

## Farmer's acceptance towards fragrant rice farming: the case of non-granary areas in the East Coast, Malaysia

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### Abstract

Malaysia depends on imports for its fragrant rice, mostly from Thailand, Vietnam, India and Pakistan. The fragrant rice farming in non-granary areas has been included in the new Entry Point Project (EPP) under the National Key Economic Areas (NKEA). In order to realize the aspiration of producing fragrant rice in large areas, it would require full participation and commitment from the existing and new farmers. The objective of this paper is to investigate farmer's acceptance towards fragrant rice farming in two districts namely Pasir Mas and Tanah Merah, located in the state of Kelantan. The respondents of the study are 23 farmers and in-depth interviews are carried out to obtain farmers' responses towards fragrant rice farming. The results from the content analysis reveal innovation characteristics, extension services and market pressure are among several factors that explain farmers' acceptance towards fragrant rice farming.

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### Introduction

Rice remains the staple food for Malaysian although other food grains are widely available in the country. Malaysia's domestic production caters for only 70% of total rice demand and because of this shortfall the country has to import about 30% of rice from other countries mainly from Thailand, Vietnam, Pakistan and India to fulfil the shortage. There are several types of rice imported by Malaysia such as white rice, fragrant rice (Basmati and Jasmine type) and glutinous rice where approximately 20% of the proportion is the fragrant rice (BERNAS, 2008). Malaysia depends on imports for its fragrant rice, about 200,000 metric tons annually with a value of RM500 million, mostly from Thailand, Vietnam, Pakistan and India. This figure has grown dramatically over the last two decades, moving it from a niche market to a commercially-attractive one. The rice imports spiked from 558,100 metric tons in 2004 to 1.09 million metric tons in 2008 and further increased to 1.13 million metric tons in 2009 due to the world food crisis (MOA, 2012). In the year 2008, the world rice prices showed an upward trend yearly with the highest value of the Basmati rice has been recorded at USD1,077/metric ton compared to USD914/metric ton for Thai Fragrant Rice and USD682/metric ton

in the case of Thai White Rice 5% Broken (FAO, 2012). The rice consumption is expected to increase from 2.30 million metric tons in 2010 to 2.69 million metric tons in 2020, a growth of 1.6% per annum due to the increase of population (MOA, 2011). The changes in lifestyle, income and eating habits will also shift consumer preferences to high quality rice that contains less starch that benefit their health (Hanis *et al.*, 2012; Syahrin *et al.*, 2008).

In March 2011, the Malaysian government has made a concerted effort through the National Key Economic Area (NKEA) under the Economic Transformation Programme (ETP) and had announced a new Entry Point Project (EPP) which to produce fragrant rice in non-granary areas. The public-private partnership between the Malaysian Agricultural Research and Development Institute (MARDI), Infoculture Sdn. Bhd., Birinbaru Enterprise Sdn. Bhd. and Sharez Amani Sdn. Bhd. as anchor companies is off to a winning start to introduce, produce and market the new fragrant rice, MRQ74 or known as Mas Wangi in non-granary areas. The rice which has 80% similar attributes to foreign fragrant rice of Basmati type will be marketed as specialty fragrant rice. This initiative will have a GNI impact of RM133 million by 2020 and this will result in a reduction of imports and an increase of participating farmer's

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income by 20% to 30%. Thus, it will indirectly help to reduce foreign exchange, of about USD10 - 27 million annually, when the country produces its own quality fragrant rice for domestic consumption and eventually will offer reasonable price to consumers. To realise the aspiration of producing fragrant rice in a larger scale areas requires full participation and high commitment from the existing and new farmers. However, the acceptance of fragrant rice farming among the farmers has been questioned. Are the farmers willing to accept and adopt this new variety? The acceptance of new variety is utmost importance to ensure the effectiveness, competitiveness and sustainability of this initiative.

According to Horna and Smale (2005), farmers' preferences and willingness to choose new rice varieties relied on social experience, economic condition and their knowledge about the variety. The conversion to the new variety is just not being considered as technology adoption behaviour, but it does as well implicate the decision-making process (Li *et al.*, 2010). Feder *et al.* (1985) indicated that size of the farms would affect farmers' behaviour in adopting and accepting irrigation equipment, machineries and modern agricultural inputs. While, Chi (2003) believed that property ownership, level of business and practices in land utilization are the factors that influenced farmers' behaviour. Additionally, adoption of new technology is in accordance with trend and at that time the farmers will imitate each other. Li *et al.* (2010) categorized the variables that affected the adoption of new technology to four categories namely individual characteristic, individual perceptions towards the technology, income and environmental factors. Age, gender, educational level and numbers of household are the factors that belong to the individual characteristic. While income variables consist of total planted areas, productivity and total sales. It is believed that farmers preferred variety that gave higher yields and also constancy in the production, which will increase their income. These findings are parallel with the innovation characteristics that have been stated in the Diffusion of Innovation (DOI) model. The varieties that have high pest and disease resistance are significantly been chosen, but it also depends on the seed price. If the price is too high, the demand for that variety may be low. Moreover, sufficient knowledge about the technology will also give impact in the decision-making, which determines the willingness to choose new varieties. Finally, the environmental variables that consist of soil characteristics and suitability, cultivation practices, government promotions via extension agents and mass media, as well as perceived risk and market

pressure may assist farmers to make decisions. In addition, influence of relatives and neighbours may also affect the farmer behaviours, which would cause the tendency to change for the new variety.

Currently, little is known about the farmer's behaviour against the new rice variety, MRQ74. Therefore, this study will provide information about farmers' acceptance towards fragrant rice farming using the new variety of MRQ74 or Mas Wangi.

## Methodology

This study involved 23 farmers in non-granary areas in two districts; Pasir Mas and Tanah Merah, Kelantan as the target respondents. This study aimed to explore farmers' acceptance on switching to fragrant rice farming. Their decision to switch depends on varieties of factors that include price and non-price criteria. The specific criteria have been identified for this study, which the respondents were farmers in the non-granary areas and non-adopters of the new rice variety, MRQ74. These two districts, Pasir Mas and Tanah Merah have been selected as the location of the study due to the planting activity of MRQ74 has been introduced to the farmers in the year 2005. The convenience sampling was used in this study, where the farmers in these two districts were identified and invited to participate by the Department of Agriculture (DOA) extension agents. In-depth interviews were carried out using a structured questionnaire consisting of open-ended questions. There were fifteen open-ended questions developed to explore farmers' acceptance towards fragrant rice farming. The farmers' demographic profiles including their age, gender, education level and number of households were also asked during the interviews. The interviews were held at comfortable and convenient locations for all farmers. The duration of the interviews was between 30 to 45 minutes. Content analysis was carried out to analyse the data and information by examined words or phrases within a wide range of texts transcribed during the interview sessions with the farmers.

## Results and Discussions

### *Socio-demographic profiles of farmers*

A total of 23 farmers were interviewed and all of them are non-adopters of new rice variety, MRQ74. The age of the farmers varied between 33 to 71 years with a majority above 49 years old (52.2%). Since 2008, the average age group has declined and this reflects the promising better returns from paddy farming since more young farmers have participated.

Table 1. Socio-demographic profiles of farmers

Profile	Frequency (n)	Percentage (%)
<b>Age</b>		
30 years - 39 years	2	8.7
40 years - 49 years	9	39.1
Above 49 years	12	52.2
<b>Gender</b>		
Male	22	95.7
Female	1	4.3
<b>Race</b>		
Malay	23	100.0
<b>Level of education</b>		
Primary school	8	34.8
Secondary school	15	65.2
<b>Household size</b>		
1 - 5	14	60.9
6 - 10	9	39.1
<b>Number of years operation</b>		
Less than 10 years	10	43.5
11 - 20 years	8	34.8
21 - 30 years	3	13.0
More than 40 years	2	8.7
<b>Farm size</b>		
Less than 5 hectares	11	47.8
5 - 10 hectares	7	30.4
11 - 15 hectares	1	4.3
More than 15 hectares	4	7.4
<b>Income</b>		
Less than RM 1,000	5	21.7
RM 1,000 - RM 1,999	7	30.4
RM 2,000 - RM 2,999	3	13.0
RM 3,000 - RM 3,999	4	17.4
More than RM3,999	4	17.4

Note: n = 23

Most of the farmers were male (95.7%) and 65.2% of them have obtained secondary school education. As shown in Table 1, majority of the farmers (78.3%) has been involved with paddy farming less than 20 years and 47.8% farmers have farm size less than five hectares. Majority of the farmers (52.1%) earned a monthly farm income less than RM2,000. Socio-demographics characteristics of the farmers are provided in Table 1.

### **Factors explaining farmers' acceptance towards fragrant rice farming**

#### *i. Innovation characteristics*

Characteristics of the innovation or the new technology are utmost important for the participants before they can make decisions, whether to accept or reject the innovation. According to Rogers (1995), there are five innovation characteristics that will affect the decision to adopt the innovation namely relative advantage, compatibility, complexity, observability and triability. The innovation characteristics showed 49% to 87% of the variance of the innovation adoption (Rogers, 1995). Through the discussion with the farmers, the factor that will influence their acceptance of fragrant rice farming was encouraged by the perceived benefits of the rice variety. Eighteen farmers indicated that the new rice variety should have better superior quality characteristics than the current variety such as higher yield, offering better price (14 farmers), resistant varieties towards pests and diseases (13 farmers), earlier maturity (12 farmers), as well as lower of production costs (13 farmers). It is expected that the adoption level will increase when the adopters

obtained greater benefits from the innovation (Jeon *et al.*, 2006; Lin *et al.*, 2007). Li *et al.* (2010) found that farmers preferred the variety that gave higher yields and also constancy in the production, which will increase their income. These findings are parallel with the innovation characteristics in the Diffusion of Innovation (DOI) Model.

Ten farmers also responded that trialability is one of the aspects that will accelerate the farmers' adoption to the new rice variety provided that they have the knowledge on the advantages and disadvantages of the new rice variety. This will help them to make decisions, whether to accept or to reject the new variety, as well as to reduce the risk that they will face. Besides, the difficulty to cultivate the new rice variety in small-scale will stifle the desire to venture into the business. Fifteen farmers also agreed that they need the trial plot as a reference before they can cultivate the variety in a large scale to ensure that the variety is suitable to be planted in the current paddy fields.

A study in Cromwell (1990) revealed that farmers evaluated the new varieties based on the characteristics (strengths and weaknesses), and made a comparison with existing varieties. This is in line with the DOI model which stated that perceived innovation characteristics is one of the factors that influences individuals' adoption decision of innovation (Rogers, 2003). The farmers' perceptions of new varieties are the critical elements or factors in adoption behaviour (Adesina and Zinnah, 1993; Mazid, 1994). The information based on the farmers' perceptions is important to ensure the continuous adoption of the new varieties and sustainability of the upstream supply chain.

#### *ii. Extension services*

Extension service is the pivotal source of technology transfer and adoption. In the DOI model, it is represented by the communication source, which imparts knowledge to the target group. The survey revealed that 22 out of 23 farmers indicated that technical support from the extension agents would encourage the adoption of the new rice variety because through the extension services, they will expose and get information about the new rice variety in terms of cultivation practices, as well as pest and diseases control. Meanwhile, 22 of the farmers also indicated that other aspects that would attract their attention to adopt the fragrant rice farming were the skills and knowledge expertise of the extension agents in disseminating information via on-farm demonstration. This is in line with Rogers (2003) that the adopters will only take decisions as to accept or to

reject innovation after they got enough information about the new technology or innovation.

### iii. *Market pressure*

Eighteen farmers expressed that Basmati rice demand in the market is one of the factors that could motivate them to cultivate this new rice variety. In addition, 14 of them said that the higher selling price would also encourage them to shift to the new rice variety. Moreover, 13 farmers were confident that this new rice variety could compete with the imported Basmati rice in terms of price and quality. Previous studies such as Chwelos *et al.* (2001); Gatignon and Robertson (1989) have shown that market pressure may also influence and stimulate the potential adopters to adopt new technology or innovation due to the high level of competition among them. This will help them to sustain the market position in highly competitive market. Abdullah (2007) also stated that paddy farmers are more responsive to upward price movement than to increased subsidies. Thus, the new variety is promising if it can provide higher income to the farmers.

### iv. *Government policy*

In general, 15 farmers have responded that the government should provide subsidies and incentives to boost the growth of fragrant rice industry in Malaysia. Twenty two out of 23 farmers also required assurance in guaranteed minimum rice price (GMP) before they can make decisions in cultivating this new variety. Financial assistance from the government will motivate them to adopt fragrant rice farming because most of the small-scale farmers have insufficient savings to venture into the business. The farmers argued that same treatments in terms subsidies and incentives should be given to the farmers who cultivated the new variety as those given to "old" rice varieties farmers. This will expedite the adoption of new variety by the non-adopter farmers. This is not surprising because at present paddy farmers enjoy up to RM2,500 of incentives per hectare. These incentives consist of production inputs and GMP. In order to encourage the farmers to plant new varieties, the government should at least provide the same incentives or even better incentives.

### v. *Barriers*

The farmers indicated that there are several factors that would hinder them to accept and adopt fragrant rice farming. Twenty farmers stated that it was difficult for them to ensure that the dedicated areas for the farming of this variety are not contaminated by the normal white rice variety. In addition, the farmers hesitate to plant this rice variety if they

are facing difficulties in obtaining pure seed for each season. Perceived risks can affect the process of decision-making, particularly for the expensive and complex innovation that gives large potential benefits (Gao *et al.*, 2005; Heide and Weiss, 1999) and can be considered as a significant barrier to the adoption (Lee and Allaway, 2002; Sarin *et al.*, 2003). Apart from those factors, the decision to accept this new rice variety is also influenced by other farmers. Social factors such as age, education level, family, and income are among the important elements in the decision-making process because the innovation decisions also relied on other members within the system.

### vi. *Attitude*

Attitude may affect farmers' decisions towards fragrant rice farming, which can be either positive attitude or negative attitude. The study showed that most of the farmers had positive acceptance attitude in which 17 farmers responded on the cultivation of the new rice variety, MRQ74 should be expended nationwide. Additionally, they indicated that the government decision to introduce and cultivate MRQ74 for non-granary areas was an appropriate action, as well as a wise decision. However, only 14 out of 23 farmers agreed that MRQ74 cultivation could reduce the country's dependence on imported Basmati rice.

### vii. *Adoption intention*

Adoption intention is the farmers' decision, whether to adopt fragrant rice farming in the future. Eighteen out of 23 farmers will only cultivate MRQ74 if they have adequate capital. Meanwhile, twenty out of 23 farmers were willing to attend course or training about MRQ74 cultivation to gain more information of this variety. They were still contemplating about adopting MRQ74 in the next season.

## **Conclusions**

A new rice variety, MRQ74 or known as Mas Wangi is a higher-value crop that is capable of tapping new market segment in Malaysia. Implementation of the fragrant rice farming in the country is expected to reduce imports and an increase of farmer's income. Besides that, it will indirectly help to reduce foreign exchange and offer a reasonable price to consumers. The preliminary result shows that there are several factors explaining the farmers' acceptance towards fragrant rice farming in Malaysia such as the innovation characteristics, extension services, market pressure, and government policy. In addition, there are few factors that will be considered as a significant

barrier for the farmers to adopt fragrant rice farming. The result also shows that most of the farmers are willing to accept this variety with positive attitude and adoption intention towards fragrant rice farming. Thus, it is recommended that the information and knowledge about variety MRQ74 should be disseminated widely using extension agents and mass sources to ensure that the aspiration of producing fragrant rice in large areas will be a successful pursuit. The insistence for trial plots by the farmers is legitimate as the success or failure of the plot will significantly influence their adoption decisions. Besides, the policy makers or researchers should give attention on how to mitigate the impact of negative factors and barriers on the adoption of fragrant rice farming among existing paddy farmers.

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