
**PERCEPTION ON NEW PADDY VARIETY AMONG PADDY FARMERS IN
TERENGGANU, MALAYSIA**

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ABSTRACT

This paper employed survey data to identify paddy farmers' perception towards new paddy variety in IADA KETARA granary area in Terengganu, Malaysia. Systematic random sampling techniques was used to select the respondents. Face-to-face interview among 110 respondents was conducted by using structured questionnaire. The objective of this study is to investigate paddy farmers' perception towards new paddy variety. The results show that socio-demographic of respondents in IADA KETARA area represents 98.2% of respondents are male and the rest of 1.8% are female farmers. The most predominant age group of the respondents are between 41 to 50 years old represents 28.2%.. About 62.7% of respondents were secondary educated, 27.3% primary educated, 5.5% non-formal educated and 4.5% were tertiary educated. The mean value analysis considered that farmers have positive perception as the overall mean value for advantages statement is 5.44 while mean value for disadvantages statement is 4.21. Chi-square analysis found that there are significant association between farmers' age, education level and farm assistant towards knowledge about new paddy variety.

Keywords: Mean value, new paddy variety, paddy farmers, perception.

1. INTRODUCTION

Paddy is an important major food crop in Malaysia since rice is an important source of food in supplying energy sources as increasing number of human population. Due to its strategic importance of rice as the Malaysian staple food, it were undertaken as the government responsibilities which make this industry often receive massive attention and seriously emphasized by the government. According to the Ministry of Agriculture and Agro-Based (2018)[16], the paddy farming occupied approximately more than 680 thousand hectares of total agricultural land in Malaysia. The production of yield is estimated to be around 3,000 metric tons in 2018 with average yield at 4.443 tons per hectares (DOA, 2018)[3]. However it is still insufficient to accommodate the needs of the domestic consumption. It is inevitable for Malaysia to import rice to meet the domestic demand and the task was given to BERNAS as a government link company (Othman, 2007). Currently Malaysia needs to import rice from neighbour countries like Thailand, Cambodia and Vietnam. In 2017, the total rice imports is about 900,000 tons (DOA, 2018)[3].

In 2007, the world was faced food crisis which caused many countries to significant decrease in rice production. This experienced has made Malaysian government taking further step in strengthening the food security by increasing the rice production yield. It is being the main focus in agriculture sector. The Malaysian self-sufficiency level (SSL) which is at about 70% is not parallel with the increasing of country's growth population (MARDI, 2013). Based on Table 1, the SSL in 2017 is at about 71.5%, which targeted to be 75% in 2018 and 77% in 2019 (MOA, 2019). Farmers had need to increase the current crop yield of 4-6 tons to 7 tons per hectare (MOA, 2015)[16]. Simultaneously, Fatimah Mohamed Arshad[18] in National Paddy Conference 2017 declared that the rice production is targeted to be 100% self-sufficient in 2050.

Table 1: Paddy and Rice Information in Malaysia, 2014 – 2018

Item /Year	2014	2015	2016	2017	2018 ^e
Production of paddy ('000 mt)	2,845	2,741	2,740	2,568	3,065
Production of rice ('000 mt)	1,835	1,767	1,766	1,655	1,976
Average yield (t/ha)	4.194	4.022	3.978	3.728	4.443
Self-sufficiency level (SSL) of rice	71.6	71.5	71.5	71.5	75.0

Note: e = estimated data

Source: DOA (2018)

IADA KETARA (Integrated Agriculture Development Area of North-west Terengganu) is one of the main granary areas that have an important task to increase the yield productivity particularly from average of 4.5 tons per hectare to 6 tons per hectare (MOA, 2017). Granary areas refer to major irrigation schemes with areas greater than 4,000 hectares. It was recognized by the government in the National Agricultural Policy (NAP) as the main paddy producing areas. Based on Table 2, the average yield estimated for IADA KETARA is at 6.687 tons per hectare in 2018. However, the average yield for other granary areas except IADA Barat Laut Selangor and IADA Pulau Pinang were estimated to be lower than 6 tons per hectare (DOA, 2018)[3] according to their potential productivity at current situation. The production of rice was in fluctuation trend since 1980s because of several reasons (DOA, 2018)[3]. It could be due to the low and unstable average farm productivity, seed quality, biotic and abiotic constraints, weed and weedy rice problems, climatic change, water supply and water management and also harvesting losses (MARDI, 2015)[14]. The average yield for all granary areas is estimated to be at 5.507 tons per hectare (DOA, 2018)[3].

Table 2: Average Yield of Wetland Paddy by Granary Areas in Peninsular Malaysia, 2014-2018

Granary Area	Year / Average Yield (t/ha)				
	2014	2015	2016	2017	2018 ^e
MADA	5.539	4.884	5.284	4.841	5.892
KADA	4.297	4.442	4.610	4.448	5.124
IADA Kerian	4.514	4.508	3.949	4.087	4.414
IADA BLS	6.403	6.305	5.825	4.510	6.512
IADA P.Pinang	5.872	5.866	5.801	5.737	6.571
IADA Seberang Perak	4.484	3.956	3.729	3.180	4.169
IADA Ketara	5.738	5.437	5.623	5.172	6.487
IADA Kemasin Semarak	3.715	3.781	3.771	3.779	4.192
IADA Pekan	2.671	2.571	2.052	1.357	2.113
IADA Rompin	3.442	4.014	2.793	3.147	2.876
IADA Kota Belud	-	-	-	2.511	2.511
IADA Batang Lupar	-	-	-	2.009	2.009
Average	5.212	4.864	4.941	4.491	5.507

Note: e = estimated data

BLS = Barat Laut Selangor

Source: DOA (2018)

Improving paddy seed quality is deemed one of the effective efforts to increase productivity that has been driven by the government. According to MARDI (2015)[14], the introduction of new variety is expected to have a positive impact on yield. The traditional paddy seeds were issued with low yield, long maturity days, less resistance to pest and diseases and moderate quality (MOA, 2015)[14]. Thus, the traditional quality of paddy seeds were improved to get higher yield potential, more resistance to pest and diseases and better quality of rice produced. Particularly, the improvement of high yield varieties have made it suitable for double cropping and multiple cropping which can help in resulting of high productivity as well as saving lands.

However, the use of farm chemicals like pesticides has tremendously increased over the years. Consequently, the excessive usage of farm chemicals like pesticides had made pests becoming resistant to the chemicals. In order to reduce the infestation, the seed varieties that are resistant to pest and diseases are being used (Hassan, 2012)[9]. One of the serious and main diseases that has been assault paddy plant is blast disease which is a major contributed of low productivity of paddy in Malaysia as well as other 85 paddy growing countries (Hassan, 2017)[8]. Thus, new high yield varieties have been developed as the solution and alternative to increase the production yield.

Statistical data recorded that there were seven paddy varieties that have been popular planted among the farmers from 2010 to 2015. It consists of MR219, MR220, MR232, MR263, MR284, MR220CL1 and MR220CL2 (DOA, 2016). Variety MR219 and MR220 were the most common varieties planted by Malaysian farmers for more than 12 years with significant contribution of increasing production (Talib and Kadir, 2014[25]; MARDI, 2011[15]; Suswanto et al., 2007[24]). But, the assault of panicle blast disease has been seriously detected in MR219 and MR220 since 2003. Due to that, MARDI has developed and released some new varieties like MR253, MR284, MR263, MR269 and MR Siraj 297 in order to tackle the problem of blast disease that assaulted paddy plant.

Simultaneously in 2016, a new paddy technology known as PadiU Putra has been developed by a group of researchers from Universiti Putra Malaysia (UPM). Under this package technology, there is a new paddy variety namely Putra 1 that has been developed. This new variety is developed to be more tolerant to pest and diseases especially blast disease as well as have high potential yield up to 10 tons per hectare (ITAFoS UPM, 2017)[11].

Thus, it is worthwhile to investigate paddy farmers' perception about Putra 1 before embarking on the Putra 1 in large scale. Since it is a new technology, thus it is timely to explore the criteria that could determine the farmers' perception about this new paddy variety. Farmers' opinion on the potential of Putra 1 as a more blast disease tolerant, high potential yield as well as income enhancer are worth to look at as it still at the stage of early adopter.

2. LITERATURE REVIEWS

The literature reviews have disclosed that Malaysian studies on respondents that have positive perception on urban agriculture significantly have an intention to practice it in the future (Ngahdiman et al., 2017)[21]. Likewise, positive opinion about Clearfield Rice Production System was being the determinant for paddy farmers in KADA area to adopt new paddy variety MR 220CL2 (Terano et al., 2016)[27]. Likewise, farmers in Muda Agricultural Development Authority (MADA) Malaysia were got significant impacted by their age and years of involvement on their level of practices using new paddy variety (Nazuri and Man, 2016)[20].

Similarly, the perception on innovation characteristics significantly contributes to the adoption behaviour. Positive perceptions of farmers in Madhya Pradesh, India on organic coconut farming is tend to have high adoption rate of innovations (Patidar and Patidar, 2015)[22].

Individual characteristics such as demographic factors like age, education and farm size will also influenced farmers' perception and adoption decision of innovation as well as their attitude towards organic farming (Patidar and Patidar, 2015)[22]. Apart from that, farmers' knowledge give significant effect to their willingness in adopting new chicken feed formulation in West Malaysia study area as being claimed by Mohamad et al. (2015)[17]. Simply put, farmers that have knowledge is ready to accept innovation compared to unacknowledged farmers.

The studies conducted by Bruce et al. (2015)[2] in Ghana shows that farmers that have formal education, household size and smallholder farms positively influenced the adoption of improved rice variety.

Asante et al. (2013)[1] disclosed that farmers' preferred rice varieties with high yield potential and excellent grain quality based on studies at Ashanti region of Ghana. He further notes that plant height, thresh ability, disease resistance and weed competitiveness were the other important traits that being considered in selecting a variety. Besides, a studies conducted by Jamal et al. (2013)[12] disclosed that farmers in the East Coast, Malaysia showed a positive acceptance attitude on the cultivation of the new paddy variety, MRQ 74.

The location of operation and farm size have significant effects on growers' adoption of sustainable practices (Hall and Rhoades, 2010)[7]. Perception or attitude is an individual's positive or negative evaluation of self-performance on a particular behaviour (Luthans and Avolio, 2009)[13]. The weak and negative perceptions of technology disorganization, geographical conditions, lack and inadequate resources and funds, small land area and low education level has led to low technology adoption (Truong, 2008)[28].

Besides, the adoption of new practices like conservation programs and organic production were negatively influenced as the increase of grower's age, but positively influenced by education levels (Hattam, 2006)[10]. Besides, Simpkins et al. (2005)[23] reported that demographic variables were predictor of youth participation in urban agriculture activity. Other factors like demographic characteristics and prior experience is considered as important assumed to the formation of intentions.

3. METHODOLOGY

Theory of planned behaviour (TPB) was used to construct the theoretical framework for this study. This study was conducted by face to face interviews with paddy farmers in IADA KETARA granary area in Terengganu. Systematic random sampling techniques was used to select the respondents for this study. One hundred and ten (110) paddy farmers who have been involved in the awareness campaign such attending seminar and talk by UPM researchers and extension agents were selected. The data was collected through interviewed to gather information from paddy farmers via structured questionnaire between April 2017 until May 2017.

The questionnaire included the socio-demographic, farm profile, knowledge and perception. The perception about advantages and disadvantages about new paddy variety is based on attitudinal Likert scale of 1 to 7. Descriptive analysis was performed to discover the socio-demographic background of the paddy farmers. The Chi-square analysis was employed to

examine the association between respondents’ socio-demographic profiles and knowledge. The general hypothesis test could be expressed as follows:

$$H_0: \beta_0 = \beta_1 = \beta_2 = \dots = \beta_p = 0$$

$$H_1: \beta_i \neq 0 \text{ for at least one } i$$

$$i = 1, 2, \dots, p$$

The null hypothesis (H₀) was explained as there is no significant association between dependent variable (knowledge) with independent variables (such as age, education level, types of farmer, marital status, farming experience and household number). While alternative hypothesis (H₁) was explained as there is significant association between dependent and independent variables. The hypothesis for this study can be simplified as follows:

H₀ = There is no significant association between socio-demographic profiles and farmers’ knowledge about new paddy variety (Putra 1)

H₁ = There is a significant association between socio-demographic profiles and farmers’ knowledge about new paddy variety (Putra 1)

4. RESULTS AND DISCUSSION

Descriptive Analysis

Based on the Table 3, those age group within 41 to 50 years old was the most predominant age (n=31, 28.2%), followed by those above 60 years old (n=27, 24.5%), 31 to 40 years old (n=23, 20.9%), 51 to 60 years old (n=16, 14.5%) and 21 to 30 years old (n=13, 11.8%). Majority of respondents was dominated by male farmers (n=108, 98.2%). Most of them have completed secondary education as their educational background (n=69, 62.7%). Majority of respondents have less than 5 household number (n=56, 50.9%). Most of respondents work as a full-time paddy farmer (n=80, 72.7%) and the rest were part-timer paddy farmers (n=30, 27.3%). Apart from that, majority of respondents have farm size less than 5 acres (n=51, 46.3%). Most of them have more than 16 years experience in paddy farming (n=29, 26.4%). Majority of respondents are preferred family members as their farm assistant (n=89, 80.9%).

Table 3: Respondents’ Characteristics

Characteristics	Frequency (n=110)	Percentage (%)
Age (Years old)		
21-30	13	11.8
31-40	23	20.9
41-50	31	28.2
51-60	16	14.5

Above 60	27	24.5
Gender		
Male	108	98.2
Female	2	1.8
Marital status		
Married	97	87.2
Single	13	11.8
Education level		
Non-formal	6	5.5
Primary school	30	27.3
Secondary school	69	62.7
Tertiary school	5	4.5
Household number		
Less than 5	56	50.9
5-10	46	41.8
11 and above	8	7.3
Types of farmer		
Full-timer	80	72.7
Part-timer	30	27.3
Farm size (acre)		
1-5	51	46.3
6-10	41	37.3
11-15	10	9.1
16 and above	8	7.3
Farming experience (years)		

1-5	18	16.3
6-10	29	26.4
11-15	18	16.3
16 and above	45	41.0
Farm assistant		
Family member	89	80.9
Hired labour	21	19.1

Note: n=110

Table 4 on the other hand shows the mean value analysis result of respondents’ perception towards new paddy variety. Thus, by referring to the mean, the result shows that the respondents have positive responses as the mean values for most of the advantages statements were ranged between 5.0 to 6.0 (5.0 = slightly agree and 6.0 = agree) except the statement “easy to manage and cultivate” which scored a mean value below 5.0. The highest mean value showed by “increase farmers’ income” (5.86), followed by “increase the crop yield” (5.65), “more resistant to blast disease” (5.63), “help control pest and diseases infestation” (5.51), “high quality produce” (5.41), “minimum fertilizer” (5.40) and “easy to cultivate and manage” (4.91). In overall, the total mean value scored for advantages statements was 5.44. Whereas, for all the disadvantages statements were ranged between 3.0 to 6.0 (2.0 = disagree and 3.0 = slightly disagree, 4.0 = either agree or disagree, 5.0 = slightly agree, 6.00 = agree). Four statements were ranged between 3.0 to 4.0; “low seed germination” (3.44), followed by “new variety is risky” (3.99), “require frequent pesticing” (3.93), and “require more fertilizer” (3.95). While “doubtful with seed quality” has scored a mean value of 4.53 and “the seed is difficult to access” is 5.56. In overall, the total mean value scored for disadvantages was 4.21.

In summary, the total mean of advantages was more than the mean value scored by disadvantages, thus we can conclude that there is a positive perception towards new paddy variety specifically Putra 1 among the paddy farmers in that study area.

Table 4: Respondents’ Perception towards Advantages and Disadvantages of New Paddy Variety (Putra 1)

Statements	Scale (%)							Mean	S.D
	1	2	3	4	5	6	7		
Advantages									
Increase the crop yield	0.0	0.9	0.9	10.9	24.5	44.5	18.2	5.65	0.990

Increase farmers' income	0.0	0.0	0.0	9.1	20.9	44.5	25.5	5.86	0.903	
Help control pest and diseases	0.0	0.9	6.4	10.9	22.7	40.9	18.2	5.51	1.155	
More resistant to blast disease	0.0	0.0	1.8	17.3	20.0	38.2	22.7	5.63	1.074	
Reduce the use of pesticides	0.0	4.5	5.5	10.0	23.6	42.7	13.6	5.35	1.260	
Minimum fertilizer required	0.0	1.8	0.0	10.0	36.4	48.2	3.6	5.40	0.859	
Reduce the cost of fertilizer and pesticides	0.0	9.1	5.5	10.0	20.0	37.3	18.2	5.25	1.480	
High quality produce	0.0	0.0	1.8	23.6	19.1	42.7	12.7	5.41	1.043	
Easy to cultivate and manage	0.0	5.5	10.0	23.6	17.3	25.5	16.4	4.91	1.530	
Total Mean									5.44	1.144
Disadvantages										
The seed is difficult to access	0.0	5.5	2.7	14.5	11.8	38.2	27.3	5.56	1.385	
Low seed germination	7.3	24.5	27.3	20.0	7.3	6.4	7.3	3.44	1.611	
New variety is risky	5.5	15.5	23.6	17.3	10.0	24.5	3.6	3.99	1.667	
Doubtful with seed quality	0.9	10.0	12.7	28.2	18.2	20.0	10.0	4.53	1.494	
Require more fertilizer	1.8	10.9	30.0	24.5	17.3	10.9	4.5	3.95	1.391	
Require frequent pesticing	0.0	20.0	22.7	26.4	11.8	13.6	5.5	3.93	1.482	
Total Mean									4.21	1.453
Overall Mean									4.952	1.267

Note:n=110

1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4 = Either agree or

disagree, 5 = Slightly agree, 6 = Agree, 7 = Strongly agree

4.1 Chi-Square Analysis

Chi-square analysis was used to measure the association between farmers’ knowledge and their socio-demographic profiles. There was a hypothesis developed for this analysis;

H₀ = There is no association between farmers’ knowledge and socio-demographic profiles.

H₁ = There is an association between farmers’ knowledge and socio-demographic profiles.

Table 5 shows the result of association between farmers’ knowledge about new paddy variety (Putra 1) and their demographic profiles. Based on the table, it shows that only age, education level and farm assistant are significant to farmers ‘knowledge about new paddy variety (Putra 1). As they are significant, it means that there is an association between farmers’ knowledge and demographic profiles(alternative hypothesis). Thus, null hypothesis for age, education level and farm assistant were rejected. Age was significant at 5 percent level of significance with significant value of 0.037, whilst education level (0.001) and farm assistant (0.008)were significant at 1 percent level of significance. However, other variables such as marital status, household number, types of farmer, farm size and farming experience were found not significant. It means, these variables have no association with farmers’ knowledge. Thus, the null hypothesis (H₁) is failed to reject. This finding is in line with Terano et al. (2016) that knowledge farmers were influenced by demographic profiles.

Table 5: Association between Knowledge towards New Paddy Variety (Putra 1) and Demographic Profiles of Respondents

Variables	Chi-Square Value	df	Significant	Decision
Age	10.209	4	0.037**	Reject H ₀
Education level	15.560	3	0.001***	Reject H ₀
Marital status	0.241	1	0.624	Fail to reject H ₀
Household number	0.135	2	0.935	Fail to reject H ₀
Types of farmer	0.131	1	0.718	Fail to reject H ₀
Farm size	0.813	3	0.846	Fail to reject H ₀
Farming experience	0.497	3	0.920	Fail to reject H ₀
Farm assistant	6.990	1	0.008***	Reject H ₀

*Note: ***Significant at 1% level of significance*

***Significant at 5% level of significance*

5. CONCLUSION& RECOMMENDATIONS

Based on the results of descriptive analysis, majority of respondents were dominated by male farmers, secondary educated, full-timer paddy farmers and have more than 16 years of experience in paddy farming. The mean value analysis showed the respondents' perception towards new paddy variety. The responses in each statement of perception towards advantages and disadvantages of selected new paddy variety was identified. From the analysis, it showed that paddy farmers do have positive perception as the mean values for all advantages statements were ranged (5.44) higher than mean values scored by all disadvantages statements (4.21).

Chi-square analysis was performed in order to examine the association between respondents' socio-demographic profiles (age, education level, marital status, household number, types of farmer, farming experience, farm assistant) and respondents' knowledge on new paddy variety (Putra 1). The result of this analysis indicated that age, education level and farm assistant were significant associated with knowledge.

Results from this study can be a guideline for authorities in getting a road map on how to sustain and increase the adoption on new seed varieties among paddy farmers. Providing seminar and training for the farmers for encouraging better attitude and improving their knowledge about new technologies will consequently improve the adoption so thus the yield. This information also can be used for implementing development program according to the farmers' level and capabilities . So thus, it could help to facilitate the farmers to be more understand while exploring the technology.

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