MALAYSIAN PADDY FARMERS AWARENESS AND PERCEPTION TOWARDS SYSTEM OF RICE INTENSIFICATION (SRI) PRACTICES: A PRELIMINARY STUDY

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Abstract

The increasing food demand coupled with declining water availability meant for food production cause further concerns towards food security due to increasing numbers of the world's population. System of Rice Intensification (SRI) known as a relevant innovation and has emerge as an alternative to traditional way of flooded rice cultivation and is showing great promise to deal with the problems of water scarcity and low yield. It has been introduced to Malaysia in 2009 by Norman Uphoff a renowned SRI researcher. Since SRI just recently introduced to the country, thus the aims of this paper is to determine the farmers' awareness and perception of SRI practices in their rice cultivation. A survey was conducted in February, 2012 in North-West Selangor district. Using a simple random sampling technique, 111 paddy farmers were selected and interviewed via a structured questionnaire. The results showed that most of the respondents (88%) are aware about the existence of SRI in their area. Further analysis using principal component analysis revealed two factors namely low cost of production and sustainable farming that collectively described farmer's perception towards SRI practices. It shows that SRI covered both economic and environmental aspects of rice cultivation and it should be adopted by all paddy farmers in Malaysia to overcome the issues of food security and water crisis.

Keywords: *System of Rice Intensification (SRI); paddy farmers; awareness; perceptions*

Introduction

Rice is a strategically important industry because it is a staple food in Malaysia. Rice cultivation in Malaysia was closely associated with the rural population and traditional farmers. But in the last 30 years, rice was transformed to a commercial crop. The once subsistence farming is now highly regulated and subsidized. However, for the past 40 years, Malaysia only managed to double its rice production to 2.23 million metric tons in 2005 compared to 1.09 million metric tons in 1961. Presently, local production can only cater to approximately 60-65% of domestic consumption requirements (MOA, 2010). Thus, the Ministry of Agriculture and Agro-Industries is targeting to push the national rice production to 10 tons per hectare through good agricultural practices and paddy estate strategies. To

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achieve this target, the Malaysian government has developed two plans related to this strategy.

The first plan was covered in the Ninth Malaysia Plan, where the agricultural sector is expected to increase the Malaysian economy. For the agricultural sector, the emphasis were focused on exploring activities in processing and production using recent agricultural methods and Information and Communication Technology (ICT); more Research and Development (R&D); and innovations especially in paddy farming. The second plan was introduced within the Northern Corridor Economic Region (NCER). Figure 1 shows eight granaries area and the major departments as well as agencies involved in the paddy and rice industry in Malaysia. The location of the study is North-West Selangor, which was established in 1979 with 18, 195 hectares planted area for paddy.

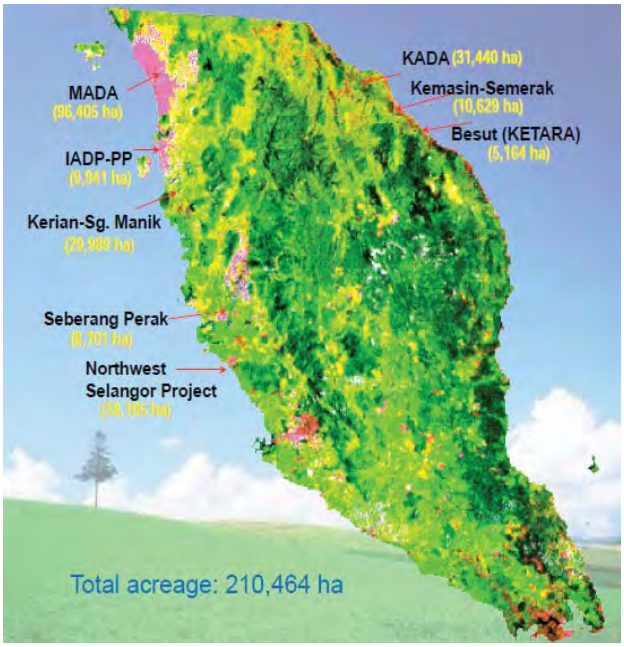

Figure 1. Integrated Agriculture Development Projects (IADP) by Granaries Areas (Source: MOA, 2008)

There are a total of 210,464 hectares of paddy planted areas, and average yield is 3.5 tons per hectare. Government support for research and development, production and marketing in this subsector have taken many forms such as credit facilities, fertilizer subsidies, irrigation investment, guaranteed minimum price, income support programs, subsidized retail price as well as research and extension support (training and advisory services), amounting to billions of dollars over the past 50 years. These expenses have been a fiscal drain on the nation. Despite the massive fiscal expenditures, rice production remains

chronically inefficient with regards to meeting market demand. Thus, the Deputy Minister of Agriculture and Agro-Based Industry remarked recently that Malaysia could achieve 100% self-sufficiency in rice if Malaysia's two major rice areas (MADA and KADA) increase their rice yields by between 5 to 10% per year. Malaysia is currently 72% self-sufficient in rice and targeted to achieve 100% self-sufficiency in 2015 as shown in Figure 2 and Figure 3.

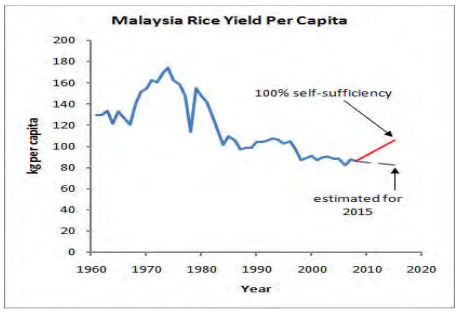

Figure 2. Malaysia Rice Yield Per Capita (Source: MOA, 2010)

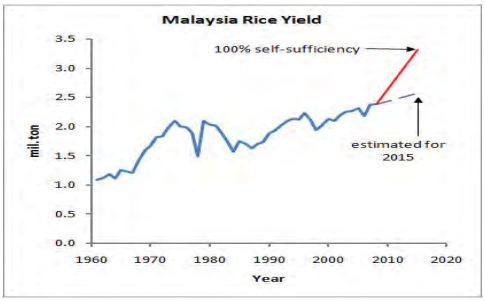

Figure 3. Malaysia Rice Yield (Source: MOA, 2010)

However, rice production is heavily subsidized by the government, and with the government now trying to reduce their subsidies, it is difficult to see more rice fields opening up in Malaysia. Thus, unless there is a major concentration of investment, research, and effort in next five years by the government, it is very unlikely that Malaysia would be 100% self-sufficient in rice by 2015 or thereabouts. In response to related issues, the third National Agricultural Policy (NAP3) introduced the need to adopt sustainable agriculture as one of its policy thrusts. It calls for the adoption of sustainable management in the utilization of natural resources as the guiding principle in pursuing agricultural development. Rules, regulations and incentives will be strengthened to encourage environmental-friendly agricultural practices to minimize the negative impact of these activities to the environment.

Organic farming is increasingly recognized worldwide as one of the suitable models for creating environmental, economical, and social sustainability in agriculture which aimed to be adopted by Malaysian paddy farmers. System of Rice Intensification (SRI) has been renowned as an option towards sustainable paddy cultivation. SRI was introduced in Malaysia in 2009 and started later than most other Asian countries in utilizing the opportunities offered by SRI especially to increase the productivity of the rice sector. However, interest in SRI has grown rapidly within the government, university, NGO, and private sectors after the first SRI trials were initiated locally. Thus, the aim of this paper is to determine farmer's awareness and perceptions towards SRI practices in North-West Selangor area.

Literature Review

The System of Rice Intensification, or SRI for short, is a fascinating case of rural innovation that has been developed outside the formal rice research establishment both in Malaysia and the rest of the world. Historically, SRI was developed in 1983 by the French Jesuit Father Henri de Laulanie in Madagascar and spread by Prof. Norman Uphoff in 42 countries. SRI refers to the changes in management of irrigated rice production that were recommended by Fr. Laulanié based on his 34 years of work with farmers and with rice systems in Madagascar (Laulanié, 1993, 2003). The main features of this system are transplanting of young seedlings singly in a square with wide spacing using organic fertilizers and keeping the soil moist during the vegetative phase. According to Uphoff (2005), SRI practices involved changing the way that rice plants, soil, water and nutrients are managed and has proven obvious and dramatic effects on yield that can rise by 50 to 100%, and sometimes even more. However, Laulanié would be the first to insist that his ideas are not final and that they should be subject to further elaboration and revision, particularly by farmers.

Thus today there is such a thing as rainfed SRI, developed successfully in Philippines (Gasparillo, 2003), northern Myanmar (Kabir and Uphoff, 2007), Cambodia (Anthofer, 2004), and eastern India (PRADAN, 2006, 2008). For all the example given, farmers and NGOs who is working together have gotten ideas and inspiration from the results of Fr. Laulanié's work with irrigated rice, adapting his concepts to unirrigated rice production know as rainfed. Rainfed rice yields averaged 7 ton/ha in carefully controlled trials in the Philippines and are now averaging this level for tens of thousands of poor

farmers in India. This system offers opportunities to researchers and farmers to expand their understanding of yield potential already existing in the rice genome (Stoop *et al.*, 2002, Uphoff, 2002).

But there are many other considerations why farmers, governments and donor agencies should consider using or supporting SRI practices that being increasingly documented in number of countries. According to Uphoff and Kassam (2009), the largest and most pervasive constraint for SRI adoption is a subjective one such as (1) farmers' thinking and (2) their willingness to change, for example overcoming skepticism and mental resistance. Farmers need certain amount of skill and motivation to use SRI techniques successfully. With the issues of skills and motivation needed to adopt SRI, Rogers (2003) indicated that the rate of adoption is the relative speed with which members of a social system adopt an innovation. The main advantages of SRI that have been reported including yield increase, reduced number of irrigations or irrigation-hours per irrigation and per unit area (i.e., increase in water productivity), reduced demand for cash inputs, improved seed quality, and higher milling ratio (Boonsong, 1997; Namara *et al.*, 2004). Besides the private benefits gained by farmers, at the same time SRI exemplify additional societal or environmental benefits due to reductions in the usage of chemical inputs such as herbicides and fertilizers.

Methodology

To determine farmer's awareness and perception towards SRI practices, detailed interviews were conducted with 111 paddy farmers in North-West Selangor. The total population of paddy farmers in the area is 10,300 farmers and the sample was collected using simple random sampling technique. For this study, the respondents were asked to answer 6 and 12 prepared statements concerned with awareness and perception towards SRI practices respectively. Respondents recorded their answers using a five-point scale where 1 was "not at all aware" and "strongly disagree" and 6 was "highly aware" and "strongly agree" for awareness and perception in that order.

The data collected was keyed in and the Statistical Package for Social Science (SPSS) Version 16.0 was used to analyze the data. In this study, descriptive statistics was used to analyze the socio-demographic profile of respondents and their awareness of SRI. Factor analysis was also employed to identify factors influencing respondent's perceptions towards SRI practices. Factor analysis was used to reduce the number of variables to a more

manageable level so that the basic structure underlying the set of variables could be found. This type of procedure groups the variables into independent factors where each factor represents a scale measure of some underlying dimension (Hair *et al.*, 2006).

Results and Discussion

Descriptive Analysis

Table 1 shows the demographic profile of the respondents in the study. From the total of 111 respondents, the percentage of respondents composed of 105 males (94.59%) and 6 females (5.41%). In term of race or ethnicity, majority of the respondents were Malays which made up 97.3% (108) of the total respondents and Indian with only 2.7 % (3). This situation occurred due to the facts that this area was dominated by Malay.

Table 1. Socio-Demographic Profile Of Respondents

Demographic Variables		Percentage (%)
GENDER	Male	93.7
	Female	5.4
RACE	Malay	97.3
	Chinese	0
	India	2.7
EXPERIENCE AS A PADDY FARMER	5 years and below	18
	6-10 years	15.3
	11-15 years	11.7
	15 years and above	55
AGE	30 years and below	14.4
	31-40 years	18.9
	41-50 years	35.1
	51-60 years	19.8
	61 years and above	11.7
NUMBER OF HOUSEHOLD	0 people	39.6
	1-5 peoples	45.9
	5-10 peoples	11.7
	>10 peoples	2.7
PERMANENT JOB	Farmer	81.1
	Businessman	10.8
	Government	8.1
FARM SIZE	1 ha and below	53.2
	2 - 5 ha	35.1
	6 - 10 ha	9.9
	11 ha and above	1.8

In terms of years of experience as paddy farmers, majority of the respondents indicated that they have experience for more than 15 years (55%); followed by below 5 years experience (18%), while another 15.3% are between 6 to 10 years and the least responses are 11 to 15 years (11.7%) of experience as paddy farmer. The survey revealed that majority of the respondents were aged between 41 to 50 years old (35.1%) followed by 51 to 60 years old (19.8%) and 18.9% are aged between 41 to 50 years old. Thus, it is not a surprise when most of the respondents indicated that they have more than 15 years of experience as paddy farmers since majority of them were aged in between 41 to 60 years old.

The analysis shows that 45.9 % of respondents have 1 to 5 peoples in the household while 39.6% of respondents indicated that they do not have family members that reside with them. Previous study revealed that household size usually influences farmer's awareness and perception towards SRI practices where they normally have 1 to 5 peoples in the household. This may be can be related to the ability of farmers to adopt SRI with the assistance of family members. The analysis also shows that majority of the respondent (81.1%) specified that paddy farmers are their permanent job, followed by as a businessman (10.8%) and lastly as a government servant (8.1%). It shows that some of the respondents are doing paddy farming as their part time job. In terms of farm size, most of the respondents (53.2%) have small farm size which is 1 hectare and below, followed by 2 to 5 hectares and 6 to 10 hectares of farm size with 35.1% and 9.9% respondents respectively. Only 1.8% of respondents owned paddy farm that sizes above 11 hectares.

Table 2. Awareness on SRI Practices

Statements	**Likert Scale (Percentage)**					
	Not at all aware	Not aware	Slightly aware	Aware	Extremely aware	Mean
I'm aware about SRI	4.5	7.2	28.8	37.8	21.6	**3.6486**
SRI can increase the yield	6.3	12.6	39.6	27.9	13.5	**3.4324**
I know about SRI method	4.5	9.0	38.7	34.2	13.5	**3.3514**
SRI is a sustainable practice	6.3	8.1	44.1	27.0	14.4	**3.1351**
SRI can reduces agronomic and economic risks	9.0	12.6	37.8	27.0	13.5	**3.3063**
SRI is interesting to learn, explore and practices.	14.4	10.8	38.7	21.6	14.4	**3.0270**

Further analysis were undertaken to see farmer's awareness regarding SRI practices in their areas as shown in Table 2. The result shows that most of the paddy farmers in North-West Selangor are aware concerning SRI practices in their area.

The mean scores for farmer's awareness towards SRI are 3 which are slightly aware. This means, sometimes the respondents are aware about SRI but they are not confident to adopt SRI practices. Besides that, sometimes they are unaware about SRI due to lack of motivation and knowledge about SRI.

Factor Analysis

The Kaiser-Meyer-Olkin (KMO) and Bartlett Test of Sphericity were used to measure sampling adequacy and the presence of correlation among the variables respectively as shown in Table 3. With the significance level of $p<0.000$ for Bartlett's test of Sphericity and KMO test which is more than 0.5 are considered satisfying for factor analysis.

Table 3. KMO Measure of Sampling Adequacy

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.761
Bartlett's Test of Sphericity	Approx. Chi-Square	305.048
	df	28
	Sig.	.000

Table 4 shows the results of factor analysis related to farmer's perceptions towards SRI practices. All the eigenvalues obtained from the analysis are greater than one, and generated two factors with four items for each factors from ten original variables as stated in the questionnaires. Sproles and Kendall (1986) indicated that for a factor to be measureable, it is preferable to have at least three measurement items, and the findings are consistent with the suggestion. Principal component analysis revealed two factors that collectively explained over 58% of the variance namely: low cost of production and sustainable farming as shown in Table 4.

Table 4. Results Of Factor Analysis On Farmer's Perceptions Towards Sri Practices

Variables	Factor Loadings	
	1	2
Low cost of production		
SRI can save seeds usage.	0.917	
SRI can increase rice yield	0.886	
SRI can reduce the cost of production	0.851	
SRI can reduce labor usage	0.621	
Sustainable Farming		
SRI practices have no negative effects on the environment.		0.675
SRI practices are free from environmental pollution caused by agrochemicals		0.644
SRI can reduces pest and disease		0.638
SRI practices are good for preservation of soil and water		0.592
Eigenvalue	3.232	1.428
% of Total Variance	36.740	21.509
Cumulative Variance	36.740	58.249
Cronbach Alpha	0.859	0.549

Factor 1 (low cost of production) consisted of four variables that evaluated the extent to which SRI can reduce the cost of production by saving seeds usage, increase rice yield, reduce the cost of production and reduce the labor. Beside factors related to the economics of production, farmers also perceived SRI as sustainable farming (Factor 2) with four variables that seems protected the environment. Both factors show that farmers in this area have superior perceptions towards SRI practices.

The reliability tests on the variables were done and the final alpha score in this study were range from 0.549 to 0.859. In addition, Nunnally (1978) study also indicated that alpha score of more than 0.5 for the factor will be considered as reliable. The alpha score for each factor are more than 0.5 thus; it does meet Nuunaly's (1978) guideline of alpha value in between 0.5 to 0.6 for explanation of research.

Conclusion

Based on the results obtained from the study, the mean of farmer's awareness towards SRI practices are below four or in the range of slightly aware and neutral. It shows that the respondents are aware about SRI but at the same time they were not confident to adopt SRI farming methods and this may be due to the lack of motivation and knowledge

towards the methods among the farmers. For factor analysis, there are two factors that affected farmer's perception towards SRI practices in North-West Selangor which can influence SRI adoption in the future. These are low cost of production and sustainable farming. SRI has been proven in other countries the ability to increase rice yields as well as reduced the cost of production.

From this preliminary finding, it shows that SRI can be a better solution for thousands of Malaysian paddy farmers since it captured both economics and environmental aspects of paddy production. Furthermore, previous studies have shown that there is a large biological potential in the paddy plant when using SRI planting methods. This potential can be effectively used if Malaysian farmers are facilitated in acquiring better knowledge and skills in SRI practices especially related to plant, water control, soil improvement, nutrient and pest management which is very important in regards with SRI methods. In addition, to ensure the adoption of SRI, the government such as agriculture extension workers as well as NGOs and private sector are playing an important role to develop and disseminate SRI methods among the growers. At the same time providing easy SRI methods for example making own organic fertilizers and botanical pesticide will create interest among the farmers to willingly adopt SRI at their paddy fields.

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