Determinants of Farmers' Decision to Adopt the System of Rice Intensification in General Nakar, Quezon, Philippines

***Julia Martha P. Adajar*[1], *Rachelle A. Mariano*[2], *Melodee Marciana E. de Castro*[2], *and Gemma U. Reyes*[2]**
Marketing Supervisor – Bria Homes[1]
University of the Philippines - Los Baños[2]
juliamartha_adajar@briahomes.com.ph
ramariano2@up.edu.ph
medecastro@up.edu.ph
gureyes@up.edu.ph

Abstract

The System of Rice Intensification (SRI) has been promoted as an affordable, environment-friendly and integrated participatory approach to rice production, but little is known about the factors influencing the decision-making processes of the farmers towards adoption of this technology. This study aimed to address this gap by finding out the factors influencing the farmers' willingness to adopt the SRI in General Nakar, Quezon, Philippines. There were 60 farmers interviewed using a semi-structured questionnaire regarding their socio-demographic characteristics, their perceptions and experience on SRI and willingness to adopt SRI on their farms. The factors that contribute to the farmers' willingness to adopt SRI was determined using a Binary Logistic Regression model. Results revealed that small-holder farmers, those who were trained and received technical support on SRI from institutions, and those who have good perceptions of cost and physical compatibility of SRI with their farm, are more likely to be willing to adopt SRI. This underscores the importance of a well-targeted capacity building and technical support which will ensure that small-holder farmers are aware of the potential benefits of SRI.

Key Words: system of rice intensification; small-holder farmers; willingness to adopt; binary logistic regression analysis; case

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Introduction

In the Philippines, rice remains the country's staple food (Balisacan et.al., 2010). The rice demand has risen steadily at two percent annually, as a consequence of the rise in population and increase in per capita consumption (Balisacan et.al. 2010). In spite of being an agricultural country, the Philippine rice production could not sustain the demand, necessitating rice importation. The country is a long-standing importer of rice, importing eleven percent of its supply annually (Davidson, 2016). Moreover, the rice yield gap still exists due to technology, efficiency and resource constraints (Silva et.al. 2017; Sebastian et.al. 2000). Chronic poverty may have contributed to this persistent need to import and yield gap. The over 2.4 million rice farmers in the country are small-holder farmers tilling an average land size of 1.14 ha (Tolentino, 2015).

Among these farmers, 30.2% are poor who cannot keep up with the high prices of inputs, water and labor shortages, and consequently, low profits from rice production (Briones, 2016). To narrow the rice yield gap and lessen the need for imports, there has been continuous efforts for the development and dissemination of rice production technologies, crafting policy measures to ensure the timely delivery of inputs such as quality seeds, fertilizers, irrigation water and machinery, as well as strengthening the provision of extension services (Sebastian et.al. 2000).

The System of Rice Intensification (SRI) is a promising environment-friendly approach to increase rice production at an affordable cost for small-holder farmers (Noltze et.al. 2012). SRI principles include practices towards increasing the efficiency of the use of natural resources (Uphoff and Dazzo, 2016).

The SRI principles and practices as explained by Uphoff (1999) and Katambara, et al., (2013), range from seed sorting, sowing, transplanting younger seedlings, weeding, and water management. In the SRI approach, defective seeds are separated from good seeds using the floatation-sink method in salty solution. Nursery-like raising of seedlings ensures careful management, easy uprooting and transplanting. The time between uprooting and transplanting is maintained between 15 to 30 minutes while keeping the roots moist. Full tillering and optimal production occurs when transplanting before the fourth phyllochron of growth (8 to 15 days). Wide spacing allows convenient tillering ang regular mechanical weeding thereby preserving soil nutrients mainly for the rice plants while facilitating root aeration. Controlled water management or intermittent flooding promote proper aeration and adequate uptake of nutrients from various soil horizons. Compost materials provide rich nutrients and microorganisms that favor the growth of rice in addition to environmental benefits than industrial fertilizers. The prohibition of the use of herbicides promotes the sustainability of the ecosystem and the micro-organisms which benefit the physiological development of rice plants.

Perera, Simmons, and Ahamed (2007) further clarified that SRI is not just a set of fixed practices of technical specifications. There may always be a need for adjustments from the standard exact technical components depending on the socioeconomic and biophysical characteristics of the area. Regardless, realizing the full potential of the SRI effect yields similar benefits.

SRI modifies standard practices of how the rice plant, water, soil and nutrients are managed to enhance the functioning of the rice plant root systems as well as the biodiversity and activity of soil organisms around the plant roots (Uphoff and Dazzo, 2016). It was developed in Madagascar (Uphoff, 1999) and has been widely promoted in several countries (Takahashi, 2013; Palanisami et.al. 2013; Noltze et.al. 2013; Ly et.al. 2012; Kabir and Uphoff, 2007). Studies that evaluated SRI in these countries had mixed results. There are studies that show that with SRI, rice production and the farmers' income increased (Palanisami et.al. 2013; Kabir and Uphoff, 2007; Barrett et.al. 2004; Pandian, Sampathkumar, and Chandrasekaran 2014). On the other hand, some authors revealed that production costs were higher with SRI and the farmers' net income did not differ from the conventional way of rice production (Ly et.al. 2012). These mixed results imply that the effect of SRI on the rice yield and farmers' income is context-specific, and depends on the benchmark used.

Despite substantial evidence proving SRI's advantages in terms of less usage of inputs and being more environment-friendly, its acceptance to a greater number of farmers has been slow in some countries like Indonesia (Takahashi, 2013) and Timor Leste (Noltze et.al. 2013). Takahashi (2013) found that some of the factors underlying the low uptake of SRI in Indonesia were risk aversion, and access to irrigation and labor. Plot level data are important factors in the adoption of SRI in Timor Leste (Noltze et.al., 2013) . The farmer's age, education, farm size, years of farming experience, attendance in trainings, extension contacts, sources of information, perception, risk orientation, and innovativeness are significant factors affecting the adoption of SRI in Andhrapradesh, India (Nirmala, 2012) . In rural Bangladesh, a study revealed that difficulties in water management, early transplanting and using cono-weeder, as well as availability of skilled labor were significant predictors of SRI adoption. However, their results are contingent on and specific to the site being studied, hence, they are not generalizable. Hence, the need for further research on SRI in other countries with different contexts exists.

In 1998, a national NGO seminar co-sponsored by Cornell International Institute for Food (CIFAD) and supported by Justin Rabenandrasana, secretary of Association Tefy Saina of Madagascar was conducted to introduce the SRI to NGOs in the Philippines. In 1999, the Consortium for Development of Southern Mindanao Cooperatives (CDSMC) conducted its first trials in Mindanao. Between 1999 and 2002, the Broader Initiatives for Negros Development (BIND) based in Bacolod City conducted trials in Negros. In 2002, SRI Pilipinas, a non-profit group that actively promotes SRI in the Philippines, was established. They were the main promoters of the method among farmers and in the government. In 2007, they managed to do 50 one-day SRI trainings in 49 provinces. Out of these trainings emerged the national network of SRI Pilipinas. In 2009, they were able to hold a national trainers' conference, to evaluate the results of the earlier nationwide trainings. Since then, they have also received support from Oxfam Great Britain, Caritas Czech, and other humanitarian organizations, conducting one-day trainings on request, each training attended by 20-25 farmers on the average.

Other organizations also actively promoted SRI. For instance, the Rice Watch Action Network (RWAN) conducted SRI trainings as part of its 16-week climate resiliency field school (CrFS) in various municipalities (Verzola 2008). The Philippine Rural Reconstruction Movement hosted a series of national SRI workshops in March 2002 attended by 50-70 participants from Isabela to Mindanao. Four groups of farmers received trainings from the Climate Resiliency Field School organized by the RWAN in General Nakar, Quezon Province. Even though studies concerning the multiple benefits of SRI abound, little evidence exists on the farmer's adoption or continued use of SRI in the Philippines.

Given the above observations on SRI's context-specific application, an important question needs to be answered, "**What can influence farmers to adopt SRI more readily**?" Thus, this research **aimed** to find out the factors that affect farmers' willingness to adopt SRI. This study contributes to a greater understanding of the context within which farmers decide to adopt or not to adopt the technology. This will aid in crafting a well-targeted program of rice production interventions for particular sites.

Methodology

A combination of qualitative and quantitative approaches were used to comprehensively explain farmers' response to SRI in General Nakar, Quezon. For the quantitative phase of the study, sixty randomly selected farmer beneficiaries who trained under the Climate Resiliency Field School (CrFS) composed the sample. Field observations and individual interviews using semi-structured questionnaires were used to gather information on farmers' perceptions, knowledge, and attitudes toward SRI. Responses were coded for each question prior to analyses. Frequency distributions provided patterns describing the behavior of the dataset. Binary logistic regression was further used to test significance of relationships between the independent and dependent variables of the study. For the qualitative phase, farmer cases were selected from the four barangays which received trainings on SRI. These farmers were asked to discuss their experiences on SRI. Their responses were transcribed and interpreted to support the quantitative findings.

Factors influencing the willingness to adopt SRI

In analyzing farmers' willingness to adopt SRI, we assume that the farming household is utility maximizing. Whether a farmer is willing or not willing to adopt SRI, is based on the notion that expected utility of SRI is more than the expected utility obtained from conventional rice farming (Noltze et.al. 2013). Adoption of SRI by farmers have been well studied in the literature (Durga & Kumar, 2016; Karki, 2010; MAVIM, 2015; Bakele, Machiel, Gezahegn, & Syed, 2009; Nirmala, 2012; Takashi et.al. 2013; Noltze et.al. 2013). Extant literature reveal that socio-demographic factors such as age, gender, education, farm experience and landholding, psychographic factors such as farmer perception, innovativeness, and awareness and support network factors such as sources of information utilization, presence of proper and formal training, and input availability are all associated with the willingness to adopt SRI.

Age of the farmer was measured in years. A study of Durga & Kumar (2016) on younger farmers showed their greater inclination towards adopting SRI technology. Karki (2010) was also able to find similar results where age played a significant influence on the adoption of SRI. The gender of the farmer was coded 1 if male, and 0 if female. Although Karki (2010) was not able to find a significant relationship between gender and adoption of SRI, his findings showed that females were more likely to adopt SRI. To add, increased participation of women in SRI was noticeable in Maharashtra, further claiming that SRI is empowering women (MAVIM, 2015). Education is measured as the number of years of formal education of the farmer. It is said that more years of schooling result to faster adoption (Durga and Kumar, 2016) as educated farmers are more receptive to technology (Bakele et.al., 2009). Farming experience, or the number of years in farming, is also found to positively influence SRI adoption (Durga and Kumar, 2016). More experienced farmers are more knowledgeable and are able to evaluate better the SRI technology (Durga & Kumar, 2016). Farm size is measured in hectares. Farmers with larger landholding are able to test SRI on small plots of their land are more inclined of adopting SRI (Karki, 2010).

As for the psychographic factors, farmer perception, innovativeness, and awareness were taken into consideration. Perceptions on cost, suitability, feasibility, recognition in the community, independence of existing practices and ease of communication are measured as 1 if favorable, 0 if otherwise. It is said that if the farmer has a favorable perception about SRI, they are expected to show higher rates of adoption (Nirmala, 2012). The general innovativeness of the farmer was measured using the scale developed by Hurt, Joseph and Cook (1977). Innovativeness is found to positively influence SRI adoption (Nirmala, 2012). Farmers' knowledge or awareness of SRI is measured as 1 if pass, 0 if otherwise. Farmers who are more knowledgeable of the system tend to lessen the risk upon trying the technology and are able to implement its practices in their own farm (Nirmala, 2012).

Lastly, support network factors were studied by determining sources of information utilization, presence of proper and formal training, and input availability. The perception of the farmer about the SRI training was measured using a Likert scale. Training also positively influence SRI adoption as farmers become knowledgeable and motivated (Nirmala, 2012). The sources of information utilization was measured as the frequency of contact with information sources. Respondents who had more sources of information become more knowledgeable on SRI, become more confident on the technology and more likely to adopt (Nirmala, 2012). Input availability was measured on a Likert scale. When inputs like markers and weeders are available on time and at reasonable cost, respondents are more encouraged to adopt SRI (Nirmala, 2012).

Hypotheses of the Study

From the above discussion, what follows are the study's hypotheses. Each factor was hypothesized to have a significant influence on the willingness to adopt SRI.

H1: Sex (SEX) is negatively related with SRI adoption. Stated alternatively, women are more inclined to adopt SRI

H2: Age (AGE) is negatively related with SRI adoption. Stated alternatively, older farmers are less willing to adopt SRI

H3: Experience (EXP) is positively related with SRI adoption. Stated alternatively, those with more years of farming are more inclined to adopt SRI.

H4: Education (EDU) is positively related to SRI adoption. Stated alternatively, farmers with more formal education are more inclined to adopt SRI

H5: Farm Size (FS) is positively related with SRI adoption. Stated alternatively, farmers with bigger farm lots are more inclined to adopt SRI.

H6: Cost (COST) is positively related to SRI adoption. Stated alternatively, farmers with a favorable perception of cost are more inclined to adopt SRI.

H7: Situational Compatibility (SIT) is positively related with SRI adoption. Stated alternatively, farmers who have a favorable perception of SRI feasibility are likely to adopt it.

H8: Physical Compatibility (PCPT) is positively related with SRI adoption. Stated lternatively, farmers with a favorable perception of the farm's suitability for SRI are more inclined to adopt it.

H9: Social Compatibility (SCPT) is positively related with SRI adoption. Stated alternatively, farmers who have a favorable perception of SRI's recognition in the community are more inclined to adopt it.

H10: Independence (IND) is positively related with SRI adoption. Stated alternatively, farmers who have a favorable perception of SRI's independence from existing practices are more inclined to adopt it.

H11: Communication (COM) is positively related with SRI adoption. Stated alternatively, farmers who have a favorable perception of the ease of communicating SRI are more inclined to adopt it.

H12: Time Saved (TS) is positively related with SRI adoption. Stated alternatively, farmers who have a favorable perception of SRI's ability to save time are more inclined to adopt it.

H13: Innovativeness (INN) is positively related with SRI adoption. Stated alternatively, farmers who are more innovative are more inclined to adopt SRI.

H14: Knowledge (KNL) is positively related with SRI adoption. Stated alternatively, farmers who are knowledgeable about SRI are more likely to adopt it.

H15: Input Availability (IA) is positively related with SRI adoption. Stated alternatively, farmers who have a favorable perception on the availability of input and their ability to acquire them are more likely to adopt SRI.

H16: Training and Support (TRS) positively related with SRI adoption. Stated alternatively, farmers who have a favorable perception on the training and support provided by agricultural extension workers are more inclined to adopt SRI.

H17: Sources (SRC) of information on SRI are positively related to its adoption. Stated alternatively, farmers are more likely to adopt SRI when sources of information on it are available.

Binary logistic regression model specification

A binary logistic regression analysis was used to analyze the dataset consisting of 17 independent variables and a binary dependent variable. Farmers were categorized whether they were "willing" or "unwilling" to practice SRI, of which was characterized as the dependent variable (Y). Responses under "extremely willing" and "willing" were recorded as "willing" where Yi = 1 while responses under "undecided" and "unwilling" were recorded as "unwilling" where Yi = 0. Thus, the dependent variables in the following binary logistic model are unwillingness = 0 and willingness = 1 to practice SRI.

The objective of logistic regression is to predict the relationship between the dependent variable and the set of independent variables (Elliot & Tranmer, 2008). The logistic regression model links the range of real numbers to the range 0 – 1:

$$p_i = \frac{1}{(1 + e^{-z_i})}$$

Where p_i is the probability that the i^{th} case is willing to practice SRI and z_i is the value of the unobserved continuous variable for this i^{th} case, assuming that z_i to be linearly related to the independent variables. Hence:

$$z_i = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n$$

Where z_i is the i^{th} value of the dependent variable, x_i is i^{th} value of the independent variable and n is the number of the independent variable. The following model was constructed and used to analyze the willingness of the farmers to practice SRI in General Nakar.

$$Logit\ (\pi) = \alpha + \beta_1 AGE + \beta_2 SEX + \beta_3 EXP + \beta_4 EDU + \beta_5 FS + \beta_6 COST + \beta_7 SIT + \beta_8 PCPT + \beta_9 SCPT + \beta_{10} IND + \beta_{11} COM + \beta_{12} TS + \beta_{13} INN + \beta_{14} KNL + \beta_{15} IA + \beta_{16} TRS + \beta_{17} SRC$$

The description of the model variables is presented in Table 1. In relation to the discussion in the literature review, the expected relationship between the dependent and independent variables are also indicated.

Results and Discussion

To investigate the determinants of farmers' decision in adopting the System of Rice Intensification in General Nakar, Quezon, Philippines, the discussion is divided into two parts. The quantitative phase describes and analyzes the attitude of farmers toward SRI adoption in relation to the pre-identified determinants from past literature. The qualitative phase builds on the findings from the quantitative phase by presenting actual testimonies of farmers on SRIs as experienced in the different barangays.

Table 1

Description of Variables

Variable		Categorical Coding	Expected Relationship
Dependent variable			
WFS	Willingness to practice SRI	Unwilling = 0 Willing = 1	
Independent Variable			
SEX	Sex of respondent	Female = 0 Male = 1	-
AGE	Age of respondent	Ratio Scale	-
EXP	Number of years in rice paddy cultivation	Ratio Scale	+
EDU	Number of years of formal education	Ratio Scale	+
FS	Size of rice paddy in ha	Ratio Scale	+
COST	Perception on SRI's initial cost	Same or greater initial cost = 0 Less initial cost = 1	+
SIT	Perception on SRI's feasibility (Situational Compatibility)	Not feasible = 0 Feasible = 1	+
PCPT	Perception on SRI's farm suitability (Physical Compatibility)	Not suitable = 0 Suitable = 1	+
SCPT	Perception on SRI's recognition in the community (Social Compatibility)	Not recognized = 0 Well recognized = 1	+
IND	Perception on SRI's independence of existing practices	Not independent = 0 Independent = 1	+
COM	Perception on SRI's ease to communicate	Difficult to communicate = 0 Easy to communicate = 1	+
TS	Perception on SRI's ability to save time	Does not save time = 0 Saves time = 1	+

INN	General innovativeness of the respondent	Innovativeness score (Hurt, Joseph, and Cook, 1977): Innovators = >80 Early Adopters = 69 – 80 Early Majority = 57 – 68 Late Majority = 46 – 56 Laggards = <46	+
KNL	Knowledge/ awareness on SRI	Fail = 0 Pass = 1	+
IA	Perception on availability and ability to acquire inputs when shifting to SRI	Total score of ease of availability and market price Ease of availability: Readily available = 4 Available but needs to wait short (<1 month) time = 3 Available but needs to wait long (>1 month) time = 2 Not available = 1 Market price: Free = 4 Cheap = 3 Reasonable = 2 Expensive = 1	+
TRS	Perception on the training and support given by agricultural extension workers.	Total score using statements measured on Likert scale: Strongly agree = 5 Agree = 4 Neutral = 3 Disagree = 2 Strongly disagree = 1	+
SRC	Available sources of information on SRI	Total score using frequency of contact with information sources with weightages of 2 (often), 1 (sometimes) and 0 (never)	+

Quantitative Phase

The profile of farmer respondents conveyed the striking reality on the attributes of rice farming community in General Nakar in terms of age, gender, education, tenure and farm size. Table 2 summarizes the socio-demographic profile of the study respondents in the quantitative phase of the study. Age distribution supports evidences from past literature that imply aging farming population (majority are more than 50 years old). This is because the younger sector of society had become less interested to pursue agriculture and farming for a variety of reasons. Only the more mature population still chose farming and have retained their traditional ways. This has implications with regards to security of the nation's food basket.

On the other hand, nearly half (43.3 %) of the total respondents are females indicating a growing interest on innovative farming evident among female farmers. More than half (58.3 %) of the respondents reached high school and only very few reached college. This is possibly due to the lacking and inaccessibility to formal education institutions in the area as substantial portion of General Nakar still remains undeveloped (Roxas, 2015). Lastly, smallholding farmers dominated the sample with a significant percentage (83.3 %) of farmers cultivating only marginal sized rice lands (less than 1 hectare).

Table 2

Distribution of respondents according to socio-demographic profile

Socio-demographic Characteristics	Frequency	Percentage (%)
Age		
36-50	18	30
51-65	36	60
66-80	6	10
Gender		
Male	34	56.7
Female	26	43.3
Educational Level		
Elementary Level	17	28.3
Highschool Level	35	58.3
College Level	8	13.3
Number of years in farming		
10 – 27	20	33
28 – 45	35	58
46 – 63	5	8.3
Farm Size		
0.25 – 0.77 ha	50	83.3
0.78 – 1.3 ha	7	11.7
1.3 – 1.8 ha	3	5

To analyze the factors that influence farmers' willingness to adopt SRI, binary logistic regression was applied. The derived model obtained 95% predictive power with chi-square value of 54.1 and p-value < 0.01% signifying a good fit. Table 3 presents the estimates derived. The estimates signify the amount of increase or decrease, in the predicted log odds of willingness (1) that would be predicted by one unit change in the independent variable while holding all the others constant. Based on the findings, only four independent variables proved significant. Farm size, perceptions on initial cost, physical compatibility, and trainings and support were found to be significant predictors of an individual's willingness to practice SRI.

Table 3

Factors influencing the willingness to adopt SRI using binary logistic regression

Variables	*B*	*Wald*	*P – value*
Sex(1)	-.057	.001	.976
Age	-.152	.325	.569
Farming experience	.078	.111	.739
Educational level	.416	.754	.385
Farm size	-12.237	4.495	.034**
Initial Cost (1)	13.608	4.017	.045**
Situational Compatibility (1)	1.061	.492	.483
Physical Compatibility (1)	7.466	4.503	.034**
Social Compatibility (1)	2.577	1.104	.293
Independent of existing practices(1)	.543	.064	.800
Communicability (1)	.941	.146	.703
Time Saving (1)	.063	.001	.977
Innovativeness	.054	.171	.179
Knowledge (1)	2.509	.989	.320
Input Availability	.038	.004	.951
Training and Support	1.301	3.262	.071*
Source of Information Utilization	.257	.076	.783
Constant	45.731	2.000	.157

** and *, Significant at *P<0.05, P<0.10*, respectively. *B*, Parameter Estimate; *SE*, Standard Error.
-2log likelihood is 22.191, Chi square statistics is 54.191***, Overall Percentage Accuracy is 95 %.

Thus, the resulting binary logistic regression equation is expressed as follows:

$$\log\left(\frac{p}{1-p}\right) = 45.731 - 12.237FS + 13.608COST(1) + 7.466PCPT(1) + 0.063TS(1)$$

Farm Size. Results suggest that farmers who cultivate larger farm sizes are less willing to practice SRI, contrary to the results of Karki (2010). This is because farmers regard SRI as more complex than conventional farming. Due to its resource complexity and labor intensiveness, farmers find it more complicated to apply it in larger farms. Conversely, this suggests that SRI complements better with small farms with its more manageable complexity as compared to conventional farming.

Initial Cost. The significant (p<.05) and positive relationship of perception on initial cost on the willingness to adopt SRI implies that farmers, who perceive smaller initial cost involvement, are more willing to practice SRI. Thus, the importance of highlighting the benefits on savings when using SRI during awareness campaigns and trainings as in the study of (Arayaphong, 2012).

Physical Compatibility. Similarly, the perception on physical compatibility is found to have positive and significant ($p<.05$) relationship with the farmer's willingness to practice SRI. This conjectures that farmers who regard SRI to be compatible with existing cultivation practices in terms of current general farming situation, good recognition among farming community and compatibility with existing practices are more willing to practice SRI.

Training and support produced a positive and significant ($p<.10$) relationship with the farmer's willingness to practice SRI. Consistent with earlier studies such as that of Nirmala (2012), farmers who perceive that agricultural extension workers, facilitators and training materials as readily available, sufficient and comprehensible are more willing to practice SRI. Therefore, trainings conducted on farmers must exude competence, preparedness and comprehensibility to positively influence farmers' perception.

Interestingly, age, gender, education, and farming experience did not significantly influence the farmer's willingness to practice SRI. The findings that age has an insignificant effect on the farmer's willingness to practice SRI is contrary to the early findings that younger farmers are more likely to adopt SRI by Durga and Kumar (2016). Another contradicting results are the insignificant effects of education and farming experience according to the studies of Durga and Kumar (2016) and Bakele, Machiel, Gezahegn, & Syed (2009). This study, therefore, suggests that age, education and farming experience do not matter in terms of the farmer's willingness to practice SRI. Thus, this implies that SRI can be promoted to a wider audience of farmers, young or old, educated or not, and well-experienced or not. Meanwhile, the result on gender is consistent with previous studies (Karki, 2010 ; MAVIM, 2015). Lastly, variables concerning the perception of the farmer such as situational compatibility, social compatibility, independence of existing practices, communicability, ability to save time, input availability, and source of information utilization had no significant influence on the willingness to practice SRI.

Qualitative Phase

The cases conducted in barangays of Pamplona, Batangan, Maigang and Minahan, where SRI field demonstrations, trainings and lectures were conducted by the RWAN provided additional insights on SRI adoption.

Barangay Pamplona

The farmers of barangay Pamplona received training on SRI from the Climate Resiliency Field School in 2015. They were the first batch to receive training. Among these farmers, only two applied SRI in their farms. The main reason for shifting towards SRI was the absence of chemical use and less dependency on inorganic fertilizer. One farmer claimed that the introduction of the full set of SRI practices was easy since he already started the incremental use of organic fertilizer in 2007. By 2015, he was already practicing a full set of SRI practices. From an estimated average of 38 sacks from previous practices, he is now harvesting not less than 45 sacks in his 0.5 ha land which is a 20 % increase from the previous practice. Moreover, he believes that his harvest is of greater quality than before. Nevertheless, he also believes that he is yet to reach the full potential of the SRI effect and that his current yield still hasn't reached its maximum. However, the laborious nature of SRI and the golden apple snail infestation made him practice SRI only on half of his land. He claimed that the golden apple snail infestation was the major difficulty in practicing SRI in their area. Most of the farms in Pamplona were low lying and near flowing streams of water hence the great numbers golden apple snails were a problem.

Barangay Batangan

The farmers of barangay Batangan were second to receive training on SRI from the Climate Resiliency Field School. Out of the 35 farmers who were listed as recipients of the training, only one applied SRI in their farm. The president of the Abaca Panususuan Irrigation and Farmers Association of Batangan (APIFABA) was the only one to practice SRI for the reason of wanting to regain the soil's fertility. However, he was not able to fully practice SRI immediately. On his first trials of SRI, he observed that the plants seemed weak and needed more nutrients, hence he felt the need to use inorganic fertilizer. Still, the use of inorganic fertilizer has become less. From applying four bags of urea, it was reduced to one and a half bags. In the coming planting season, he plans to reduce it to half a bag until he is able to plant completely with organic inputs. Moreover, he does not follow SRI's principle of early transplanting. Since his farm is low lying, he transplants seedlings at 15 days old to be able to withstand cases of flooding.

Nevertheless, he follows the required number of seedlings per hill, spacing, land preparation, and water management guidelines of SRI. Although costs on fertilizers have been minimized, additional costs were incurred in terms of labor. A big chunk of his expenses go to land preparation. Also, preparations were done earlier as compared from his previous practices. Nevertheless, the partial practice of SRI was able to give increases on yield. From previous practices, he was harvesting 32 to 35 sacks in his 0.3 ha land. Upon gradually changing his practice, he was able to harvest between 38 to 45 sacks.

Despite the positive results, farmers of APIFABA were reluctant to try SRI. According to their president, it was not only the soil that needed adjustments with the use of organic, but also the farmers themselves. He claimed that farmers cannot immediately let go of their dependence on inorganic inputs, as these provided more ease in terms of application and availability. When asked why a farmer would not want to practice SRI, most of the undecided and unwilling farmers answered that SRI is too laborious and that there are too many processes involved. Moreover, the president claimed that SRI still remains as a new method since not many are practicing it. Farmers will only follow the practice once they have witness majority of the farmers benefiting from the practice.

Barangay Maigang

Barangay Maigang was third to receive trainings on SRI. The farmers graduated last May 2017 from the Climate Resiliency Field School. However, the president of the Maigang Farmers was the only one to practice SRI for the purpose of wanting to improve yield and quality of rice. He just recently started using SRI on his 0.5 ha land and is expecting to harvest on October. He is partially following the guidelines of SRI. Although he follows the guidelines on early transplanting, required number of seeds per hill, spacing, water management, and pest and disease control, he cannot completely shift from the use of inorganic to organic fertilizer. Hence, he plans to gradually increase the amount of organic fertilizer to be used for every cropping season.

As for the other farmers who received training, they were interested and willing to practice SRI. However, they claimed that they cannot immediately practice SRI since they were still waiting for a source of water. Most of the farmers source their water from nearby streams. One of the farmers stated that he plans to use SRI on the next cropping season but only on one third of his 1.5 ha land. Still, some remain reluctant in practicing SRI. As mentioned from the results and discussion of innovativeness, a farmer was hesitant to practice SRI since farming is done as a group with other farmers' paddy adjoining his. Hence, they use the same rice variety, and practices.

Barangay Minahan

Barangay Minahan was the last to receive trainings on SRI. The farmers of Magsasaka Farmer's Association (MFA) graduated from the Climate Resiliency Field School last August 2017. Similar to previous cases, only the president of MFA practiced SRI. However, he immediately applied the full set of SRI practice on his 0.75 ha farm. This decision was based on his desire to minimize cost. He used to spend Php4,850.00 on five sacks of urea and Php5,850.00 on five sacks of Triple 14. Currently, he is spending Php580.00 for 116 sacks of chicken manure and no other additional costs for making the bokashi. Labor expense was not much of an issue since he and his family does most of the work.

Farmers were also generally impressed of the results of organic and inorganic fertilizer comparison from their field trial. They applied vermicompost for the organic trial plots, and Triple 14 and Ammophos as the inorganic counterpart. The paddy with organic compost was able to withstand harsh winds while paddy with inorganic fertilizer fell to the ground. Farmers claimed that the paddy under organic SRI treatment have deeper root growth and sturdier stalks.

However, one farmer opined that farmers within their area, specifically those who were not part of their association, were reluctant to try new practices and would rather stick to their old practices. Despite being the largest barangay among the four, MFA has the least number of members. Out of the 17 total members, only 10 were active and able to participate in the training. Nevertheless, the farmers who graduated from the field school claimed that they were willing to practice SRI but only on a certain portion of their land.

Five expatriate managers from the chosen company participated in the present study. Eight managers currently assigned to the Philippines were originally identified, however two of them were on leave during the data collection period and one advised that he would only be able to commit to a response beyond the deadline as he was in the middle of a major change activity within his line of business. With these conditions, the decision was made to continue with just the five respondents. For ethical and privacy reasons, the names of the participants have been changed.

We acknowledge that the study has several limitations that may be used as opportunities for future research. On one matter involving respondent scope, while the findings in this study provide valuable insight into the practices and perspectives of an expatriate deployment and its benefits, only one organization was used as the source of data, thus researchers looking to generalize these findings will find it necessary to engage in further validation with other respondent-companies. Other researchers may also explore undertaking other research methodologies, such as a quantitative approach, in examining related variables further. This will provide a variety of data points to look at when evaluating not just the efficiency of expatriate deployment, but also the relationship between said deployments and talent development in the local workplace. Other variables that may affect talent management in multinational settings can also be further explored, in order to see whether other related factors would have an effect to successfully developing a company's local workforce.

Conclusion and Recommendations

This study investigated the contributing factors to the farmers' willingness to adopt SRI in General Nakar, Quezon Province, Philippines. Using a binary logistic model, results showed that farm size, initial cost, physical compatibility, and training and support, play significant influence on the farmer's willingness to practice SRI. However, this study has limitations. First, the area of investigation was restricted to one site of the SRI project in the Philippines, limiting the generalizability of the results. Second, since the study was based on farmer perception, some degree of bias may be possible in the data.

Based on the cases done on SRI in different barangays, farmers only follow specific SRI principles. Uphoff (2016) stressed that SRI may be treated as a system of approach or as a methodology rather than a technology. Therefore, farmers are not required to follow a fixed set of instructions. Instead, they are encouraged to adapt the SRI system to blend with their insights and experiences depending on their farm profile and circumstances. Farmers have the option to practice SRI with only some portions of their land.

Results revealed that small-holder farmers, those who were trained and received technical support on SRI from institutions, and those who have good perceptions of cost and physical compatibility of SRI to their farm, are more likely to be willing to adopt SRI. This highlights the importance of a well-targeted capacity building and technical support which would ensure that small-holder farmers are aware of the potential benefits of SRI.

It is thus recommended that regular meetings, workshops, and farmer-to-farmer exchange visits among adopters and non-adopters at different stages of vegetative growth be done in order to help build knowledge, experience, and confidence among farmers in using SRI. Moreover, future investigations in relation to the mechanization aspect of SRI practices in order to make the work less labor intensive. Researches on transplanting requirements, fertilizer, water and weed management, optimal spacing, and most suitable variety for different soil conditions and topography may be conducted to receive the optimum benefits of SRI for specific land areas. Finally, establishment of communal compost houses in each area can ease the sourcing of organic compost.

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