

Acceptance and Practices on New Paddy Seed Variety Among Farmers in MADA Granary Area

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Abstract

This paper employed survey data to identify farmers' acceptance and practices on new paddy seed variety in MADA granary area in Kedah Malaysia. 250 of respondents who are paddy farmers in four districts area (Perlis, Jitra, Pendang and Kota Sarang Semut) were involved in this interview. The objective of the study was to obtain farmers' acceptance and practices on new paddy seed variety. The results show that socio-demographic of respondents in MADA area represents 93.2% of respondents are male and the rest of 6.8% are female farmers. The most predominant age group of the respondents between 51 to 60 years old which are 37.6%. For the marital status of the respondents, there were 64.4% are married, 15.6% are single and 20% are widow and widower. 29.6% respondents went to primary schools while about 50.8% went to secondary schools. Meanwhile, 12.4% had college/university education and only 7.2% did not get any formal education. The overall mean for perception level toward advantage and disadvantage rice variety selected is 3.902 considered as a high level of perception. Meanwhile, for chi-square analysis, it illustrates a significant different on age and years of involvement towards a level of practices on using new paddy seed variety.

Keywords: Acceptance, New seed variety, Paddy farmers, Kedah, Malaysia

1. Introduction

Paddy is an important source of food and farm income for small holders in Malaysia. The area of paddy planted in Malaysia is about 672,000 ha and 3.6 metric tons per hectares for the average of national paddy production (DOA, 2014). The government seriously emphasizes and gives a massive attention via research institute and government agency towards Malaysian paddy and rice industry. Malaysian Agriculture Research and Development Institute (MARDI), Department of Agriculture (DOA) and Muda Agricultural Development Authority (MADA) are research institute and a government agency that involve in developing many programs to increase paddy production.

Department of Agriculture is one of the main producers of rice seeds in the country and about 32% of the total production (Wan, 2006). DOA is one of government agency functions to increase production of rice by evaluating, modifying and recommending technology for rice and paddy seed production. Besides, they also produce, monitor and supply of quality seeds and the Rice Industry Development Program in the state (DOA, 2014). MARDI is a research institute that involves in seed research program by producing a new seed variety with high yield and resistance towards disease. MR219 is the most popular variety grown in Malaysia had been declared in 2001 and was almost 12 years ago. MR219 have been the most common varieties planted by farmers in Malaysia in more than 90% granary areas (Suswanto *et al.*, 2007; Raudah *et al.*, 2014). The variety has an ability to increase the production up to 10.7 metric tons per hectare. However, the performance of this variety decreased causes by weed and disease infestation in granary areas. Therefore, MR220CL2, MR253, MR263 and MR269 are several new varieties launched by MARDI as an alternative to increase production and food security requirement.

MR220CL2 had been identified as a high variety performance and had been declared on May 2010. This breed had grown in the field area that has a problem on weedy rice. Most of farmers who had a problem on weedy rice are preferred to use this breed. Besides, for variety MR253 that is resistance against blast leaf diseases also suitable for an organic and high acidity of paddy area. Based on the high yield results, MR253 had been declared on November 2010. MR263 has been declared in November 2010 and was first cultivated in FELCRA Seberang Perak, MADA and KADA. This variety is comparable to the MR219 when it was planted in fertile land. The acceptances by farmers are very encouraging and the variety planted widely in the field areas. The latest one is MR269 has a maturity stage for 104-113

days after sowing and has been declared on November 2012. Studies found that MR269 has a high resistance against blast leaf disease compared to MR219.

All these new varieties had been introduced via development of varieties and research program to ensure the rice consumption are sufficient. Meanwhile, MADA also provides support services to farmers development programs including produces high-quality paddy seeds that have been implemented to enhance socio-economic of farmers (Fauzi and Wahab, 2013). It was a good program and effort from government agencies and research institutes in the development of new variety and evaluation to strengthen the yield. Malaysia currently achieved only 70% self-sufficient in rice production. To fulfill the demand, we imported rice stock from a foreign countries such as Thailand, Vietnam, and China. The contribution in agricultural sector especially rice production is very important for generating self-sufficient, reducing imported rice and increasing food security. Farmers have low knowledge and expertise on accepting a new and different seed varieties. Only certain variety can be produced with good performance in all areas (MARDI, 2012). Therefore, farmers' level of productivity can be increased by improving their knowledge of new techniques and technologies as mentioned by Rosegrant and Cline (2003).

2. Literature Review

Development and adoption of improved technologies play a critically important role in improving the productivity (Sall *et al.* 2000). Normally, farmers do not immediately adopt a new technology or innovation. The time from initial knowledge of farmers to final acceptance may take from a few days to many years (Lionberger, 1960). These farmer perceptions reflect their experience with the new technology and it should not be automatically assume that the characteristics of new technology are satisfactory in the opinion of farmers. Access to new improved seed is a factor to stimulate the technology uptake and increase the agricultural productivity in smallholder (Bekele *et al.*, 2008). The difficulties in supplying seed in Africa country have been identified as limiting factors for adoption of improved varieties (Cromwell, 1996; Morris, 1998; Tripp, 2000). In Malaysia, the Department of Agriculture is the main producer in rice production and there is about 32% of the total production by them.

There is about 53,000 tons rice seeds production by various agencies whereas the requirement is estimated at 60,000 tons shows insufficient of seed supply (Izham *et al.*, 2003). However, Bekele *et al.*, 2008 explained that the seed access constraint was not a main factor for farmers' difficulty to adopt for a new variety, but the main problem came from incomplete information and uncertainties on the profitability of new varieties. Since farmers do not adopt new technologies without adequate information, several types of research mentioned that adoption decisions to adopt new technology depend on farmers' information about new technologies (Zhao, 2005).

Adoptions of modern varieties of seeds and fertilizers decisions tend to increase when the information about new technology increase results to strengthen the productivity and give profitable to farmers (Feder *et al.*, 1985). Burton *et al.* (2003) study on farmers' knowledge towards technology where they study shows how the knowledge affects the implementation of organic farming in United Kingdom. The study based on a cross-sectional survey of 237 farms in the UK, comprising 86 organic farmers and 151 conventional farmers. The study found that farmers who have knowledge on organic farming technology innovation significantly affected to the implementation of organic farming. According to Chhetri (2007) study showed how technology development increasing agricultural productivity in Nepal. Study showed that farmers who have knowledge on the technology have changed their attitude and more receptive towards the new technology than those farmers who are a lack of knowledge. Studies conducted by Abdulai and Huffman (2005) on acceptance of technology among farmers in Tanzania. The results showed technology acceptance depends on education background and knowledge of farmers. Most of the farmers gain knowledge about the technology from extension agencies. A knowledgeable farmer is ready to accept technology innovation compared to unknowledgeable farmers.

Therefore, extension agencies play an important role to disseminate the new information to farmers. Extension services were used as a measurement for government performances in distributing information for farmers' access (Doss, 2006). An economic analysis concluded that incomplete information, risk, human capital, input availability tends to explain agricultural technology adoption (Feder *et al.* 1985; Foster and Rosenzweig 1995; and Kohli and Singh 1998). Findings by Truong (2008) state that factors such as low education level of farmers, weak and negative perceptions of technology disorganization, geographical conditions, lack and inadequate resources and funds and small land area led to low technology adoption. Farm and farmer characteristics, and their perceptions of technology specific characteristics, all influence adoption decisions related to improved varieties (Sall *et al.* 2000).

According to Rosegrant & Cline (2003), farmers' level of productivity can be increased by improving their knowledge of new techniques and technologies. Foster and Rosenzweig (1995) reported that farmers in India were

difficult to adopt new technologies, high yielding varieties (HYV) due to imperfect knowledge about the practices. Nevertheless, farmers' adoption based on their own experience and neighbors' experience. The previous study highlighted that farmers' probability absorption of new technology via observation the behavior of neighboring farmers including their experimentation of the technology (Uaiene *et al.*, 2009).

The general objective of this study is to identify the acceptance and practices of new paddy seed variety among farmers in MADA. The specific objectives of the study are to:

- 1) Identify socio-demographic profile of respondent.
- 2) To examine the respondents' acceptance and perception toward new paddy seed variety selected.
- 3) To determine the association between the socio-demographic factors towards practices on using new paddy seed variety

3. Methodology

The primary data collected directly from the study of materials such as using questionnaire filled by the farmers as a respondent. The survey questions design according to the objectives of the study. A total of 250 farmers in the four districts area (Perlis, Jitra, Pendang and Kota Sarang Semut) were selected using random sampling. Interviews for this surveys consisted of several structured questions such as demographic characteristic, respondents' acceptance and practice towards seed selected and factor influence the respondents' decision on acceptance new paddy seed variety. Descriptive analysis was used to analyze the data which including the percentage and frequency. Frequency analysis was done to obtain information such as age, gender, ethnic, marital status, education level, years of involvement, rice varieties selected and respondents perception towards advantage and disadvantage. Meanwhile, for chi-square analysis was used to determine the association between the socio-demographic factors towards practices on using new paddy seed variety.

4. Result and Discussion

4.1 Descriptive analysis

4.1.1 Socio-demographic Profile of Respondents

Descriptive analysis was carried out to discuss the results on the demographic profile of respondents such as age, gender, ethnic, marital status and education level. Table 1 shows the demographic profile of respondents' in the study area. From the table, we can see that the most predominant age category among the respondent is between 51 to 60 years old. There was 37.6 percent of the total respondents are in the age category, followed by 41 to 50 years old with 28.8%, 31 to 40 years old with 14.8%, above 60 with 12.4% and 20 to 30 years old with 6.4%. Since the highest frequency age of the respondent is more than 50, it can be concluded that most of the farmers are in the old age range.

In terms of gender, 93.2% of respondents are male and the rest of 6.8% are female. It shows that most of the respondents involve in paddy farming activities in the surveyed area are male. For the marital status of the respondents, there were 64.4% are married, 15.6% are single and 20% are widow and widower. The finding from the survey shows that only 7.2% did not get any formal education. There were 29.6% went to primary schools while about 50.8% went to secondary schools. Meanwhile, 12.4% had college/university education. It can conclude that most of the farmers in Malaysia have low education level.

Years of involvement illustrated that 32.8% of the respondents have been involving in paddy planting above 16 years. Meanwhile, 28% of respondents have experience in paddy farming between 6-10 years, followed by 22% between 1-5 years and 17.2% between 11-15 years. Based on the result, we can conclude that majority of the respondents have sufficient experience since most of them have a long years involvement in paddy farming.

Table 1: Socio-demographic profile of respondents

Characteristics	Frequency (n=250)	Percentage (%)
Age		
20-30	16	6.4
31-40	37	14.8
41-50	72	28.8

51-60	94	37.6
>61	31	12.4
Average age: 48.24		
Gender		
Male	233	93.2
Female	17	6.8
Ethnic		
Malay	248	99.2
Chinese	1	0.4
India	1	0.4
Marital status		
Single	39	15.6
Married	161	64.4
Widow/ Widower/Divorce	50	20
Education level		
Never been to school	18	7.2
Primary school	74	29.6
Secondary school	127	50.8
College/university	31	12.4
Years of involvement in paddy experience		
1-5 years	55	22.0
6-10 years	70	28.0
11-15 years	43	17.2
16 years and above	82	32.8

4.1.2 Rice varieties

Regarding to Table 2, it shows that farmers most preference on seed variety are MR220CL-2 with the frequency 186 followed by MR263 (68), MR269 (43), MR220CL-1 and MR253 (32). Most of farmer in MADA area preferred to choose MR220CL-2 since they had experienced on weedy rice problem at their field. MR220CL-2 variety is a herbicide-resistant rice is one of the new technology to control weed rice problem in Malaysia (Azmi et al., 2012a).

In Malaysia, weedy rice became a serious major threat faced by farmers in recent years in the direct-seeded rice culture (Azmi and Karim, 2008). There are about RM90 million per season loss of yield due to weedy rice infestation problem (Azmi, 2013). Therefore, uses of MR220CL-2 variety become popular among farmers in MADA area in order to reduce the cost of weed management and enhance the yield production. MR220CL-2 also have been the most common varieties planted by Malaysian rice farmers more than 90% granary areas (Suswanto et al., 2007; Raudah et al., 2014). They also should concern on practices of MR220CL-2 variety for a long period in field due to pests and diseases infestations possibilities.

Table 2: Rice varieties selected by respondent

Varieties	Frequency	Percentage (%)
MR253	32	12.8
MR263	68	27.2
MR269	43	17.2
MR220CL-1	35	14.0
MR220CL-2	186	74.4

4.1.3 Respondents' perception level toward Advantage and Disadvantage on New Paddy Seed Variety Selected

The percentage of variable respondents' perception toward advantage and disadvantage of new paddy seed variety selected had shown in Table 3.

From the table, the advantage on new paddy seed variety with the statement "Increase the crop of yield" shows the highest mean (4.09) and the disadvantage of new seed variety with the statements "The seed are difficult to access", "Low percentage of germination" and "Pests and disease problem occur" show the lowest mean (3.34). It can be concluded that a high perception shows by respondent towards advantage compared to disadvantage on new paddy seed variety selected.

Table 3: Perception toward Advantage and Disadvantage on New Paddy Seed Variety Selected

Statements	Scale					Mean	S.D
	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)		
Advantage							
The seed price are reasonable	3.0	10.0	48.0	164.0	25.0	3.79	0.720
The seed produce have high quality	3.0	0.0	46.0	154.0	47.0	3.97	0.693
Faster and easy to cultivate and manage	3.0	2.0	61.0	129.0	55.0	3.92	0.693
Reduce uses of labour	0.0	7.0	48.0	141.0	54.0	3.97	0.722
Reduce pests and disease problem	0.0	7.0	66.0	133.0	44.0	3.86	0.730
Reduce weed problem	0.0	9.0	50.0	131.0	60.0	3.97	0.765
Reduce cost of fertilizer and pesticides	2.0	8.0	55.0	123.0	62.0	3.94	0.817
Save energy and time	0.0	2.0	42.0	156.0	50.0	4.02	0.634
Increase the crop of yield	3.0	2.0	33.0	143.0	69.0	4.09	0.736
Disadvantage							
The seed are difficult to access	11.0	45.0	66.0	104.0	24.0	3.34	1.022
The price of seed are relatively expensive	13.0	27.0	68.0	111.0	31.0	3.48	1.015
Low percentage of germination	14.0	32.0	81.0	100.0	23.0	3.34	1.003
Low quality of seed	11.0	42.0	75.0	92.0	30.0	3.35	1.036
Pests and disease problem occur	13.0	47.0	61.0	99.0	30.0	3.34	1.076
Low quality of yield	10.0	40.0	69.0	99.0	32.0	3.41	1.031
The seed package price are relatively expensive	14.0	31.0	68.0	104.0	33.0	3.44	1.048
Overall Mean						3.70	0.409

Note: 1: Not Agree, 2: Less Agree, 3: Not Sure, 4: Agree, 5: Strongly Agree

Table 4 shows a perception level toward advantage and disadvantage on new paddy seed variety selected by respondents. Total mean of perception level on new paddy seed variety considered high with the percentage 52.4%.

Table 4: Perception level toward Advantage and Disadvantage on New Paddy Seed Variety Selected

Level	Frequency	Percentage	Mean	S.D
High (3.67-5.0)	131	52.4%	3.70	0.409
Moderate (2.34-3.66)	119	47.6%		
Low (1-2.33)	0	0%		
Total	250	100.0%		

4.2 Chi-Square Analysis

4.2.1 Association between Socio-demographic Factors and Respondents' Level of Practices on Using New Paddy Seed Variety

From the chi-square table above (Table 5), we can illustrate that age and years of involvement have a significant different towards the level of practices on using a new paddy seed variety. Since the farmers majority is between 51-60 age, with the sufficient of experience it shows the significant effect on practices on using new seed variety. Meanwhile for gender, the size of farm, household size, and education level show no significant different at all.

Table 5: Association between Socio-demographic Factors and Respondents' Level of Practices on Using New Paddy Seed Variety

Demographic Profiles	Chi-Square Test	df	Significant	Decision
Gender	2.392	1	0.122	Failed to Reject H ₀
Age	10.329	4	0.035	Reject H ₀
Years of involvement in paddy experience	11.179	3	0.011	Reject H ₀
Size of farm	3.655	4	0.455	Failed to Reject H ₀
Household Size	2.787	2	0.248	Failed to Reject H ₀
Education level	8.208	5	0.145	Failed to Reject H ₀

5. Conclusion

This study impacts give a clear picture and better insight in understanding farmers' decision to accept new variety. Farmers' knowledge on using the new seed variety based on their experiences built over a lifetime. However, farmers' good practices and taking into account the farmers' knowledge has given rise to the development of approaches to participatory technology development. Farmers need to master the knowledge and skills to ensure the right practices of new seed variety. An incline of paddy production will strengthen agricultural economic and industry. Thus, all parties such as farmers, government agency and private sector should involve ensuring that the objectives or targets to enhance the agricultural industry will achieve.

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