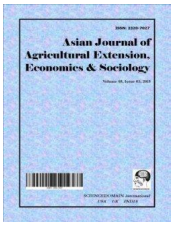

Asian Journal of Agricultural Extension, Economics & Sociology

31(3): 1-14, 2019; Article no.AJAEES.48332
ISSN: 2320-7027

Farmers Current Agriculture Practices on Paddy Cultivation and Relationship with Work Performance in Iada Batang Lupar, Sarawak, Malaysia

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Authors' contributions

This work was carried out in collaboration among all authors. Author SH contributed in the aspect of study designed and the protocol of the research and the second author NAY handle the aspect data cleaning and management of analysis. The third author MG managed the literature searches and wrote the first draft of the manuscript. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2019/v31i330134
Editor(s):
(1) Dr. Alexandre Bosco de Oliveira, Professor, Department of Plant Science, Federal University of Ceara, Ceara, Brazil.
Reviewers:
(1) Eduardo Mulima, Agricultural Research Institute of Mozambique, Mozambique.
(2) Dr. Virendra Singh, IFTM University, India.
Complete Peer review History: http://www.sdiarticle3.com/review-history/48332

Original Research Article

Received 13 January 2019
Accepted 01 April 2019
Published 11 April 2019

ABSTRACT

This study investigated the relationship between agricultural practices as independent factors influencing work performance among paddy farmers in IADA Batang Lupar, Sarawak, Malaysia. Correlational design was use for the study between January 2017 to January 2018. It employs simple randomization and recognized sample size determinant, Krejcie and Morgan Table to select respondents. Self-administered questionnaire use to collect information from respondents. Descriptive, correlation and regression analysis was used to analyzed the data obtained for the study. Demographic profile revealed that the age range of respondents is between 39-59 years and majority are almost old between the ages of 50-59 with low educational level. While, more than half are part-time farmers. Majority had an experience between 40-50 years with a production yield of only 2.0-2.9 tons/hectare. Result on the level of independent factors as plot preparation, planting or

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transplanting, water source, fertilizer, weeding indicates low level while, pest and disease management and harvesting recorded high. Also, the level of dependent variable work performance indicate high level. Result on the relationship between independent and dependent factor revealed that two independent variable pest and disease management and harvesting revealed a significant relationship at 0.01 and 0.05 level with the dependent variable. While, plot preparation, planting and transplanting, water source, fertilization and weeding are not significant. Regression analysis revealed that pest and disease management and harvesting were significant to work performance with the t-value of 0.000 while others independent variables are not significant with performance since the t-value was more than 0.05. The highest contributing factor (β = 0.463) obtained by harvesting practice. Hence, adjusted R square value is 0.330 this means that pest and disease management activities and harvesting explained 33.0% variance on work performance. It concludes that agricultural practices and harvesting recorded the highest contribution to work performance.

Keywords: Dependent variable; field activities; independent factors; relationship; level; production yield.

1. INTRODUCTION

Agriculture is one of the most important sectors that contribute to the economy of Malaysia. Indeed, in Malaysia some of the crops that contribute to the sector are majorly oil palm, cocoa, tea and of course paddy. Malaysia's Agriculture Ministry, as well as government and private agencies, really had a serious development in the agriculture. Thus, Malaysia as a developing country, find it very imperative to have a self-sufficient food supply so that the import commodities can be reduced year by year.

According to the [1], a number of establishments operating in the agriculture sector were 11,628 with an annual growth of 5.7 per cent. Gross output in 2015 was RM73, 853.6 million, an increase of 6.7 per cent per year compared to RM53, 452.1 million in 2010 while value added for this sector was RM41, 473.4 million. Agriculture sector provides job opportunities to 444,531 people, recorded an annual growth of 2.6 per cent within five years with salaries & wages paid amounting RM7, 904.3 million. This sector recorded the highest increase in the average monthly salaries of 7.3 per cent to RM1, 504 in 2015.

Nevertheless, apart from job opportunities and income generation by the sector, food security is very imperative component to look into in the sector. In Malaysia, food security policy is largely about ensuring the availability, accessibility and utilization of rice to the society. To this end, three policy objectives were set since the 1970s, which are to ensure high price to paddy farmers to produce rice, to achieve a certain level of self-sufficiency in rice and to ensure stable and high quality of rice to the consumers. To ensure these three objectives are met, the government has launched on a protectionist regime to ensure the sector is insulated from the black market particularly supply and price shocks. The instruments implemented include; price control (farm and retail), subsidies and income transfer, licensing and import monopoly. The interventions are deep and extensive in that the industry is highly distorted and begun to show some rigidities and inefficiencies [2].

Based on the available data from Food and Agriculture Organization of the United Nations (FAO) confirmed that the Asian population is growing at 1.8 per cent per year at present, and thus, the population may not be stabilize before the middle of the next century. Hence, a population projection made for the year 2025 shows an average increase of 51 percent and in certain cases up to 87 per cent over the base year 1995 [3].

In Malaysia alone, paddy is one of the most important commercial crop particularly for domestic consumption and it continues to be an important source of food and nutrition. Based on data from the Department of Statistics Malaysia, paddy plantation shows increasing production which is about 2,604 tons (2013) to 2,645 tons (2014). This shows that paddy plantation in Malaysia can really boost-up to the next level, even though it is the third most extensively cultivated crop after oil palm and rubber. Thus, self-sufficient and food security can be achieved and in long-term and can maintain a high quality of paddy. Based on this background, in order to boast production, rice is being cultivated in ten main (10) designated producing areas that are officially called Granary Areas of Malaysia.

These areas are MADA, KADA, IADA Barat Laut Selangor, IADA Penang, IADA Ketara, IADA Kerian Sungai Manik, IADA Seberang Perak, IADA Kemasin-Semerak, IADA Pekan and IADA Rompin. These granary areas are introduced by the National Agro-Food Policy as one way and strategies to increase and as well to maximize rice production. Hence, MADA is the largest among ten granary areas which is approximately 191, 856 hectares and it is known as paddy bowl of Malaysia [4]. It should however be noted that, the total area of all ten granary areas in Malaysia is 406, 048 hectares.

Nevertheless, the independent factors which could effectively influence farmers production on paddy was the technology practices. In Malaysia, the technology practices among farmers were based on rice production Manual adopted from Australia and MARDI is the starting engine for it during 2001. Department of agriculture is the one who is responsible to distribute it and provide to the growers. The manual is prepared according to the action that needs to be taken during the activity and day number. The type and amount of material that are going to be used in each activity are also provided for the farmer as their references. Hence, Rice check is thus a recommended technology package with a complete standard for compliance. It therefore serve as a guide to farmers to achieve 10 mt/ha. Indeed, the key check or practices that must be followed by farmers to gain 10 mt/ha are soil analysis, land preparation, roughing weedy rice, irrigation, ploughing, planting, fertilizing, water management, weed, pest and disease control and harvesting. Rice farmers must therefore, follow the key to manage rice plant as targeted. Hence, every single step must be fulfilled by growers to achieve maximum production and high yield. More so, Field monitoring in terms of growth, water management, fertilization, weed, pest and disease control and harvesting is important to identify the problem. The records are essential to guide farmers for subsequent seasons so that the same problem will not occur [5].

However, despite the good effort of Malaysia government towards paddy production, the outcome of the production is still facing challenges in terms of availability in food supply especially rice as the major staple food in Malaysia. Hence, the national rice self-sufficiency level is at 72%. To make sure that this demand is fulfilled, Malaysia still need about 28% imported rice so as to bridge the gap. In 2015, Malaysia imported more than 800 tons of rice to meet local demand due to some obvious factors such as poor farm practices and management, poor agriculture practices and management were major constraints to paddy cultivation over the years (Department of statistics, 2018). Indeed, Paddy production was dominated by conventional method especially at new open granary area, particularly in Iada Batang Lupar, Sarawak**,** which serve as the primary study area, in terms of agricultural practices such as plot preparation, planting or transplanting, water source, fertilizer, weeding, pest and disease management and harvesting [6].

These and others practices aforementioned contribute to poor work performance among farmers, resulting to low production of rice in terms of self-sufficiency in the country. Thus, the government of Malaysia had to import rice from other countries to reach a sufficient level of rice consumption [7].

1.1 Objectives of the Study

This research is aimed at determining current agriculture agricultural practices and relationship with work performance among paddy farmers in IADA Batang Lupar. Specifically:

1. To determine the current agricultural practices among paddy farmers in IADA Batang Lupar, Sarawak.
2. To determine the relationship between independent factors and work performance of paddy farmers in IADA Batang Lupar, Sarawak
3. To determine the most contributing independent factors towards work performance of paddy farmers IADA Batang Lupar, Sarawak

1.2 Significance for the Study

The study is significant to farmers, stakeholders, millers, policy makers as it has implication on both theoretical, practical and policy wise. The study would give an insight into the current agricultural practices among paddy farmers and determine the relationship of those agricultural practice with the work performance of paddy growers and as well determine the most contributing independent factors that influence paddy farmers work performance in IADA Batang Lupar, Sarawak. Hence, the information obtained would have both theoretical, practical and policy implication for future improvement among

farmers and policy makers such as the stakeholders of the granaries, government of Malaysia and research institutes to further try to investigate the findings and recommendations to make improved all relevant areas need to be boasted.

2. MATERIALS AND METHODS

This study was carried out at the Integrated Agriculture Development Area (IADA) Batang Lupar, Sarawak Malaysia, which was one among the four new granary areas, in which studies of this nature was not conducted and therefore no data is available on paddy farmers work performance in relation to farmers current agriculture practices. Hence, Paddy plantation at this area has the potential and possibility to maximize the production of rice in Malaysia.

The data were collected using pretested validated questionnaire designed by researcher. Hence, the score for the Cronbach Alpha reveals that all variables scored more 0.5 and that means all the construct are acceptable. The questionnaire was however, administered to the registered farmers under the Integrated Agriculture Development Area (IADA) Batang Lupar. Simple random sampling and the approved ready-made table [9]. This was used to select 143 respondents for the study. Thus, 143 serve as the sample population for the study. The data was analyzed using Statistical Package for Social Science (SPSS) version 21 and descriptive statistics, correlation and regression model was used for the analysis. Hence, regression equation model could be portrayed as seen below:

Regression equation: $Y = b_0 + b_1X_1 + b_2X_2 + e$

Where,

Y-Dependent variable
b_0- B value for constant
b_1X_1 and b_2X_2- Independent variable
b_0= B value for constant
b_1X_1=B value for pest and disease management
b_2X_2 = B value for harvesting
e = error

$Y= 2.063 + (0.336)\ X_1 + (0.305)\ X_2 + e$

3. RESULTS AND DISCUSSION

This section captures the results obtained from the analysis based on the objectives of the study to established fact. Hence, the result were hereby shown below coupled with discussion.

3.1 Demographic Profile of Respondents

This subsection capture the Demographic profile of farmers which include among others Age, Educational level, Size of Land, Land ownership, work commitment, paddy variety used by farmers, Average Yield and Experience in Paddy production.

3.1.1 Age

The age of a farmer plays a vital role on practices and agricultural decisions [10]. The result of respondents based on their age range are shown on Table 1 the data revealed that 30 respondents are between the ages are below 49 years representing 21%. While, 54 respondents fall between the age range of 50-59 years old which constitute the highest percentage of 37.8%. Respondent between the ages of 60-69 years were 39 representing 27.3% the least age that contributed is between the ages less than 39 years old which recorded only 7.0% of the total respondents and others that did not indicate their ages constitute 5 respondents representing 3.5% among farmers.

3.1.2 Educational level

Table 1 presents results of the educational level of the respondents. Highest numbers of respondents were 56 farmers from the total 143 representing 39.2% of respondents who have attained primary educational level. While, respondents that completed secondary education constitute 30.1% of the respondents. Those that obtained Certificates and Diploma were 3.5% and 0.7% respectively. Whereas, 38 respondents from the total respondents recording 26.6% did not go to school. According to Danso-Abbeam et al. [11] who suggested that, educational attainments plays a vital role in enhancing production as in this case paddy production.

3.1.3 Land size

The land area for paddy production in IADA Batang Lupar, Sarawak by the respondents are shown in Table 1 the respondents that have the land below 1.9 hectares are 54.6% which has the highest percentage in this study and which could be categorize as small-scale farmers, which is equivalent to about 78 paddy farmers from the total 143. Then followed by the land area

between below 2.9 hectares about 11.2% which are 16 categorize as medium-scale farmers. The respondents that are categorize as large-scale farmers with frequency of 18 paddy farmers has the land area of more than 4 hectares which is 12.6% only. Hence, about 21.7% have not indicated the size of their land with a frequency of 31 among paddy farmers in the study area.

3.1.4 Work commitment

Type of work commitment by paddy farmers at IADA Bantang Lupar, Sarawak is shown on the in Table 1 below. The data indicates shows that, 67.8% of the total respondents were dedicated part-time paddy farmers which correspond to with the frequency of 97 respondents from the total 143 while the other 32.2% of the respondents which correspond to 46 respondents had fulltime commitment towards paddy cultivation activity at IADA Batang Lupar, Sarawak.

3.1.5 Average yield

Table 1 shows the result of average yield obtained by the farmers. It clearly shows that highest numbers of respondents were 52 people, who recorded 2.0-2.9 tons per hectares, constituting about 36.4% of total respondents. Followed by 34.3% of the respondents who recorded an average yield of 1-1.9 tons per hectares and 11.9% recorded 3-3.9 tons per hectare, and the lowest is 5.6% from total respondents who produces more than 4 tons per hectare. These findings indicate that, the higher the land size of farmers, the higher the productivity and as well as use of inputs, other agricultural practices and subsequent increase in average yield among farmers.

3.1.6 Experience in paddy production

Table 1 below shows respondents years of experience in paddy farming at IADA Batang Lupar, Sarawak. Based on the data on the table, 22 respondents representing 15.4 % of total respondents were involved in paddy planting for about 41-50 years, which recorded the highest percentage of respondent involved in the study followed by 16 respondents representing 11.2% had less than 10 years' experience. While, the lowest percentage were 9 respondents representing 6.3% had an experience of 11-20 years. While, 41.3% representing 59 respondents have not stated their years of experience [12] suggested that experience determines the success of the farmers in both practice and subsequent increase in the level of production. Hence, farmers with more years of experience are more productive than farmers with no experience in the production practice and so experience is the best teacher.

3.2 Level of Current Agriculture Practices among Farmers

The paddy cultivation comprises of important agricultural practices. The practice identified among which are plot preparation, planting and transplanting, water source, fertilization, weeding, pest and disease management and harvesting. All these agricultural practices stretch influences on paddy cultivation. Thus, it is important to determine the relationship for further evaluation.

3.2.1 Plot preparation

From Table 2 the results, indicates that, 72% from the total respondents had low level of land preparation, which is equivalent to 103 respondents from a total of 143. The results further, showed that 28% of respondents were categorized as those who recorded high level of plot preparation with a frequency of 28 respondents. Hence, the results portray that plot preparation level of paddy farmers at IADA Batang Lupar, Sarawak, recorded a mean of 2.5 which is categorized as low level. That means that majority of the paddy farmers in IADA Batang Lupar, Sarawak has a low level of plot preparation and invariably serve as constraint to production and higher output during harvest. The findings further show that majority of respondents did not know the important of plot preparation activity in paddy cultivation and this affect the whole the production process of paddy right from the beginning of the season.

3.2.2 Planting and transplanting

From Table 3 results on the level of planting and transplanting activity by paddy farmers at IADA Batang Lupar, Sarawak were presented. The planting and transplanting activity shows the mean score of 2.8 which is categorized as low level. That means, majority of the paddy farmers at IADA Batang Lupar, Sarawak are not aware of the importance and process of planting and transplanting activity in paddy cultivation, recording 58% and are categorized as low level which constitute a frequency of 85 respondents from the total of 143 respondents. While, the

other category recording 42% had high level, which constitute the frequency of 42 respondents out the total number of 143 respondents. It should be noted that planting of paddy involves soaking of paddy seed into water and after which the seed are sown into special nursery beds before transplanting. While, transplanting on the other hand has to do with a process of planting paddy seedling after when they might have been raised in nursery beds. These processes need good management practices for better production yield.

Table 1. Demographic profile of farmers (n=143)

Variables	Frequency	Percentage
Age		
≤39	10	7.0
40-49	20	14.0
50-59	54	37.8
60-69	39	27.3
≥70	15	10.5
Not stated	5	3.5
Educational level		
Primary	56	39.2
Secondary	43	30.1
Certificate	5	3.5
Diploma	1	0.7
Others	38	26.6
Land size (Hectare)		
≤ 0.9	42	29.4
1-1.9	36	25.2
2-2.9	16	11.2
3-3.9	10	7.0
≥ 4.0	8	5.6
Not stated	31	21.7
Work commitment		
Part time	97	67.8
Full time	46	32.2
Average yield (tons/hectare)		
≤0.9	12	8.4
1-1.9	49	34.3
2-2.9	52	36.4
3-3.9	17	11.9
≥4	8	5.6
Not stated	5	3.5
Experience in paddy production (yrs)		
≤10	16	11.2
11-20	9	6.3
21-30	12	8.4
31-40	14	9.8
41-50	22	15.4
≥51	11	7.7
Not stated	59	41.3
Total	143	100.0

Source: Field Survey 2018

Table 2. Plot preparation level

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	103	72	2.5	0.69
High (2.6-4.0)	40	28		

Source: Field Survey 2018

Table 3. Planting/transplanting level

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	83	58	2.5	0.51
High (2.6-4.0)	60	42		

Source: Field Survey 2018

3.2.3 Water source

Table 4 shows the level of water source used by paddy farmers at IADA Batang Lupar, Sarawak. Water is very essential resources for paddy cultivation. In Malaysia, the major source of water for paddy cultivation is river and rainfall, but sometimes there are dry month sometimes (May- August). However, the river water is mostly used by farmers in granary areas. Based on the data below, a mean score of 2.5 was recorded for water source section, which is considered as low level. From the results, 67.1% which represents 96 respondents recorded low level, from the total 143 respondents. That means majority_of the paddy farmers at IADA Batang Lupar, Sarawak recorded weak attention and perception on source of water for their paddy cultivation. While, the other category representing 32.9% with a frequency of is 47 respondents out of 143 had high level perception on water source. Hence, water as a resource determine the production yield of paddy for subsequent harvest of the produce.

3.2.4 Fertilization

Table 5 presents fertilization activity level by paddy farmers at IADA Batang Lupar, Sarawak. From the data, the mean value of 2.4 recorded and categorize at low level. It conveys that most of the paddy farmers at IADA Batang Lupar Sarawak had no concern about fertilization activity in their paddy plot and as well paddy cultivation. A total of 118 respondents out of the total of 143 respondents had low level which represents 82.5% of respondents. While, only 25 respondents from the total of 143 recorded high level, which constitute only 17.5%. These results indicate that farmers had low level of fertilizer usage in the cultivation of paddy in the study area. Hence, fertilization of paddy by farmers involves application of either organic or inorganic synthetic materials to soils or paddy plants, which serve as nutrients essential to the growth of the paddy plants and subsequent production yield.

3.2.5 Weeding

Table 6 shows the weeding level of paddy farmers at IADA Batang Lupar, Sarawak. Based on the result, a total mean of 2.5 is categorized as low level. That means majority of the paddy farmers in IADA Batang Lupar, Sarawak had a low perception level in the weeding activity for their paddy cultivation. It thus indicates that majority of respondents did not know the importance of weeding in paddy cultivation. From the data, 61.5% out of the total respondents had low level which constitute 88 respondents from the total of 143. While, 38.5% of respondents were categorized as having high level in weeding activity which represent 55 respondents out of 143 total population.

Table 4. Water source level

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	96	67.1	2.5	0.75
High (2.6-4.0)	47	32.9		

Source: Field Survey 2018

Table 5. Fertilization level (n=143)

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	118	82.5	2.4	0.67
High (2.6-4.0)	25	17.5		

Source: Field Survey 2018

Table 6. Weeding level (n=143)

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	88	61.5	2.5	0.58
High (2.6-4.0)	55	38.5		

Source: Field Survey 2018

3.2.6 Pest and disease management

From Table 7 Pest and disease management is an act of crop protection particularly paddy, which often deal with pesticides, fungicides and nematicides, aimed at good management practice for better and higher production yield. From the results, respondents level of pest and disease management activity in paddy farming at IADA Batang Lupar, Sarawak was presented and the results revealed that the mean score of 3.3 was recorded and thus categorize as high level by respondents in terms of pest and disease management activities in the study area That, means majority of the paddy farmers at IADA Batang Lupar, Sarawak are aware of the importance of pest and disease management activity in paddy cultivation. From the total respondent, 76.2% are on high level which represent 109 respondents from 143 respondents. While, 23.8% were on low level which represent 34 respondents out of the total of 143. The result has confirmed that paddy farmers were very knowledgeable about pest management practice.

3.2.7 Harvesting

Table 8 shows the level of harvesting activity by paddy farmers at IADA Batang Lupar, Sarawak. Harvesting activities in paddy production is a process of collecting the mature paddy crop from the field which involves cutting, stacking, handling, threshing, cleaning and hauling. Hence, such activities could be done individually or through the use of combine harvester simultaneously. The finding on harvesting revealed a mean score of 3.3 for harvesting activity and categorize as high level. This shows that, from the total respondent, 81.8% which constitute 117 respondents were at high level. While, 18.2% categorize as low-level representing recording 26 respondents from the total 143 respondents. That means only minority of the paddy farmers at IADA Batang Lupar, Sarawak had weak attention and perception towards harvesting activity. This conclude that majority of the paddy farmers at IADA Batang Lupar, Sarawak have strong attention and perception towards harvesting activity.

3.2.8 Work performance

Table 9 capture the work performance level by paddy farmers at IADA Batang Lupar, Sarawak. From the data, a mean score of 3.5 which was categorized at high level was recorded. It conveys that most of the paddy farmers at IADA Batang Lupar Sarawak had high perception about work performance in their paddy plot with a frequency of 131 respondents out of a total of 143 and categorize at high level which constitute about 91.6%. While, only 12 respondents from the total of 143 were at the low level which constitute only 8.4% of the respondents.

Table 7. Pest and disease management level (n=143)

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	34	23.8	3.3	0.47
High (2.6-4.0)	109	76.2		

Source: Field Survey 2018

Table 8. Harvesting level (n=143)

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	26	18.2	3.3	0.56
High (2.6-4.0)	117	81.8		

Source: Field Survey 2018

Table 9. Work performance level (n=143)

Level	Frequency	Percent (%)	Mean	SD
Low (1.0-2.5)	12	8.4	3.5	0.37
High (2.6-4.0)	131	91.6		

Source: Field Survey 2018

3.2.9 Summary on the level of independent and dependent variables with mean and standard deviation

Table 10 shows mean, standard deviation and level of independent variables and dependent variable. The independent variables were plot preparation, planting and transplanting, water source, fertilization, weeding, pest and disease management and harvesting while the dependent variable is work performance. All the independent variables are components of agriculture practices in paddy cultivation activity. The level of variables was measured using the mean while standard deviation was used to measure the confidence statistical conclusion of the level. In other words, a standard deviation close to 0 indicates that the data points tend to be very close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values.

From the summary, the level of plot preparation, planting and transplanting, water source, fertilization and weeding among farmers at IADA Batang Lupar, Sarawak recorded low. While, Fertilization mean ranked the lowest among other mean of independent variables with 2.4 and a standard deviation 0.66. The level of pest and disease management and harvesting among farmers in IADA Batang Lupar, Sarawak was high. Hence, pest and disease management and harvesting mean were ranked the highest with mean value of 3.3 and standard deviation 0.47 and 0.56 respectively.

3.2.10 Relationship between agricultural practices and work performance among farmers IADA Batang Lupar, Sarawak

Result of the correlation analysis to determine the relationship between all the seven independent factors which are component of paddy agricultural practices such as plot preparation, planting and transplanting, water source, fertilization, weeding, pest and disease management and harvesting with work performance among farmers is shown in Table 11 From the results, two independent variable pest and disease management and harvesting revealed a significant relationship at 0.01 and 0.05 level with the dependent variable. The other independent variable which are plot preparation, planting and transplanting, water source, fertilization and weeding had no any significant to the dependent variable as shown on the outcome.

Furthermore, the result displayed on (Table 12,) which capture agricultural practices such as plot preparation, planting and transplanting, water source, fertilization and weeding which serve as independent factors revealed that, there is no correlation towards the farmers work performance in IADA Batang Lupar, Sarawak. While. pest and disease management indicate positive low correlation towards the work performance of paddy farmers in IADA Batang Lupar, Sarawak. The results also indicate a weak positive relationship between these two variables. In addition, harvesting also shows a low positive correlation towards work performance in IADA Batang Lupar, Sarawak; which indicates a weak positive relationship between these two variables.

However, the findings of the research study thus justified that only the independent variables of pest and disease management and harvesting had strong relationship to work performance at IADA Batang Lupar, Sarawak. The other independent variables such as plot preparation, planting and transplanting, water source, fertilization and weeding were not significant and had no relationship with work performance among paddy farmers at IADA Batang Lupar, Sarawak. Indeed, this kind of scenario happened because the location where the respondents live and work their paddy plot is quite rural and they were not exposed to the area that is outside of their living environment. Also, the finding of the correlation further reveals that, the paddy farmers at IADA Batang Lupar, Sarawak do not have appropriate knowledge about agriculture practices and agriculture cultivation especially in paddy plantation. That means paddy farmers only apply knowledge that they knew and knowledge that they gain from their ancestry. Also, this indicates that paddy farmers have no awareness of the modern implement on the real appropriate practices, skills and knowledges that could be used in paddy plantation and thus utilize the existing or traditional knowledge. In addition, the paddy farmer's perception on their paddy yield and work performance is more than enough for their subsistence and survival.

Table 10. Level of independent variables and dependent variable

Independent variables	Mean	SD	Level
Plot preparation	2.5	0.69	Low
Planting or transplanting	2.5	0.51	Low
Water source	2.5	0.75	Low
Fertilization	2.4	0.66	Low
Weeding	2.5	0.58	Low
Pest and disease management	3.3	0.47	High
Harvesting	3.3	0.56	High
Dependent variable			
Work Performance	3.5	0.37	High

Source: Field Survey 2018

Table 11. Relationship between independent variables towards dependent variable using pearson correlation

	Plot preparation	Planting	Water source	Fertilization	Weeding	Pest and disease	Harvesting	Work performance
Plot preparation	1	.3225**	.620**	.627**	.324**	.169*	.104	-.079
Planting		1	.145	.188**	.295**	.348**	.069	.040
Water source			1	.592**	.219**	.165*	.279**	-.006
Fertilization				1	.416**	.299**	.140	-.005
Weeding					1	.632**	.309**	.161
Pest and disease						1	.299**	.394**
Harvesting							1	.486**
Work performance								1

***. Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed)*

Table 12. Correlation of paddy agriculture practices towards work performance

Practices	Work performance	Correlation
Plot preparation	**-.079**	No significant relation
Planting and transplanting	**.040**	No significant relation
Water source	**-.006**	No significant relation
Fertilization	**-.005**	No significant relation
Weeding	**.161**	No significant relation
Pest and disease management	**.394****	Low positive relation
Harvesting	**.486****	Low positive relation

Source: Field Survey 2018

Table 13. Estimated coefficient work performace model

Model	Unstandardized coefficients		Standardized coefficients		Sig
	B	Stnd. Error	Beta	T	
(Constant)	2.063	.228		9.050	.000
Plot preparation	-.017	.054	-.033	-.323	.747
Planting	-.037	.056	-.051	-.665	.507
Water source	-.064	.048	-.129	-1.325	.187
Fertilization	-.006	.055	-.011	-.109	.913
Weeding	-.122	.061	-.192	-1.996	.048
Pest and disease	**.336**	**.074**	**.424**	**4.551**	**.000**
Harvesting	**.305**	**.050**	**.463**	**6.070**	**.000**

Dependent variable: Work performance; Source: Field Survey 2018

Table 14. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.602[a]	.363	.330	.30098

3.2.11 Contribution of independent factors towards work performance among farmers

Table 13 shows the estimated coefficient for the respondent work performance model. The pest and disease management and harvesting are highly significant with work performance with the t-value of 0.000 meanwhile the others independent variables were not significant to work performance since the t-value is more than and equal to 0.05. The highest contributing independent factor which was confirmed to be harvesting practice recorded a beta value of (β = 0.463. Thus, harvesting practices had the highest contribution to work performance by paddy farmers at IADA Batang Lupar, Sarawak.

Table 14 above shows a model summary that contains R, R Square and Adjusted R Square. R-square is modified into Adjusted R Square for the number of predictors in the model. The highest Beta value from the information in Table 14 was harvesting activity which is had a (β= 0.463), followed by pest and disease management activity with Beta value of 0.424. The adjusted R square value is 0.330 which means pest and disease management activities explained 33.0% variance of work performance while the other 67.0% variance is explained by other factors. Hence, in IADA Batang Lupar, Sarawak, the pest and disease management activities and harvesting activities are the most important activities related to paddy farmers work performance.

3.3 Discussion of Results

In an attempt to discuss the results presented above In this study, effort is being made to discuss the overall result of the study presented above. This study used 143 paddy farmers as the sample population, which serve as respondents to answer the questionnaires. From the findings, the highest age range that contribute to answer the questionnaires are between the ages of 50 to 59 years old. while, the least age range of respondents that contribute in this study was the ages ranging from less than 39 years old. The age of a farmer plays a significant role on crop farming decisions, farming management practices [13]

Thus, data indicates that only a few young generations take part in paddy production at IADA Batang Lupar, Sarawak. Hence, the potential reasons are such as lack of interest, finance limitation and maybe also they prefer to migrate to the city. We can also sum that, only older generation wanted to work on their paddy plot at IADA Batang Lupar, Sarawak.

The data on education level of the respondents at IADA Batang Lupar, Sarawak, revealed that most of them ended their educational career with only primary education which constitute 56 respondents out of a total of 143 and then followed by the respondents who end their educational career at secondary school constituting about 43 respondents out of the total 143. The data on the respondents' farm size indicates that, most of the respondents at IADA Batang Lupar, Sarawak own land area less than and equal to 0.9 hectares. The data on respondent's work commitment revealed that, the number of respondents working based on part-time and full time. From the result obtained, slightly more than half of the total respondents dedicated their paddy cultivation as part-time

work while the other works on full time basis. This is a good information because full-time farmers could attend any meeting with the extension agents in the area anytime. They would help the farmers not to miss the latest information regarding paddy cultivation technology during each visit as their commitment is only for paddy farming. It is concluded that full-time farmers were able to pay more attention to their paddy cultivation.

Results on the average yield by respondents revealed that yield of the respondents at IADA Batang Lupar, Sarawak are between 2.0-2.9 tons per hectare which was considered as low. It was represented by 52 respondents from the total of 143 which is equivalent to 36.4% by respondents. The least average is yield less than 4 tons per hectare that is equivalent to 8 respondents from the total of 143 and which represent 5.6%.

According to [14] who suggested that, the higher the level of farming experience, the more the tendency of the farmer obtained more productivity and subsequent higher yield and vice-versa. The data on respondents' experience in paddy production revealed that, farmers acquired certain experiences that enable them to do and perform well in this sector. From the data analysis, 15.4% of farmers had experiences between 41-50 years in paddy production. The least category of farmers had experience of 11-20 years representing 6.3 % of respondents at IADA Batang Lupar, Sarawak is between of experience which correspond to 6.3% from the total of 143. While, 41.3% representing 59 respondents have not stated their years of experience in the questionnaire.

Furthermore, results on level of current agricultural practices among the seven independent factors such as plot preparation, planting and transplanting, water source, fertilization, weeding recorded low level based on their mean scores while, pest and disease management and harvesting activities recorded high level. While, results on the level of dependent variable work performance revealed high level among farmers in IADA Batang Lupar, Sarawak.

Results on the relationship between all seven components of agriculture practices as plot preparation, planting and transplanting, water source, fertilization, weeding, pest and disease management and harvesting towards the work performance was identified using correlation analysis, which revealed that only two independent factors as pest and disease management and harvesting agriculture practices that were significant to the work performance of respondents at IADA Batang Lupar, Sarawak. Hence, harvesting activity shows the strongest correlation towards work performance at IADA Batang Lupar, Sarawak these results concluded that harvesting activity is very important to farmers work performance.

Furthermore, results of the regression analysis to identify the strongest independent variables that contribute to work performance shows that pest and disease management and harvesting were highly significant to work performance with the t-value of 0.000 while others independent variables are not significant with performance since the t-value was more than 0.05. The highest (β = 0.463) obtained by harvesting practice. Thus, agricultural practices of harvesting recorded the highest contribution to work performance by paddy farmers at IADA Batang Lupar, Sarawak. The adjusted R square value is 0.330 this means that pest and disease management activities and harvesting explained 33.0% variance on work performance.

4. CONCLUSION, IMPLICATIONS RECOMMENDATIONS

The study concludes that, in IADA Batang Lupar, Sarawak, pest and disease management activities and harvesting activities were recorded as the most important activities related to paddy farmers work performance.

The policy implications of this study are that independent factors as pest and disease management and harvesting, agriculture practices were significant to the work performance of respondents at IADA Batang Lupar, Sarawak indicates, and findings also shows that they are the most contributing factors on work performance. Hence, results on regression analysis equally shows that pest and disease management and harvesting were highly significant to work performance and others independent variables are not significant with performance such as plot preparation, planting and transplanting, water source, fertilization, weeding and therefore policy makers are to arrange for farm trials and demonstration plots to strengthen knowledge and skills of the paddy farmers. Water sources should also be boasted in the study area. Thus, based on the findings, the study recommended that paddy farmers need

to gain much knowledge on how to implement appropriate agricultural practices on paddy cultivation activities. Knowledge could also be enhanced by attending relevant courses or seminars conducted by the extension agent by the agency itself (IADA Batang Lupar) to improve their skills and knowledge in paddy cultivation.

The study equally recommended that, paddy farmers should create good relationship with the experienced farmers as well as the extension agents, by having good relationship so that they can always share their knowledge and opinion based on their experience without being shy. The study also recommended that, the young generation should be involved in the actively on paddy plantation. This was unveiling from the result as most of the paddy farmers were old generation and not youth anymore. Therefore, this indicates that younger generations are not interested to work in paddy plantation. Hence, with the improvement of new, modern and advanced technologies, youth were expected to participate actively. Hence, Youth are very crucial and important to the nation to improve and enhance the paddy plantation in Malaysia.

This study also recommended that, a good implementation of technology will surely increase the yield of paddy per ton to help increase the self-sufficiency level of rice in the country and boost the economy through rice production. It is therefore, important to expose the youth generations on the benefits of becoming farmers and make them aware that farming is not only for older people or farming does not require higher capital for one to participate with the assistance of the government of the day.

ACKNOWLEDGEMENT

The authors appreciate the effort, Department of Agriculture Technology, faculty of agriculture, Universiti Putra, Malaysia for enabling environment for this research and all the 143 paddy farmers that, participated in the research in Iada Batang Lupar, Sarawak, Malaysia

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sdiarticle3.com/review-history/48332