated Development Project (IADP) have attained technical, allocative and economic efficiency using a probability frontier production function.

There are a variety of methods used for measuring and computing technical efficiency. Most involve the construction of a best-practice frontier of one kind or another and measurement of inefficiency relative to this frontier. Past empirical studies have used a variety of methods and specifications which include Dawson (1985), Ekanayake and Jayasuria (1987), Taylor and Shonkwiler (1986), Habibullah and Ismail (1992), Neff, Garcia and Hornbacker (1991) and others. Forsund, Lovell and Schmidt (1980), Schmidt (1985), Balbase and Grobowski (1985) and Ali and Chaudhry (1990). Bauer (1990), Battese (1992) and Button and Weyman-Jones (1994) presented a review of the concepts and models which have been suggested and surveyed the applications which have appeared in economic journals.

*Discussion on Theoretical Framework*

The production function is defined as the relationship that describes the *maximum possible* output for the given combination of input (Ferguson, 1966). However, a production function estimated by OLS method shows an *average* response and does not qualify for the theoretical definition of production function or frontier. Farrell (1957) employed a deterministic approach in which he estimated the frontier by using linear programming (LP), requiring all observations to lie at or above the frontier.

Consider the following Cobb-Douglas production function in general form:

$$Y_j = \prod_{i=0}^m X_{ij}^{\beta_i} \epsilon^{\mu_j} \tag{1}$$

where  $i = 1, 2, \dots, m$  are inputs;  $j = 1, 2, \dots, n$ ;  $Y_j$  = output of the  $j^{\text{th}}$  farm;  $X_{ij}$  = level of the  $i^{\text{th}}$  input on the  $j^{\text{th}}$  farm;  $\beta_i$  = parameters (including in intercept,  $\beta_0$ ) to be estimated;  $\mu_j$  = error term; and  $\epsilon$  is the natural exponential. If  $\mu_j$  is assumed to be randomly and normally distributed, Equation (1) can be estimated using the OLS method.

A measure of technical efficiency can be estimated using a linear programming (LP) method, which has been used by Timmer (1970,1971). Using Equation (1), assume that the disturbance term are constrained to be one sided, that is,  $\mu_j \leq 0$ , so that the function is a frontier one. For an efficient frontier, this should be estimated, so that

$$\sum_{i=0}^m \alpha_i X_{ij} = Y_j^* \geq Y_j \quad j = 1, 2, \dots, n \tag{2}$$

where  $Y_j = Y_j^* + \mu_j$ ;  $Y_j^*$  is frontier estimate of  $Y_j$  and  $\mu_j$  is residual from farm  $j^{\text{th}}$ . Only efficient farms satisfy the strict equality, In order to determine the unique vector,  $\alpha_i$ , which satisfy (2), Timmer (1970) suggests minimizing the linear sum of residuals rather than minimizing linear sum of square residuals since the later accentuates the impact of extreme observations. Thus the problem is to find

$$\min \sum_{j=1}^n \mu_j \tag{3}$$

subject to

$$\sum_{i=0}^m \alpha_i X_{ij} \geq Y_j \quad j = 1, 2, \dots, n$$

To solve this using LP methods,  $\sum \mu_j$  is expressed as a linear function of  $\alpha_i$  and  $X_{ij}$ . The production function in (1) is then summed over  $j$  and solved for  $\sum \mu_j$ , that is

$$\sum_{j=1}^n \mu_j = \sum_{j=1}^n \sum_{i=0}^m \alpha_i X_{ij} - \sum_{j=1}^n Y_j \tag{4}$$

where

$$y_j = n \times 1 \text{ vector of } 1$$

$$x_{ij} = \log X_{ij}, \quad i=0, 1, \dots, m \text{ and } j = 1, 2, \dots, n$$

However, for any data set, the last term on the right hand side of (4) is a constant, so it can be removed without any consequence and what remain becomes the objective function that Timmer (1970) suggests which is computationally simpler when the objective function is divided by the number of observations. Thus, the LP problem is to find  $\alpha_{ij}$ ; in order to

$$\min \sum_{i=0}^m \alpha_{ij} \bar{X}_i \quad (5)$$

subject to

$$\sum_{i=0}^5 \alpha_{ij} X_{ij} \geq Y_j \quad j = 1, 2, \dots, n$$

From the probabilistic function coefficients, farm specific technical efficiency (TE<sub>j</sub>) is measured as follows:

$$TE_j = AGR_j / MGR_j \quad (6)$$

where AGR<sub>j</sub> and MGR<sub>j</sub> are the j<sup>th</sup> farmer's actual and maximum possible output, respectively. MGR<sub>j</sub> is measured by substituting the j<sup>th</sup> farmer's level of resources into the estimated probabilistic frontier production function.

Allocative efficiency expressed as the ratio of technically maximum possible output at the level of resources to the output obtainable at the optimum level of resources. Farm specific allocative efficiency (AE<sub>ij</sub>) in the use of a variable inputs is

$$AE_{ij} = MGR_j / OGR_{ij} \quad (7)$$

where OGR<sub>ij</sub> is output at the optimum level of the i<sup>th</sup> input, with the other inputs remaining at the level at which there were used by the j<sup>th</sup> farm. Farm specific optimum input levels is calculated by equating marginal value product (MVP) of an input with its

$$\begin{matrix} \beta_0 + \beta_1 \ln F_1 + \beta_2 \ln W_1 + \beta_3 \ln C_1 + \beta_4 \ln L_1 + \beta_5 \ln A_1 \geq Y_1 \\ \beta_0 + \beta_1 \ln F_2 + \beta_2 \ln W_2 + \beta_3 \ln C_2 + \beta_4 \ln L_2 + \beta_5 \ln A_2 \geq Y_2 \\ \beta_0 + \beta_1 \ln F_3 + \beta_2 \ln W_3 + \beta_3 \ln C_3 + \beta_4 \ln L_3 + \beta_5 \ln A_3 \geq Y_3 \\ \vdots \\ \vdots \\ \vdots \end{matrix}$$

$$\beta_0 + \beta_1 \ln F_{174} + \beta_2 \ln W_{174} + \beta_3 \ln C_{174} + \beta_4 \ln L_{174} + \beta_5 \ln A_{174} \geq Y_{174}$$

price. The fact that AE<sub>ij</sub> can take value of greater than 1. Thus, AE<sub>ij</sub> > 1 or AE<sub>ij</sub> < 1 depending upon under or over utilisation of input i over its allocatively efficiency level.

The overall allocative efficiency (AE<sub>j</sub>) of all inputs on the j<sup>h</sup> farm is estimated to be

$$AE_j = MGR_j / OGR_j \quad (8)$$

where OGR<sub>j</sub> is the j<sup>h</sup> farmer's output at the optimum level of all variable inputs.

Farm specific economic efficiency (EE<sub>j</sub>) is estimated, using the following function

$$EE_j = TE_j \cdot AE_j \quad (9)$$

### METHODOLOGY

The empirically estimated Cobb-Douglas production function is specified as

$$\ln Y = \beta_0 + \beta_1 \ln F + \beta_2 \ln W + \beta_3 \ln C + \beta_4 \ln L + \beta_5 \ln A + \mu \quad (10)$$

where

- Y = output of paddy (kg)
- F = fertilizer (kg)
- W = herbicide (lt)
- C = chemical (lt)
- L = labor (hour)
- A = land area (ha)
- μ = error term
- β<sub>i</sub> = parameter estimates

The production function in Equation (10) was first estimated using ordinary least square (OLS) method. It was transformed into a deterministic frontier production function as follows

$$\begin{matrix} \text{minimize } \beta_0 + \beta_1 \ln \bar{F} + \beta_2 \ln \bar{W} + \beta_3 \ln \bar{C} \\ + \beta_4 \ln \bar{L} + \beta_5 \ln \bar{A} \end{matrix} \quad (11)$$

subject to

where  $\bar{F}$ ,  $\bar{W}$ ,  $\bar{C}$ ,  $\bar{L}$ , and  $\bar{A}$  are mean values of the respective inputs.

The probabilistic function coefficients used in estimating efficiencies were obtained from Equation (11) and allocative efficiency of five variable input, viz fertilizer, herbicide, chemical, labor and land cultivated were estimated. The data used in this study consisted of production cost for a sample of 174 paddy farm in Northwest Selangor IADP). Variables collected include production data, quantity of inputs used and prices of inputs. A statistical summary concerning the above variable are presented in Table 1.

TABLE 1  
Summary statistics of variables

|                          | Mean    | Standard Deviation |
|--------------------------|---------|--------------------|
| Output (kg)              | 3803.20 | 849.2100           |
| Output price (RM/kg)     | 0.78    | 0.0538             |
| Fertilizer (kg)          | 1307.10 | 1463.9000          |
| Fertilizer price (RM/kg) | 0.07    | 0.0006             |
| Herbicide (lt)           | 17.39   | 7.4108             |
| Herbicide price (R/lt)   | 6.96    | 0.7265             |
| Chemical (lt)            | 7.97    | 6.1543             |
| Chemical price (RM/lt)   | 9.80    | 1.0004             |
| Labor (hour)             | 56.18   | 20.8240            |
| Labor wage (RM/hr)       | 1.68    | 0.5691             |
| Land area (ha)           | 2.59    | 1.7678             |

**RESULTS AND DISCUSSION**

The estimated OLS and probabilistic Cobb-Douglas production frontier models are given in Table 2. The data fit the model quite well as shown by an R2 of 0.7964. The OLS estimates showed that all coefficients have the expected signs and are significantly different from zero at the 1 percent level for fertilizer, chemical and labor, and 10 percent level for herbicide.

The OLS function portrays the response of the *average* farmers while the frontier function reflects the *best practice* of farmers. The intercept term in the frontier production function is higher than that estimated by the OLS method. In addition, some of the coefficients in the frontier function have increased viz. chemical, land area and

TABLE 2  
Estimated parameters of OLS and probabilistic frontier production functions of paddy farms

|            | OLS                   | Probabilistic Frontier |
|------------|-----------------------|------------------------|
| Fertilizer | 0.0717<br>(5.6740)*   | 0.0420                 |
| Herbicide  | 0.0227<br>(1.6850)*** | 0.0028                 |
| Chemical   | 0.1184<br>(9.0790)*   | 0.1325                 |
| Labor      | 0.1486<br>(6.9480)*   | 0.1946                 |
| Land area  | 0.1200<br>(9.0530)    | 0.1531                 |
| Intercept  | 6.7797<br>(66.2400)*  | 6.9678                 |
| R2         | 0.7964                |                        |
| SSE        | 1.5557                |                        |

Note: Figure in parentheses are t-statistics

- \* Significant at 1% level
- \*\* Significant at 5% level
- \*\*\* Significant at 10% level

labor. Coefficient for fertilizer and herbicide, on the other hand had decreased. This shows increased output if farmers used more chemical land area, increased labour but applied less fertilizers and herbicides. Thus, compared with the OLS *average* model, the envelope shifts vertically along with shifts in the slope of the production function for the probabilistic model.

Technical, allocative and economic efficiencies were measured, using Equations (6), (7), and (9) respectively. The results are shown in Table 3. The sample of farmers have a technical efficiency mean of 0.8515 with standard deviation of 0.0826. This means that there exists a 15 percent potential for increasing farmers production at the existing level of their resources. The higher production gap that exists between the *best-practice* farmers and *average* farmers suggests the need to improve the existing agricultural extension services in order to exploit the above-mentioned potential.

The economic significance of inefficiency can be expressed in terms of the losses of output. The sampled farms have an allocative

TABLE 3  
Potential output and efficiency measure  
of paddy farms

|   | Average | Standard<br>Deviation |
|---|---------|-----------------------|
| Output (kg)   | 3803.20 | 849.2100              |
| Potential output at<br>technical efficiency<br>level (kg) | 4476.60 | 946.43                |
| Potential output at<br>optimum level of<br>input (kg)     |         |                       |
| Fertilizer  | 4143.10 | 636.34                |
| Herbicide   | 3748.60 | 784.04                |
| Chemical  | 4747.20 | 685.75                |
| Labor   | 5077.90 | 1185.7                |
| Overall   | 6893.10 | 970.86                |
| Technical Efficiency<br>Ratio                             | 0.8515  | 0.0826                |
| Allocative Efficiency<br>Ratio                            |         |                       |
| Fertilizer  | 1.0725  | 0.0633                |
| Herbicide   | 1.1936  | 0.0272                |
| Chemical  | 0.9371  | 0.0857                |
| Labor   | 0.8882  | 0.0753                |
| Overall   | 0.6474  | 0.0806                |
| Economic Efficiency<br>Ratio                              |         |                       |
| Fertilizer  | 0.9130  | 0.1019                |
| Herbicide   | 1.0159  | 0.0968                |
| Chemical  | 0.7974  | 0.1034                |
| Labor   | 0.7554  | 0.0891                |
| Overall   | 0.5509  | 0.0857                |

efficiency mean level of 0.6474 and a standard deviation of 0.0826. This means that there exist a 35 percent potential for increasing farm output by using optimum input combination. From Table 4, it can be noted that about 2.6 percent of the farmers were at least 80 percent efficient in terms of allocative efficiency. The results showed that the output loss due to allocative inefficiency ranged from 25 percent to 55 percent. Inefficiency in labor contributed most to the overall allocative inefficiency. This could be partly attributed to the labor shortages during land preparation and planting time. Only 1.1 percent of the farmers are at least 80 percent efficient in terms of economic efficiency. It ranges from

TABLE 4  
Distribution of technical, allocative and economic  
efficiency

| Efficiency Level<br>(%) | Technical<br>Efficiency | Allocative<br>Efficiency | Economic<br>Efficiency |
|-------------------------|-------------------------|--------------------------|------------------------|
| 30-40                   | -                       | -                        | 4( 2.3)                |
| 40-50                   | -                       | 5(2.9)                   | 29(28.2)               |
| 50-60                   | -                       | 52(29.9)                 | 77(44.3)               |
| 60-70                   | 5( 2.9)                 | 71(40.8)                 | 34(19.5)               |
| 70-80                   | 42(24.1)                | 41(23.6)                 | 8( 4.6)                |
| 80-90                   | 77(44.3)                | 5( 2.6)                  | 2( 1.1)                |
| 90-100                  | 50(2.87)                | -                        | -                      |
| Minimum (%)             | 63.97                   | 45.30                    |                        |
| Average (%)             | 85.15                   | 64.74                    | 55.09                  |
| Maximum (%)             | 100.0                   | 84.83                    | 82.32                  |

Note: Figure in parentheses are percentage from total

0.3660 to 0.8232 with a mean of 0.5509. This implies that there exists a potential for increasing the output of the farmers by more than 45 percent simply by adopting a technology of the *best-practice* farmers and through optimal resource allocation.

### CONCLUSION

The purpose of this paper is to measure farm efficiency using probabilistic frontier production methodology. The production function is estimated from a sample of paddy farms and farm efficiencies was measured in terms of technical, allocative and economic efficiencies.

Results of the study show that the technical efficiency ratio is 0.8515. This indicates that there still exist a 15 percent potential for increasing the output of the farmers, if the production gap between the *average* and the *best-practice* farmers can be narrowed. In terms of allocative efficiency, there is still a 35 percent potential for increasing in output optimally allocating given inputs. With respect to economic efficiency, results indicate that farmers are economically inefficient with a mean efficiency ratio of 0.5509. This indicates that there are enormous potential for the farmers to increase output by adopting the best technology and through optimal resource allocation.

The findings of the study emphasized the need to improve farm efficiency at all levels.

Mechanisation should be promoted while technology utilisation upgraded at farm level. Government efforts should be directed in education, extension, social change and support in order to improve the extent to which farmers are technically and allocatively efficient.

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## Price Linkages within Selected Vegetable Markets in Malaysia

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### ABSTRAK

Kertas kerja ini pola jalinan harga antara tahap ladang, borong dan runcit bagi sebelas pasaran sayuran terpilih di Malaysia. Kajian ini bertumpu kepada perhubungan dahulu – ikut antara tahap menegak dalam pasaran terpilih. Ujian statistik yang digunakan untuk meneliti arah penyebab dan perhubungan dahulu dan turut adalah berdasarkan kepada kaedah yang dipelopori oleh Granger dan Pearce. Penemuan kajian menunjukkan bahawa harga ditemui di pusat borong dan harga borong mendahului harga ladang dan runcit bagi sebahagian besar sayur-sayuran yang dikaji.

### ABSTRACT

This study examined the nature of price linkages in farm, wholesale and retail markets of eleven selected Malaysian vegetables, and focused on the lead-lag relationship in vertical level within the selected markets. The statistical tests used for the causality and lead and lag relationship were based on methods developed by Granger, Haugh and Pearce. Findings indicate that price discovery is made at the wholesale centre and whole sale price appears to lead both farm and retail prices for most of the vegetables examined.

### INTRODUCTION

The vegetable marketing in Malaysia is characterised by a number of structural inefficiencies which has resulted in lack of market transparencies between levels and even regional centres (Low, 1993). The market is allegedly highly concentrated at the wholesale, which has a relatively small number of traders with each accounting a significant share of the market trade. Price is determined here by the wholesalers themselves. Unlike the producers, the wholesalers are more equipped with information – both on the supply and the retail demand and arrive at the prices for vegetables which are then transmitted to the producers. Furthermore, this price information is received by producers normally 2-3 days after the produce is sold to the wholesalers. This is because the

producers are practising marketing through consignment system – where the produce is consigned to a particular trader (normally wholesaler) to find the market for the produce. More than two thirds of producers in Selangor, Perak and Johor do so. (MARDI, 1981). Under such an arrangement, farmers surrender the price discovery function to the traders. In other words, they do not negotiate to arrive at the price for their produce. They are merely price takers in the pricing process. Such a marketing structure is conducive towards price manipulation particularly by big time wholesalers.

Such allegation in the case of vegetable market is yet to be verified. Price manipulation is difficult to prove but a study on the nature of price linkages between market levels would provide a clearer picture and hence the

pricing efficiency of the system. There are two major factors that determine the efficiency of price transmission between levels; firstly market structure of each level and secondly, information advantage of one level compared to another. It can distort the quality and timing of information received at each pricing level.

It has been shown that industry concentration at market levels beyond farm gate has resulted in asymmetric farm-retail price transmission in dairy products (Kinnucan and Forker, 1987). Ward (1982) further contended that besides market structure, the extent of product transformation has a direct bearing on price linkages. Agricultural products having many uses and going through considerable transformation are expected to exhibit weak price relationship among the exchange points. In contrast, price linkages should be stronger for perishable products requiring a minimal transformation. Besides these factors, differences in the assimilation of market information may result in price leads and lags among retail, wholesale and farm. This because the information flow throughout the vertical system may not be equal between levels and traders' abilities to assimilate and for respond to market signals can differ at each market level.

The statistical tests to ascertain causality, leads and lags in prices were developed by Granger (1969), Sims (1972) and Haugh (1976) and Pierce (1977). These tests have been used in empirical studies of price transmission (Heien, 1980, Lamm and Westcott, 1981 and Ward, 1982). Lamm and Westcott shows that the direction of causality runs from farm to retail in the case of dairy products. Heien further shows a joint causal relationship occurs between wholesale and retail price for butter and a unidirectional downward relationship for milk.

This paper examines the nature of price linkages of vegetable markets between farm, wholesale and retail levels. In particular it aims at ascertaining the lead-lag relationship of vegetable prices at the three market levels using direct Granger, Haugh and Pierce causality tests. The priori hypothesis being

tested here is that there is a causal linkage from wholesale to retails and farm levels.

## METHODOLOGY

This study utilises Heien's markup pricing model to examine the price transmission behaviour between market levels. This model assumes that the market is competitive, fixed - proportion production technology and constant returns to scale in food marketing system. The pricing rules are in the following general form

$$R = b_1W + b_2Z$$

$$F = a_1W_1 + a_2Z$$

where  $R$  is retail price,  $W$  is wholesale price,  $F$  is farm price and  $Z$  is a price vector (assumed exogenous) of marketing inputs,  $a_1$ ,  $a_2$ ,  $b_1$  and  $b_2$  are the coefficients of the variables.

The causality test developed by Granger (1977) provides us the nature of the causal direction and lead/lag relationship between prices. Granger provided a definition of causality among a set of variables that is based upon predictability as well as the fact that the effect of a change in an exogenous variable upon an endogenous variable requires time. According to Granger, a variable  $X$  causes another variable  $Y$ , with respect to a given universe or information set that includes  $X$  and  $Y$ , if present  $Y$  can be better predicted by using past value of  $X$  than not doing so, all other information in the past of the universe being used in either case. Causality from  $Y$  and  $X$  is defined in the same manner. Feedback occurs if  $X$  causes  $Y$  and if  $Y$  causes  $X$ . A causal relationship between  $X$  and  $Y$  does not exist if causality does not run from  $X$  to  $Y$  or from  $Y$  to  $X$ , and feedback does not occur. A variety of testing procedures have evolved in applying the Granger definition to economic time series. For the purpose of this study, direct Granger Test (1969) and Haugh (1972) and Pierce (1977) were employed.

### *Direct Granger Test*

Direct Granger test as refined by Geweke (1980) relies on direct OLS (ordinary least

squar) regressions on levels of the time series data. Sometimes it is suggested that the data series be transformed before causality test are performed. Pre-filtering procedures considered include first and second differencing and second order filter of the form  $(1 - 0.75 L)^2$  as suggested by Sims (1972).

$$Y_t = a_1 + \sum_{j=1}^p a_{1j} Y_{t-j} + e_{1t} \quad (1)$$

$$y_t = a_2 + \sum_{j=1}^p a_{2j} Y_{tj} + \sum_{k=1}^q b_{2k} X_{t-k} + e_{2k} \quad (2)$$

where

- p and q = number of lags (j and k) used to eliminate autocorrelation
- $e_{it}$  = white noise residuals
- $a_{ij}$  = parameters relating  $Y_t$  to its lag value
- $b_{2k}$  = parameters relating  $Y_t$  and the past values (from time t-k) of X

The direct Granger test based on (1) and (2) is equivalent to testing the following null hypothesis;

$$b_{21} = b_{22} = \dots b_{2q} = 0$$

which can be carried out with F test.

$$F^* = \frac{SSE_1 - SSE_2}{Q} \bigg/ \frac{SSE_2}{N - p - q - 1}$$

where  $SSE_1$  and  $SSE_2$  refer to the sum of squared errors from OLS regressions on (1) and (2) respectively, and N is the number of time series observation on  $Y_t$ . Under the null hypothesis,  $F^*$  is distributed as F with (q, N-p-q-1) degrees of freedom. For suitably large values of  $F^*$ , the null hypothesis that X does not cause Y is rejected. The test of no instantaneous causality is done by using equation (2) and adding current values of X (Geweke, 1980);

$$Y_t = a_3 + \sum_{j=1}^p a_{3j} + \sum_{k=0}^q b_{3k} X_{t-k} + e_{3k} \quad (3)$$

Given equations (1), (2) and (3), the next task involves the choice of the lag length parameters of p and q. The choice of appropriate lag length is important since

omission of lagged values whose underlying population coefficients are non-zero, is likely to produce serial correlation in the residuals. This limitation is shared by univariate cross-correlation approach since computation of the U-Statistics is dependent on the choice of the number of lags and a possibility exists that a significant cross-correlation value may not be captured by the test statistic. This will affect the conclusion drawn from the results.

A number of simple procedures for determining the length of autoregressive process such as partial autocorrelations are available. However, an attractive mechanical method can be based on Akaike's Final Prediction Error (FPE) criterion or Akaike's Information Criterion (AIC) Judge et al. (1982). AIC proposed by Akaike is based on an extension of the maximum likelihood principle. This criterion is used in this study.

A check to see if the chosen autoregressive order l is appropriate can be based on the portmanteau test statistic for white noise Box and Pierce (1970).

$$Q = T (\sum_{i=1}^k r_i^2) \quad (4)$$

where the  $r_i$ 's are estimated autocorrelation coefficients and  $K > l$ . Q has a chi-square (k-l) distribution if the null hypothesis of no autocorrelation (white noise) is true. Once the length parameters p dan q have been determined, then Granger test for causality is performed.

#### The Haugh and Pierce Test

Technique suggested by Haugh (1972) and Pierce (1977) utilizes the cross-correlation technique which is essentially looking at relationships between the estimated innovations of stationary series. The procedure involves the determination of the appropriate ARIMA filter for each series such that they become white noise. The those innovations are cross-correlated. The strength of the relationships between two series is measured through cross-correlations of residual from pre-whitened series.

Let  $X_t$  and  $Y_t$  be the realizations at time t of two stochastic process. Associated with  $X_t$  and  $Y_t$  are white noise terms,  $U_t$  and  $V_t$



respectively. Also,  $E(U_t) = E(V_t) = 0$ ;  $E(U_t^2) = \sigma_U^2$ ;  $E(V_t^2) = \sigma_V^2$ . According to Haugh and Box (1977), the theoretical cross-correlation between the  $U$ 's and  $V$ 's is defined at lag  $k$  as;

$$P_{UV}(k) = \frac{E(U_{t-k}, V_t)}{\sigma_U \sigma_V} \quad (5)$$

where  $P_{UV}(k)$ 's are the coefficients of the cross-correlation between  $U$ 's and  $V$ 's and can be used to assess the lead lag relationships between the original  $X$  and  $Y$  series.

Estimated  $U$ 's and  $V$ 's denoted as the  $\hat{U}$ 's and  $\hat{V}$ 's respectively, can be obtained via application of univariate time series modelling techniques developed by Box and Jenkins (1976). Statistical test of the significance of the calculated cross-correlations between the  $\hat{U}$ 's and  $\hat{V}$ 's denoted as the  $r_{UV}(k)$ 's may be used to interpret the lead-lag relationship between  $X$  and  $Y$ . Since individual estimated cross-correlation can be misleading, Pierce suggests a portmanteau statistic to test the hypothesis. As discussed by Pierce (1977), the hypothesis that  $X$  and  $Y$  are linearly independent may be rejected at significant level  $\alpha$  if;

$$Q_{2m+1} = n \sum_{k=-m}^m |r_{UV}(k)|^2 > X_{\alpha}^2, 2m + 1 \quad (6)$$

where  $X_{\alpha}^2, 2m + 1$  is the upper  $\alpha$  percentage point of the chi-square distribution with d.f.  $\# 2m + 1$ ; and  $m$  is chosen as to include  $a$ ;  $r_{UV}(k)$ 's expected to differ from zero. The contention that  $X$  leads  $Y$  is supported at significance level  $\alpha$  if;

$$Q_{m+1} = n \sum_{k=1}^m |r_{UV}(k)|^2 > X_{\alpha}^2, m \quad (7)$$

Similarly,  $Y$  leads  $X$  may be asserted at  $\alpha$  if;

$$Q_{m+1} = n \sum_{k=-m}^{-1} |r_{UV}(k)|^2 > X_{\alpha}^2, m \quad (8)$$

If the inequities in equation (7) and (8) hold simultaneously, a feedback relationship between  $X$  and  $Y$  is indicated. Furthermore, if the cross-correlation is non-zero, then there exists instantaneous causality. Details on the nature of causality based on cross-correlation values are described in Pierce (1977).

*Data*

Eleven major vegetables which consisted of highland and lowland types and leafy and fruity vegetables were selected for this study. These varieties provided the more general types for the vegetable market and also represented variations the degree of perishability and shelf life in the industry. Unde-flated wholesale, retail and farm prices A Chinese cabbage, tomato, chilli, cucumber, long beans, French beans, spinach, Chinese mustard, kangkong, lady's fingers and brinjal of the selected vegetables were computed markly for the period January 1989 – November 1992 or a total of 204 observations. Unde-flated prices were used to see the effects of nominal price changes. Average weekly prices of five market centres; Kuala Lumpur, Ipoh, Johor Bahru, Penang and Kuantan were computed for every level except farm price for tomato and Chinese cabbage. For the latter two types of vegetable, wholesale purchase prices in Kuala Lumpur and Ipoh were used as a representative. The criteria for the selection of the sample period, market centres and types of vegetable were based on the continuity and availability of data for all levels of selected items, size of the market centres and popularity of the vegetables among farmers and consumers. The sample, represent 44% of the total prodction and 39% of the domestic consumption of common vegetables found in the market. The price series were collected from the Federal Agricultural Marketing Authority (FAMA).

**RESULTS AND DISCUSSION**

The results of the Granger causality test performed on the eleven popular vegetables selected are summarized in Table 1. Wholesale prices were found to lead farm price for more than half of the vegetables (Chinese mustard, brinjal, lady's finger, French beans, chilli and long beans). The lagged changes in wholesale prices were significantly associated at the 95% confidence level with the current change in farm prices. In other words, the changes in the wholesale prices tend to lead changes in the farm price of the above

TABLE 1  
Granger causality test results between farm, wholesale and retail prices of selected fresh vegetables in Malaysia<sup>a</sup>

| Item            | F Value Regression <sup>b</sup> | Instantaneous | One way <sup>d</sup> | Direction of causality |
|-----------------|---------------------------------|---------------|----------------------|------------------------|
| Chinese Mustard | WS : WS                         | 13.79*        | -0.53                | -                      |
|                 | FM : WS                         | 19.98*        | 5.37*                | FM ← WS                |
|                 | WS : RT                         | 83.46*        | 1.55                 | -                      |
|                 | RT : WS                         | 76.40*        | 2.89*                | RT ← WS                |
| Brinjal         | WS : FM                         | 6.27*         | 1.55                 | -                      |
|                 | FM : WS                         | 8.98*         | 3.58*                | FM ← W                 |
|                 | WS : RT                         | 8.13*         | 1.75                 | -                      |
|                 | RT : WS                         | 12.99*        | 3.85*                | RT ← W                 |
| Lady's Finger   | WS : FM                         | 10.48*        | 1.63                 | -                      |
|                 | FM : WS                         | 19.97*        | 4.90*                | FM ← WS                |
|                 | WS : RT                         | 58.31*        | 1.92                 | -                      |
|                 | RT : WS                         | 55.54*        | 0.21                 | -                      |
| French Beans    | WS : FM                         | 32.78*        | 2.03                 | -                      |
|                 | FM : WS                         | 46.47*        | 6.82*                | FM ← WS                |
|                 | WS : RT                         | 82.51*        | 2.53**               | WS ↔ RT                |
|                 | RT : WS                         | 84.41*        | 3.58*                |                        |
| Chilli          | WS : FM                         | 85.11*        | 1.16                 | -                      |
|                 | FM : WS                         | 88.55*        | 2.50**               | FM ← WS                |
|                 | WS : RT                         | 181.97*       | 2.54**               | WS ↔ RT                |
|                 | RT : WS                         | 288.66*       | 3.80*                |                        |
| English Cabbage | WS : FM                         | 16.70*        | 4.63*                | FM ↔ WS                |
|                 | FM : WS                         | 9.60*         | 2.05**               |                        |
|                 | WS : RT                         | 23.00*        | 1.31                 | -                      |
|                 | RT : WS                         | 25.40*        | 2.15**               | RT ← WS                |
| Spinach         | WS : FM                         | 51.10*        | 2.47**               | FM ↔ WS                |
|                 | FM : WS                         | 53.09*        | 3.43*                |                        |
|                 | WS : RT                         | 62.46*        | 0.82                 | -                      |
|                 | RT : WS                         | 63.60*        | 1.32                 | -                      |
| Kangkong        | WS : FM                         | 53.18*        | 5.88*                | WS ← FM                |
|                 | WS : WS                         | 39.96*        | 2.10                 | -                      |
|                 | WS : RT                         | 34.17*        | 5.19*                | WS ↔ RT                |
|                 | RT : WS                         | 28.50*        | 3.82*                |                        |
| Long Beans      | WS : FM                         | 27.63*        | 1.95                 | -                      |
|                 | FM : WS                         | 34.89*        | 4.16*                | FM ← WS                |
|                 | WS : RT                         | 83.31*        | 5.47*                | WS ↔ RT                |
|                 | RT : WS                         | 56.62*        | 2.48**               |                        |
| Tomato          | WS : FM                         | 58.23*        | 33.89*               | WS ← FM                |
|                 | FM : WS                         | 27.85*        | 1.38                 | -                      |
|                 | WS : RT                         | 23.81*        | 0.56                 | -                      |
|                 | RT : WS                         | 105.03*       | 8.95*                | RT ← WS                |

Table 1 (cont'd)

| Item     | F Value Regression <sup>b</sup> | Instantaneous | One way <sup>d</sup> | Direction of causality |
|----------|---------------------------------|---------------|----------------------|------------------------|
| Cucumber | WS : FM                         | 27.31*        | 2.76**               | FM ↔ WS                |
|          | FM : WS                         | 33.44*        | 0.73                 |                        |
|          | WS : RT                         | 72.56*        | 4.52*                | WS <-> RT              |
|          | RT : WS                         | 68.33*        | 2.81**               |                        |

## Note:

a Lag length determined through Akaike's information criterion

b The variable to the left of column is dependent: FM, WS and RT refer to farm wholesale and retail prices respectively

c Test is based on equation (3) and (1)

d Test is based on equations (2) and (1)

- Asterisk represents rejection of null hypothesis of no causality significance level  $\alpha = 0.01$  (\*),  $\alpha = 0.05$  (\*\*)

vegetables. The reverse effects, however, is shown for tomato, kangkong and cucumber where changes in farm prices significantly influenced changes in the wholesale prices. English cabbage and spinach showed bi-directional relationship between farm and wholesale prices. The tests of same-week causality, however, indicate that for all vegetables under study, changes in farm and wholesale prices exhibited a significant same-week relationship. It appears that prices tend to be discovered within the same-week at both levels.

The lagged changes in wholesale prices are also found to be significantly associated at the 95% confidence level with the current changes in retail prices as shown by the F-values of nine out of eleven types of vegetables under study (Table 1). This means that wholesale price changes tend to lead changes in the retail prices. The reverse effect (retail on wholesale), however, is found to be significant for French beans, chilli, kangkong, long beans and cucumber, indicating bi-directional relationship between retail and wholesale levels. Independent relationships exist between both prices for lady's fingers and spinach as shown by the insignificant association of both prices for both direction. However, the F-values for the effect of wholesale on retail changes is bigger for spinach which implies that wholesale changes lead retail changes. Similar to the farm-wholesale price relationship, instantaneous relationship between retail-wholesale is found for all vegetables indicating that prices

tend to be discovered within the same week at wholesale and retail levels.

The empirical evidence from Granger's test suggests that wholesale prices of the vegetables tend to lead both farm and retail prices of more than half the vegetables examined. Such results are consistent with most of the previous studies (Ward, 1982, and Heine 1980) and our *a priori* expectation.

As an alternative to Granger's test, the direction of causality between farm and wholesale levels can be established using the Haugh and Pierce test. Estimated autocorrelations of the wholesale and farm price changes for up to ten lags are given in Table 2. The standard errors of individual autocorrelations may be approximated by  $n^{-1/2}$ ; here  $204^{-1/2} = 0.07$ . The series are found to be autocorrelated since some of the coefficients exceed the value 0.07, hence this univariate residual cross-correlation analysis is less likely to be misleading in explaining the relationship of both prices (Miller, 1980).

Results in Table 2 indicate, that  $Q_{10+}$  exceed the critical value of  $X^2_{5,10} = 18.3$  for four out of eleven vegetable under study, the implication being that wholesale changes lead farm price changes. The test reveals that for the other two varieties, i.e; English cabbage and long beans, bi-directional relationship exists between both wholesale and farm levels, with the effect of wholesale price changes on farm price being greater than the reverse direction as shown by greater portmanteau statistic  $Q_{10+}$ . While an independent relationship exists for chilli and

TABLE 2  
Estimated cross correlations between White Noise residual of weekly wholesale and farm prices

| Lag         | C. Mustard |        | Brinjal |       | Lady's Finger |       | French Beans |       | Chilli |       | Eng. Cabbage |       | Spinach |       | Kangkong |       | Long Beans |       | Tomato |       | Cucumber |       |
|-------------|------------|--------|---------|-------|---------------|-------|--------------|-------|--------|-------|--------------|-------|---------|-------|----------|-------|------------|-------|--------|-------|----------|-------|
|             | POS        | NEG    | POS     | NEG   | POS           | NEG   | POS          | NEG   | POS    | NEG   | POS          | NEG   | POS     | NEG   | POS      | NEG   | POS        | NEG   | POS    | NEG   | POS      | NEG   |
| 1           | 0.02       | 0.02   | 0.18    | 0.04  | 0.20          | 0.15  | 0.19         | 0.08  | 0.05   | 0.08  | 0.08         | 0.27  | 0.18    | 0.11  | 0.06     | 0.11  | 0.21       | 0.03  | 0.02   | 0.37  | 0.00     | 0.17  |
| 2           | -0.06      | 0.90   | 0.12    | 0.18  | -0.04         | 0.01  | 0.05         | -0.01 | 0.00   | 0.00  | -0.05        | 0.10  | -0.12   | -0.04 | -0.03    | 0.17  | 0.04       | -0.07 | -0.07  | 0.06  | 0.00     | -0.07 |
| 3           | -0.07      | -0.11  | -0.03   | -0.12 | -0.01         | -0.04 | -0.10        | 0.02  | 0.11   | 0.09  | 0.00         | 0.04  | 0.03    | 0.02  | 0.02     | -0.16 | -0.26      | 0.04  | -0.03  | 0.02  | -0.23    | -0.10 |
| 4           | -0.02      | 0.02   | 0.02    | -0.05 | 0.08          | -0.02 | -0.09        | -0.05 | -0.14  | -0.05 | 0.09         | 0.08  | -0.03   | -0.09 | -0.20    | -0.18 | -0.06      | 0.02  | 0.05   | -0.04 | -0.07    | -0.21 |
| 5           | -0.12      | -0.13  | -0.02   | -0.23 | -0.05         | 0.04  | -0.06        | 0.06  | 0.09   | -0.07 | -0.04        | 0.03  | -0.07   | -0.14 | -0.11    | -0.06 | 0.09       | -0.13 | 0.01   | -0.13 | -0.07    | -0.02 |
| 6           | -0.013     | -0.016 | -0.08   | -0.10 | 0.07          | -0.11 | -0.01        | -0.02 | 0.06   | 0.09  | 0.01         | 0.04  | -0.10   | -0.03 | -0.09    | -0.23 | 0.04       | -0.09 | 0.04   | -0.14 | 0.06     | 0.05  |
| 7           | 0.02       | 0.07   | -0.09   | 0.04  | -0.06         | 0.07  | -0.02        | -0.03 | -0.15  | -0.11 | -0.03        | -0.14 | 0.10    | 0.11  | -0.08    | 0.14  | -0.10      | 0.04  | -0.08  | 0.00  | 0.09     | 0.10  |
| 8           | 0.04       | 0.01   | 0.03    | 0.03  | -0.03         | 0.00  | 0.08         | 0.02  | 0.04   | 0.03  | 0.06         | 0.10  | -0.02   | -0.01 | 0.08     | -0.06 | 0.05       | 0.12  | 0.02   | 0.05  | 0.02     | -0.02 |
| 9           | 0.07       | 0.15   | 0.12    | 0.04  | 0.21          | 0.13  | 0.15         | 0.02  | 0.00   | 0.02  | -0.15        | -0.08 | 0.03    | 0.02  | -0.05    | 0.07  | 0.13       | 0.10  | 0.05   | -0.19 | -0.05    | 0.05  |
| 10          | -0.04      | -0.07  | 0.12    | 0.04  | 0.00          | 0.03  | -0.10        | -0.16 | -0.12  | 0.04  | -0.24        | -0.04 | -0.12   | -0.11 | 0.08     | -0.03 | 0.04       | -0.20 | -0.09  | -0.03 | -0.02    | -0.13 |
| $Q_{10+}$   | 26.95*     |        | 19.04** |       | 20.73**       |       | 19.40**      |       | 17.07  |       | 20.82**      |       | 17.74   |       | 17.43    |       | 31.61*     |       | 5.72   |       | 15.14    |       |
| $Q_{10-}$   | 9.80       |        | 24.48*  |       | 12.43         |       | 7.93         |       | 8.77   |       | 25.71*       |       | 13.52   |       | 35.66*   |       | 20.12**    |       | 43.89* |       | 26.64*   |       |
| $r_{WF}(0)$ | 0.55*      |        | 0.30*   |       | 0.49*         |       | 0.55*        |       | 0.80*  |       | 0.51*        |       | 0.67*   |       | 0.66*    |       | 0.61       |       | 0.48*  |       | 0.64*    |       |

Note: - Asterisk represents rejection of null hypothesis of no causality at significance level  $\alpha = 0.01$  (\*)  $\alpha = 0.05$  (\*\*)

-  $Q_{10} \alpha (0.01) = 23.21$ ,  $Q_{10} \alpha (0.05) = 18.3$

TABLE 3  
Estimated cross correlations between White Noise residual of weekly wholesale and retail prices

| Lag         | C. Mustard |       | Brinjal |       | Lady's Finger |       | French Beans |       | Chilli  |       | Eng. Cabbage |       | Spinach |       | Kangkong |       | Long Beans |       | Tomato |       | Cucumber |       |
|-------------|------------|-------|---------|-------|---------------|-------|--------------|-------|---------|-------|--------------|-------|---------|-------|----------|-------|------------|-------|--------|-------|----------|-------|
|             | POS        | NEG   | POS     | NEG   | POS           | NEG   | POS          | NEG   | POS     | NEG   | POS          | NEG   | POS     | NEG   | POS      | NEG   | POS        | NEG   | POS    | NEG   | POS      | NEG   |
| 1           | 0.12       | 0.04  | 0.30    | -0.90 | 0.30          | 0.11  | 0.21         | 0.12  | 0.00    | 0.03  | 0.13         | 0.18  | 0.05    | 0.03  | 0.12     | 0.17  | -0.01      | 0.16  | 0.22   | 0.07  | 0.05     | 0.11  |
| 2           | 0.03       | 0.03  | 0.25    | 0.07  | 0.08          | -0.04 | 0.01         | -0.09 | -0.05   | 0.03  | -0.03        | -0.08 | -0.02   | 0.02  | 0.04     | 0.10  | -0.29      | -0.09 | -0.05  | -0.03 | 0.02     | -0.09 |
| 3           | -0.19      | -0.03 | -0.10   | 0.11  | -0.06         | 0.00  | -0.13        | 0.05  | 0.10    | 0.03  | 0.12         | 0.10  | -0.07   | -0.03 | -0.18    | -0.08 | -0.24      | 0.04  | -0.08  | 0.00  | -0.20    | -0.19 |
| 4           | -0.02      | 0.09  | -0.01   | -0.01 | -0.03         | 0.11  | 0.00         | -0.08 | -0.11   | -0.08 | 0.09         | 0.01  | 0.01    | 0.00  | -0.22    | -0.07 | 0.01       | 0.07  | 0.03   | -0.05 | -0.12    | -0.17 |
| 5           | -0.09      | -0.17 | 0.01    | -0.15 | 0.04          | -0.05 | 0.04         | 0.07  | -0.04   | -0.11 | -0.05        | 0.00  | -0.06   | -0.10 | -0.03    | -0.27 | 0.12       | -0.06 | -0.03  | 0.01  | -0.08    | -0.10 |
| 6           | -0.13      | -0.15 | -0.12   | 0.03  | -0.10         | 0.10  | -0.02        | -0.08 | 0.14    | 0.04  | -0.03        | 0.03  | -0.07   | 0.00  | -0.14    | -0.02 | -0.05      | 0.01  | -0.04  | 0.06  | 0.10     | 0.18  |
| 7           | -0.05      | -0.04 | 0.08    | -0.21 | -0.03         | -0.03 | 0.09         | 0.06  | -0.15   | -0.12 | -0.04        | -0.03 | -0.09   | 0.03  | 0.03     | -0.04 | -0.08      | -0.08 | -0.01  | -0.02 | 0.05     | 0.06  |
| 8           | 0.03       | -0.04 | -0.21   | -0.08 | 0.02          | 0.07  | -0.05        | 0.00  | 0.10    | 0.05  | 0.08         | 0.03  | -0.01   | 0.14  | -0.01    | -0.03 | -0.05      | 0.12  | -0.07  | -0.05 | 0.02     | 0.04  |
| 9           | 0.06       | 0.07  | -0.15   | -0.02 | 0.14          | -0.07 | 0.08         | 0.02  | 0.09    | 0.03  | -0.06        | 0.00  | -0.03   | 0.05  | 0.18     | 0.04  | 0.07       | 0.12  | -0.03  | -0.06 | 0.03     | -0.05 |
| 10          | 0.01       | 0.01  | -0.27   | 0.04  | -0.10         | 0.04  | -0.16        | -0.12 | 0.13    | -0.09 | -0.20        | -0.15 | -0.12   | -0.07 | -0.05    | -0.04 | -0.03      | -0.14 | -0.11  | -0.04 | -0.11    | -0.03 |
| $Q_{10+}$   | 16.67      |       | 43.80*  |       | 20.73**       |       | 20.67**      |       | 20.50** |       | 18.70**      |       | 10.11   |       | 30.44**  |       | 35.40**    |       | 15.76  |       | 17.39**  |       |
| $Q_{10-}$   | 13.86      |       | 20.11** |       | 12.43         |       | 12.04        |       | 8.77    |       | 14.73*       |       | 8.35    |       | 26.03**  |       | 19.58**    |       | 3.89   |       | 27.08*   |       |
| $r_{WF}(0)$ | 0.80*      |       | 0.35*   |       | 0.49*         |       | 0.68*        |       | 0.80*   |       | 0.70*        |       | 0.75*   |       | 0.66*    |       | 0.69*      |       | 0.70*  |       | 0.74*    |       |

Note: - Asterisk represents rejection of null hypothesis of no causality at significance level  $\alpha = 0.01$  (\*)  $\alpha = 0.05$  (\*\*)  
-  $Q_{10} \alpha (0.01) = 23.21$ ,  $Q_{10} \alpha (0.05) = 18.3$

spinach as shown by insignificant  $Q_{10}$ -statistic at 95% confidence level in both directions, the effect of wholesale price changes on farm prices is again found to be stronger than the effect of farm price changes on wholesale price. Wholesale is found to lead farm for both varieties if the confidence level is reduced to 90%.

Instantaneous effect of wholesale price on farm price is very significant for all vegetables, as indicated by the large individual cross-correlations at zero lag. However, other large cross-correlations are found at either positive or negative lags, depending on the direction of causality discovered earlier. Since our *a priori* expectation that wholesale price changes lead farm price changes cannot be rejected for the majority of the vegetables at the 90% or even at the 95% confidence level, only the large cross-correlation at positive lags will be discussed. For example, Chinese mustard, brinjal and lady's fingers indicate significant cross-correlations at lag 1, 6 and 9 weeks, respectively. The implication is that the largest response of farm level changes to wholesale level changes is instantaneous, whereas wholesale level changes precede farm changes by 1, 6 and 9 weeks, for the respective varieties.

The effects of wholesale price changes on retail price is evident for all the vegetables (Table 3). However, it is statistically insignificant at the 95% confidence level for Chinese mustard, lady's fingers, spinach and tomato as shown by the values of  $Q_{10+}$  that are less than the critical value. The reverse effect is also found to be significant as shown by  $Q_{10-}$  for brinjal, kangkong, long beans and cucumber, and this reflects the existence of bidirectional relationship between wholesale and retail price changes for these varieties. Again, the instantaneous effect of wholesale price changes on retail price is revealed by significant cross-correlation coefficients at lag zero. The other large correlations at positive lags also exist for all the vegetables, except spinach. The results imply that the largest impact of retail price changes on wholesale price is instantaneous, while most wholesale

price changes lead farm price changes by less than a month (Table 3).

The Haugh and Pierce test provides empirical evidence that reaffirm the findings on Granger's test. Our *a priori* that wholesale leads both farm and retail levels cannot be rejected.

## CONCLUSION

The outcome of the tests indicate that the hypothesis of price independence at the farm retail and wholesale levels cannot be rejected for all vegetable under study, except for lady's fingers and spinach at retail level only. At farm level, bi-directional relationships exist for English cabbage and spinach. Similar relationships at retail level are shown by long beans, French beans, chilli, kangkong and cucumber. In contrast, farm leads wholesale prices for kangkong, tomato and cucumber while for other vegetables, wholesale leads at both farm and retail levels.

The variation in direction of causality, the impact of wholesale prices on farm and retail prices are generally greater, even in the case of bi-directional and independent relationships. This evidence can be accepted at a degree of confidence of not less than 90%.

Using the pricing efficiency framework proposed by Fama, the above evidence of leads and lags relationship between markets suggest that information is not fully transmitted to all levels and in particular at the farm level. It is evident that the price discovery is made at the wholesale level. As noted by Mohd. Ariff et al., (1985), in the case of fish, the fish wholesalers use information both from the landing and retail in the price determination. While the fishermen do not use the corresponding information from the former (as they normally consign their fish for sale to the wholesaler). Such pricing is also applicable in the case of vegetable marketing where marketing through consignment is predominant among the producers. In short, for some vegetable markets, wholesale market leads in the pricing process hence suggesting there exists an opportunity for extra-normal profit from arbitrage leaving a contention which requires further empirical investigation.

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## Consumer Attitude Towards Tropical Hardwoods in the United Kingdom

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### ABSTRAK

Penyelidikan keatas sikap orang awam di UK terhadap kayu tropika telah dijalankan. Ia juga bertujuan untuk menentukan samada sifat spesies kayu penting kepada pengguna untuk membuat keputusan pembelian barangan kayu serta mengenalpasti sifat keluaran yang diperlukan jika mereka akan membeli keluaran diperbuat dari kayu tropika. Pada amnya, pengguna di UK mempunyai sikap dingin terhadap kayu tropika. Mereka yang bercadang untuk membeli keluaran kayu tropika akan berbuat demikian sekiranya harga keluaran itu setanding, tidak diawet dan diperbuat dari spesies kayu yang dikenali. Keluaran kayu tropika mungkin tidak akan dapat bertahan lama memandangkan kepada sikap dingin pengguna terhadap kayu tropika dan spesies kayu merupakan sifat penting yang diambilkira oleh mereka untuk membuat keputusan pembelian. Pemasar keluaran kayu tropika boleh menggunakan strategi peluang pasaran memandangkan terdapat segmen yang mempunyai sikap positif terhadap kayu tropika terutamanya kaum lelaki dan mereka dari golongan isirumah berpendapatan tinggi. Penyelesaian kepada masalah sikap dingin pengguna ini ialah dengan memasarkan keluaran kayu tropika dari sumber yang terurus.

### ABSTRACT

A survey in United Kingdom on public attitude towards tropical timbers showed negative disposition towards tropical hardwoods and wood products. Those considering buying tropical wood products would do so if it was competitively priced, not treated with chemicals or manufactured from timber species known to them. Tropical wood products may not fare better in the future due to greater awareness of environment quality. The survey results revealed that males and those from higher incomes groups unlike the others were willing to purchase tropical hardwood, especially if it was from sustainable forests.

### INTRODUCTION

There is currently a deep and widespread public concern about the quality of the environment in the major tropical hardwood-importing countries. Deforestation in the tropical region has been cited to be one of the major causes of the environmental degradation and the commercial tropical rainforest logging is said to be the major activity that results in a chain of events leading to the degradation of the environment the world is currently facing. To many, one of the ways to check global environmental degradation is to stop commercial logging in the tropics. Reducing demand for tropical hardwoods

will stop this commercial logging. Ban on the trade of tropical hardwoods and 'eco-labelling' of tropical wood products are a means of pressuring the tropical hardwood-exporting countries to stop 'destroying' their forest resources and help improve the world's environment. Many governments in the European countries have stopped using tropical hardwoods in their building programmes as a result of pressure from the conservationists. Consumers, are urged to demand for wood products manufactured from timbers other than the supposedly environmental-degrading tropical hardwoods.

The United Kingdom is one of the major importers of tropical hardwoods and their public are said to be less responsive to the various issues currently surrounding tropical hardwoods than other tropical hardwood-importing European countries (Sullivan, 1990; Anonymous, 1993a) and also they very rarely enquire about the source of the timber items (Anonymous, 1993b). Of importance to them are the quality, price and design of the products, and not the the forest management status of the product's origin (MORI, 1990). Imports of tropical hardwoods into UK have since the early 1990s dropped as importers have switched to the perceived sustainably managed North American hardwoods (Upton, 1993) amidst growing pressure from the environmentally-conscious consumers. Beside the attributes of the product itself, a purchaser's decision is also influenced by other wide-ranging factors like his or her own economic "well-being", age and life style, occupation, social class and a myriad of other highly interrelated external and internal factors (Mercer, 1992). The major internal factors, which operate within individuals to partially determine and influence their behaviour as consumers, are perceptions, motives, learning, personality and attitudes (Pride and Ferrel, 1977). An attitude, learned through experience and interaction with others, consist of knowledge and positive or negative feelings held by an individual for an object. When a consumer has a strong negative attitude towards an object, he or she will not only avoid it but will also try to influence others not to buy the product (*ibid.*). Also product attributes influence product choice (Stureson and Sinclair, 1991). There is, however, a lack of direct and predictive relationship between attitudes and external behaviour but a survey of attitudes will provide an indicator of the current beliefs, thoughts, preference and desires held by certain communities (Baker, 1992).

In light of the foregoing, a survey was conducted to study public attitude towards wood in United Kingdom products made from tropical timbers and to determine whether the timber species attributed any importance to the customers' choice. The survey also aimed to identify product attri-

TABLE 1  
Demographics of the respondents

| Characteristic                      | Frequency (%)<br>(N = 144) |
|-------------------------------------|----------------------------|
| Sex:                                |                            |
| Male                                | 52                         |
| Female                              | 48                         |
| Age:                                |                            |
| Young (19 - 24 years)               | 40                         |
| Middle (25 - 39 years)              | 31                         |
| Old (40 years and over)             | 29                         |
| Household income:                   |                            |
| Low (under £10,000 annually)        | 41                         |
| Middle (£10,000 - £19,999 annually) | 29                         |
| High (over £20,000 annually)        | 30                         |

butes required by the consumers.

#### MATERIALS AND METHODS

The data was collected using structured, self-administered questionnaires. Based on a purposive sampling method, university students were asked to distribute the questionnaires to their friends and neighbours above the age of 19 years in their hometown during a mid-semester break. Customers in UK are usually above 19 years. It was hoped that the students from the diverse geographical regions would provide representatives for a realistic sample frame.

The respondents were required to respond to each of the questions in the questionnaire. The attitude of the consumers towards tropical hardwoods was measured using an attitude scale which consist of a series of six sentences regarding tropical hardwoods. The respondents were required to indicate their intensity of feeling towards the object by stating their agreement or disagreement to these sentences. Each answer was given a score and the respondent's total score was used as a measure of his or her attitude towards tropical hardwoods. A negative total score meant that the respondent had an unfavourable attitude, while those with a positive total score had a positive disposition. Semantic differential scaling was used, with respect to the answers, in particular the Likert summated scale. A total of 144 valid question-

TABLE 2  
Importance of each product attribute in wooden furniture purchase decision making (N = 144)

| Products attributes   | Mean importance score | s   | Difference between subsamples <sup>1</sup> |
|---|-----------------------|-----|--|
| Workmanship   | 4.5                   | 0.8 | ns   |
| Species of wood used  | 4.0                   | 0.9 | b  |
| Country in which the item was produced  | 2.6                   | 1.2 | ns   |
| Type of wood material used  | 4.1                   | 0.8 | ns   |
| Retail outlet where product was sold  | 2.1                   | 1.1 | ns   |
| Manufacturer/brand of the item  | 2.1                   | 1.1 | ns   |
| Design of the product   | 4.3                   | 0.8 | ns   |
| Services offered by the seller  | 2.9                   | 1.2 | a,b  |
| Whether the item is produced according to British or other internationally accepted standards | 3.6                   | 1.1 | ns   |
| Price   | 3.9                   | 0.9 | ns   |

Note: Scores are based on a 5-point Likert scale where 1 = Not at all important, 3 = Fairly important and 5 = Very important.

<sup>1</sup> Statistically significant at 0.05 level, a = difference in means between gender (t-test), b = difference in means between household income groups (ANOVA). An 'ns' denotes no statistical difference at 0.05 level in means between gender, age or household income of the respondents.

TABLE 3  
Importance of timber species attribute in purchase decision among subsamples of respondents

| Subsample         | Mean importance score | s   |
|-------------------|-----------------------|-----|
| Sex:              |                       |     |
| Male              | 4.0                   | 0.8 |
| Female            | 3.9                   | 1.0 |
| Age:              |                       |     |
| Young             | 4.5                   | 0.7 |
| Middle            | 4.5                   | 0.7 |
| Old               | 4.5                   | 0.9 |
| Household income: |                       |     |
| Low               | 3.8                   | 0.9 |
| Middle            | 3.9                   | 1.2 |
| High              | 4.3                   | 0.7 |

naires were returned. The demographics of the respondents are shown in Table 1.

## RESULTS

A summary of the results is shown in Tables 1 to 5.

In selecting consumer durables including wood products e.g. furniture the customers consider various attributes such as suitability, quality, price and style (Kotler and Arm-

strong, 1992). Other attributes said to be of importance are style, quality, price, suitability to other existing home furniture and its practical value (Albaladejo, 1986) and rate the importance often different attributes in making their decision. The list of attributes was by no means exhaustive, as the main objective was to determine whether the timber species was an important factor in the purchasers, decision. A summary of the result is shown in Table 2.

### *Timber Species as an Important Attribute*

Evidently, the species of timber used to manufacture the wood product was considered an important attribute to purchasers of furniture. While the level of importance placed on this attribute does not differ significantly between different gender and age of the respondents, the high income groups were more concerned with the species of timber used in the manufacture than those from the low or middle income groups (Table 3).

### *Consumer attitude to other attributes of wood products*

It is also worth noting that the consumers are quality conscious as reflected by the high

importance score accorded to workmanship and the standard of the manufactured wood product. Other attributes of high importance were the product's design and type of wood material used to manufacture the product. It is also interesting to note that the consumers place relatively lower importance on the price of the product.

#### Consumer Attitude towards Tropical Timber

An overall mean attitude score of  $-2.4$  was obtained, which implies that the respondents have an unfavourable or negative attitude towards tropical hardwoods (Table 4). While the attitude of the respondents towards tropical hardwoods do not differ significantly with their age or household income, their gender did play a significant role. Women appear to be more negative towards tropical hardwoods than men, as their scores are significantly higher than men (Table 5). The mean attitude score for the women respondents of  $-3.4$  is also higher than the overall mean score. There is also a high percentage of those in the low and middle household income groups who do not favour tropical hardwoods.

TABLE 4  
Mean attitude score of respondents – by various subsamples

| Subsample                      | Mean attitude score | s   |
|--------------------------------|---------------------|-----|
| All respondents                | -2.4                | 3.3 |
| Sex: <sup>a</sup>              |                     |     |
| Male                           | -1.5                | 3.6 |
| Female                         | -3.4                | 2.6 |
| Age: <sup>b</sup>              |                     |     |
| Young                          | -2.6                | 3.1 |
| Middle                         | -2.2                | 3.3 |
| Old                            | -2.3                | 3.6 |
| Household income: <sup>b</sup> |                     |     |
| Low                            | -2.9                | 2.9 |
| Middle                         | -2.5                | 2.8 |
| High                           | -1.5                | 3.9 |

Note:<sup>a</sup> Significantly different at the 0.05 level (t-test)

<sup>b</sup> Not significantly different at the 0.05 level (ANOVA)

#### Attributes required of tropical wood products

The respondents indicated that they would purchase tropical wood products if the price was competitive with similar items made of other materials. In addition, the wood material used to manufacture the tropical wood product should not be chemically treated, and should have suitable properties for the intended use, and should be of a timber species known to them. Apart from product quality and design, some required that the wood material used should come from managed sources. In addition, the popularity of the timber species used is one of the attributes mentioned by those respondents. Consumers in the UK generally prefer household furniture with real wood and wood finishes, and tropical hardwoods such as teak and mahogany have been popular timber species in the manufacture of household furniture in the UK (ITTO/ITC, 1990). It is worth noting that income is important in a respondent's purchase decision. High income householders tend to place more importance on the timber species than others.

Wood products manufacturers in UK are reducing the amount of tropical hardwood used due to growing pressures by the consumer who are concerned with the current environmental issues (*ibid.*). This is evident from the present study, as the respondents generally had a negative attitude towards tropical hardwoods. The finding is in contrast with earlier reports about the UK consumers' insensitivity towards environmental issues concerning tropical forests and their indifference to the source of timber. With respect to the demographic variables used in this study, female respondents, regardless of their age and household earnings, were more negative towards tropical hardwoods than men.

The consumers in UK have been exposed to various forms of publications and television programmes dealing with the ill-effects of deforestation, especially on the environmental degradation and destruction supposedly as a result of commercial logging in the tropics. Some non-governmental organisations (NGOs), like the Friends of the Earth-UK, published the 'Good Wood Guide' highlighting deforestation in the tropics and has not

TABLE 5  
Distribution of respondents in the different subsamples based on their level of attitude towards tropical timbers (percentage)

| Subsample                      | Attitude level |         |            |
|--------------------------------|----------------|---------|------------|
|                                | Unfavourable   | Neutral | Favourable |
| All respondents                | 72.2           | 7.6     | 20.1       |
| Sex: <sup>a</sup>              |                |         |            |
| Male                           | 61.3           | 9.3     | 29.3       |
| Female                         | 84.1           | 5.8     | 10.1       |
| Age: <sup>b</sup>              |                |         |            |
| Young                          | 75.9           | 6.9     | 17.2       |
| Middle                         | 68.2           | 9.1     | 22.7       |
| Old                            | 71.4           | 7.1     | 21.4       |
| Household income: <sup>a</sup> |                |         |            |
| Low                            | 76.3           | 10.2    | 13.5       |
| Middle                         | 80.9           | 4.8     | 14.3       |
| High                           | 58.1           | 6.9     | 34.9       |

Note: Classification into various level of attitude is based on the respondent's total attitude score

<sup>a</sup> Statistically significant relationship between gender and household income and attitude at the 0.05 level (Chi-square test)

<sup>b</sup> No statistically significant relationship between age and attitude at the 0.05 level (Chi-square test)

classified tropical timbers as "good wood". Public rallies are often organised by these NGOs at the vicinity of retail stores purportedly selling tropical wood products from unmanaged sources. These efforts have not only raised public awareness on the issue of tropical deforestation, but also probably help develop the consumers' negative attitude towards tropical timbers.

### CONCLUSION

In conclusion, consumers in the United Kingdom generally have a negative attitude towards tropical hardwoods. As the timber species used in the manufacture of a wood product is considered to be an important attribute by consumers in the UK, it could have an adverse effect on the demand for tropical wood products. To be appealing to the general consumers, tropical wood products must not only be priced competitively with similar items made of other timber species and/or non-wood substitutes but should also be appealing to them in terms of quality, design and environmental considera-

tions. Ideally, these wood products should also be manufactured from timbers sourced from environment-friendly managed forests. Marketers of tropical wood products may want to target their products to specific niches positively disposed towards tropical hardwoods. A substantial percentage of the male and high income household respondents in the study do not have negative attitude towards tropical hardwoods, and could be the target niches for marketing tropical wood products. The main contention for the negative attitude towards tropical hardwood is not the timber species itself but on the manner its sources are managed. If the tropical hardwood-producing countries could convince its market that their tropical forest resources are indeed properly managed and logged, there is no reason why those consumers who have been using tropical wood products should stop doing so in the future. The only rational and long-term solution to counter the growing green consumerism is to market wood products from certified, managed tropical forests.

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