



## Pesticides Risk Safety Awareness, Practices and Knowledge among Paddy Field Farmers.

S.Shuib<sup>1</sup>, A.A Suhaimi<sup>1</sup>, N.Abdull<sup>1</sup>, M.Sholehudin<sup>2</sup>, Salsabila<sup>2</sup>

<sup>1</sup>Faculty of Industrial Science and Technology, Universiti Malaysia Pahang, 26600 Pahang, Malaysia.

<sup>2</sup> Department of Environmental Health, Faculty of Public Health, Universitas Airlangga, Surabaya, East Java, Indonesia

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### KEYWORDS

Paddy Field farmers, Knowledge, Pesticide Risk

### ABSTRACT:

Knowledge, practices and awareness of the risks of pesticides among paddy field farmers may reduce the negative impact on health and the environment. The study was conducted to measure knowledge, awareness and identify practices used by paddy field farmers when handling pesticides. Data was collected through a face-to-face cross-sectional survey of 64 respondents among paddy field farmers. The set of questions is divided into 2 questions consisting of demographics and knowledge, practices and awareness. The frequency, mean, standard deviation and percentage determined by the Statistical Package for the Social Sciences (SPSS) and used Bloom's cut point method to determine the level of knowledge, awareness and practices used by paddy field farmers when handling pesticides. The level of knowledge of pesticides farmers about the risk of pesticides to health and the environment is high, which is 92.19%. The mean of practices handling pesticides that can be used by paddy farmers when handling pesticides is also high, which is (m= 4.80). The mean for paddy field farmers' awareness of the risk of pesticides to health and the environment is high (m= 4.65). The results suggest that knowledge, practice and awareness should be maintained and improved according to the standard regulations set by the government and the requirements of the current situation.

### INTRODUCTION

One of the most significant industries in the world, agriculture plays a key role in the food industries. Nevertheless, only 25% of all agricultural land is grown organically; the remaining 75% uses pesticides. According to Agnihotri, Dr. N.P (2014), 15% of all pesticides used in agricultural operations worldwide are used in paddy production. Farmers in Malaysia traditionally and frequently use pesticides to manage pests, particularly in paddy fields. The application of insecticides became into a custom that ensured the avoidance of pest that frequently targets paddy fields. Modern paddies, pesticides, irrigation, and technology are just a few of the tactics that have been heavily used to prevent the issue and boost output. However, this has altered the ecological structure and made pests more of a concern (Rahaman et al., 2018). Modern agriculture practices, particularly chemically coupled farming systems, have an impact on human health and the

environment in an effort to maximize revenues through efficient and productive ways.

In the food subsector, paddy is Malaysia's most important crop for two reasons. First and foremost, the majority of people's main food source is rice. On average, adult Malaysians consumed 2.5 plates of white rice daily (Kasim et al., 2018). Second, rice is a key source of revenue and subsistence for the community that grows it, especially for small-scale farmers and landless agricultural labourers. About 40% of farmers only make money from the production of paddy. As a result, the main objectives of Malaysia's paddy and rice policy are to ensure supply security for customers, maintain price stability, and encourage fair income for farmers. In general, a country's ability to maintain its food security is reflected in its ability to secure its rice supply, and achieving rice self-sufficiency is essential to enhancing that ability (Rajamoorthy et al., 2015).



The production and marketing of agricultural products, particularly those intended for consumption, have given rise to grave issues regarding food safety and quality. The World Trade Organization (WTO) and the ASEAN Free Trade Area (AFTA) have liberalized trade, and as a result, producing safe and high-quality agricultural products is now essential to increasing one's competitiveness in both home and foreign markets. In addition, customers are preferring higher-quality, better, and more nutritious items as they make the shift to healthier lives (Yeong Sheng Tey, 2012). Many nations throughout the world, including Malaysia, are becoming aware of the dangers associated with pesticide use in agriculture. When hazardous pesticides are used improperly in terms of dosage density, frequency, operation procedures, and time spent applying the pesticides, a residue will be left on crops and in the environment, which will have a negative impact on both the environment and human health (Sabran & Abas, 2021). Pesticide residues have become a serious risk to the quality and safety of agricultural products, especially those from very hazardous pesticides. In addition to pesticide quality and specifications, paddy farmers' ignorance of the issues surrounding pesticide application contributes to chemical residual hazards (Rother, 2005; Guo et al., 2021).

That is why the lack of pesticides risk safety awareness, practices and knowledges among paddy field farmers have hooked the attention to conduct this kind of research. According to past result, many of the paddy field farmers have low safety awareness and practices in handling pesticides during farming. Rice farmer respondents were in Neutral Agreement (NA) in terms of awareness on pesticide usage with 2.30 weighted mean (Maria Petra O. Ebron, 2021). Besides that, according to the World Health Organization (WHO) (2009), a minimum of 300,000 people die from pesticides poisoning each year, with 99 % of these from low- and middle-income countries (Elvis Dartey Okoffo, 2016). A study will be conducted to measure the pesticides risk safety awareness, practices and knowledges among paddy field farmers. This section includes research background, the problem statement of the study, objectives of the study, research questions, research hypothesis, the significance of the study, the scope of the study, the definition of terms in this study, conceptual framework of this study and expected result.

## METHODOLOGY

Data was collected through online cross-sectional survey of 64 respondents among paddy field farmers in Gurun, Kedah. The set of questions is divided into 2 sections consisting of Section A (Demographic Information) and Section B (1. Knowledge about the pesticides risk, 2. Awareness of pesticides risk and 3. Practices in pesticides handling). Using applied cross-sectional study is to determine the level of knowledge, awareness of pesticides risk among paddy field farmers health and environmental and practices that paddy field farmers use when handle it. This study had been done among paddy field farmers from paddy field in Gurun, Kedah. The paddy fields farmers who are handling the pesticides in their paddy field will be selected as respondents. In this study, purposive or judgemental sampling because it is a non-probability sampling where the selection of sample is based on specific characteristics will be applied in this study after the selection of paddy field farmers based on the inclusion criteria who are handling the pesticides in their paddy field will be selected as respondents. This sampling will be use because it can reduce cost and offers a chance to perform data analysis that has less risk of carrying an error. It also the simplest form of data collection. All data collected throughout this study will be analysed using IBM Statistical Package for the Social Science Software (SPSS) Version 23.0. The descriptive analysis will be used to analyse the demographic of respondent such as age, gender, and so on into percentage, frequency and mean. Knowledge of pesticides risk was determined using the Bloom's cut off point.

$$\frac{\text{Number of correct answer}}{\text{Total of question}} \times 100\%$$

**Table 1. Bloom's cut off point**

Range of Score	Level of knowledge
< 60%	Poor
60% - 79%	Moderate
80% - 100%	Good

Source: Feleke et al. (2021)



## RESULT AND DISCUSSION

### Demographic Information

Table 2 present the demographic data of respondent in this study. The respondent in this study are all the paddy field farmers that have the inclusion criteria. The selected respondents are the paddy field farmers that handle pesticides and exposed to it. Paddy field farmers that have more than 2 years of experience and above 18 years old. 3.1% of the respondents in this study are within 31-40 years old, 7.8% are within 41-50 years old, 42.2% are within 51- 60 years old and 46.9% are above 60 years old. Next, all respondent in this study is male which is 100%. Next, all the respondents are Malaysian which is 100%. All the respondents are 100% married. Then, the respondents have 48.4% educational level in secondary school which is Sijil Pelajaran Malaysia (SPM) and 51.6% in education level of others. For the experience in handling pesticides, there are 9.4% have 6 to 10 years of experience handling the pesticides, 21.9% in within 11 to 20 years of experience and lastly 68.8% have experience more than 21 years. For the hours that respondent exposed to the pesticides, there are 42.2% have less than 2 hours per day that exposed to the pesticides, 56.3% have 3 to 8 hours of exposure and only 1.6% that exposed more than 9 hours. Lastly, types of pesticides that respondent used for their paddy field, majority use 2 types to 4 types of pesticides which is 92.2% and only 7.8% that use more than 5 types of pesticides for their paddy field.

**Table 2. Demographic information**

AGE		
Category	Frequency	Percent
	N=64	%
18-30	0	0
31-40	2	3.1
41-50	5	7.8
51-60	27	42.2
Above 60	30	46.9
Total	64	100.0
GENDER		
Category	Frequency	Percent
	N=64	%
Male	64	100
Female	0	0

Total	64	100
NATIONALITY		
Category	Frequency	Percent
	N=64	%
Nationality	64	100
Non-nationality	0	0
Total	64	100
MARITAL STATUS		
Category	Frequency	Percent
	N=64	%
Married	64	100
Single	0	0
Total	64	100
EDUCATION LEVEL		
Category	Frequency	Percent
	N=64	%
SPM	31	48.4
Diploma	0	0
Degree	0	0
Others	33	51.6
Total	64	100
HOW MANY YEARS DO YOU EXPERIENCE IN HANDLING PESTICIDES AS A PADDY FIELD FARMER		
Category	Frequency	Percent
	N=64	%
<2 years	0	0
2 years – 5 years	0	0
6 years – 10 years	6	9.4
11 years – 20 years	14	21.9
>21 years	44	68.8
Total	64	100
HOW MANY HOURS THAT YOU EXPOSED TO THE PESTICIDES WHEN HANDLING IT?		
Category	Frequency	Percent
	N=64	%
<2 hours	27	42.2
3 hours – 8 hours	36	56.3
>9 hours	1	1.6
Total	63	100
HOW MANY TYPES OF PESTICIDES THAT YOU USED FOR YOUR PADDY FIELD?		
Category	Frequency	Percent
	N=64	%



1 type	0	0
2 types	59	92.2
3 types	5	7.8
Total	64	100

### Knowledge About the Pesticides Risk towards Environmental Health and Awareness

Table 3 shown the knowledge of pesticides risk towards health and environment among paddy field farmers. There are 7.81% respondent that has moderate knowledge and 92.19% of respondent that has high knowledge of pesticides risk safety awareness. It is believed that all the paddy field farmers that have good knowledge because of their experience in handling pesticides. Most of them are 66.8% have more than 21 years of experience in handling pesticides. According to past result, most farmers have been engaged in agriculture for a considerable amount of time many for an average of 28.6 years and may have learned about pesticide use from the media, such as television, public health officials, and village health volunteers. (Sapsatree Santaweesuk, 2020). In addition, According to Apriluana et al. (2016), the longer the working period, the more familiar the worker is with the working conditions. They would be in good PPE compliance if they were familiar with the working conditions and the hazards of their job. The working period mirrored the experience. The longer he worked, the more experience he gained. The working period was one of the factors in the worker's characteristics that shaped behaviour (Widyawati & Paskarini, 2021). Some research showed that the education as an effective intervention, improves farmers' safety attitudes and behaviors in the use of pesticides and is recommended that educational programs be designed according to the characteristics of the audience (Ahmadipour & Nakhei, 2024). Knowledge is one of the factors that significantly affects the behavior of safe pesticide use (Suphim & Songthap, 2024). The other research said that the level of education had a significant influence ( $p < 0.01$ ) on the level of knowledge about pesticide use, treatment time and dosage, control methods, and perseverance time. In addition, the level of education has a significant effect on farmer's attitudes before and after pesticide treatment ( $p < 0.05$ ) (Masumbuko, et al., 2024). Knowledge of the use of pesticides is influenced by educational qualifications.

Farmers who have a higher level of education have the ability to receive and process information related to the use and handling of pesticides. So that to create good pesticide management conditions, it is necessary to provide good education by extension workers to farmers (Ademola, et al., 2024)

Therefore, H0 is rejected and H1 is accepted.

H0: The level of knowledge of pesticides risk towards paddy field farmers health and environmental is low among paddy field farmers in Gurun, Kedah.

H1: The level of knowledge of pesticides risk towards paddy field farmers health and environmental is high among paddy field farmers in Gurun, Kedah.

**Table 3. Mean of level for knowledge of pesticides risk towards health and environment among paddy field farmers.**

Range of score (number of correct answer)	Level of knowledge	Frequency	%
<60% (1-5)	Low	0	0
60% - 79% (6-7)	Moderate	5	7.81
80% - 100% (8-9)	High	59	92.19

Source: Feleke et al. (2021)

### Practices of using pesticides among paddy field farmers

Table 4 shows the level of practices using the pesticides and awareness about the pesticides risk to paddy field farmers health and environmental are categorized into three level according to the to the mean value. There are three level which are low (0.0 - 1.6), moderate (1.7 - 3.3) and high (3.4 - 5.0). From table 4 the study population have high level in all categories including practices using the pesticides and awareness about the pesticides risk to paddy field farmers health and environmental. The mean of practices of using pesticides for paddy field farmers is high which is ( $m=4.80$ ). I believed that paddy field farmers got a constantly training from the government



and their attitude in handling the pesticides that always practice preventing the health hazards that they may expose. Past result stated that their attitude can sometimes be influenced by the training they attended and also from life experiences (Samad1, 2020). From the table 4.7, the result has shown that 5 over 10 practices got the highest mean which is (m=5.00). the practices that respondent practice are they never reused empty containers for others purpose in the house. Second, they wash their hands with soap and water before eating and drinking after using the pesticides. Third, never blow with mouth to clear the blocked nozzles of pesticides out, wear the respirators (R95) while spraying the pesticides to the paddy field. Forth, they also stored the pesticides at the suitable place that far from the children to reach. Fifth, check the wind direction before applying the pesticides.

Therefore, H<sub>0</sub> is rejected and H<sub>1</sub> is accepted.

H<sub>0</sub>: The practices that farmers practice to reduce the pesticides risk for their health and environment is low among paddy field farmers in Gurun, Kedah.

H<sub>1</sub>: The practices that farmers practice to reduce the pesticides risk for their health and environment is high among paddy field farmers in Gurun, Kedah.

**Table 4 practices of using pesticides among paddy field farmers.**

Variable	Mean	Standard deviation	Level
Practices of using pesticides	4.80	0.382	High

#### **Awareness of pesticides risk towards environmental and human health**

Table 5 shows the awareness about the pesticides risk to paddy field farmers health and environment is high which is (m= 4.65). Thus, it is believed that they are very aware with the effect of human health and effect to the environment that can risk them in daily life. According to past result, this shows that they are well informed of the risks and problems posed by these pesticides (Siti Hajar Sabran, 2021). Awareness of pesticides is very necessary for farmers. This is important because the risk

of health effects may occur if farmers are not careful. Some of the effects of pesticides on health are dry throat, eye irritation, headache, cough, sneezing, skin rashes, nausea, vomiting, wheezing, and dyspnea (Suphim & Songthap, 2024). In addition, long-term exposure to pesticides increases the concentration of toxins inside organs and can cause chronic diseases such as cancer, neurotoxicity, asthma, necrosis, reproductive disorders, cardiac disease, diabetes, and child neurodevelopmental disorders (Pathak et al, 2022). In 1990, the World Health Organization (WHO) estimated that approximately one million unintentional pesticide poisoning events occurred annually, leading to approximately 355,000 deaths globally each year. Such poisoning is strongly related to the unsafe and inappropriate use of pesticides (WHO, 1990).

Therefore, H<sub>0</sub> is rejected and H<sub>1</sub> is accepted.

H<sub>0</sub>: The level of pesticides risk safety awareness among paddy field farmers health and environmental is low among paddy field farmers in Gurun, Kedah.

H<sub>1</sub>: The level of pesticides risk safety awareness among paddy field farmers health and environmental is high among paddy field farmers in Gurun, Kedah.

**Table 5 Awareness of pesticides risk towards environmental and human health.**

Variable	Mean	Standard deviation	Level
Awareness about the pesticides risk to paddy field farmers health and environmental.	4.65	0.610	High

## **CONCLUSION**

### **Recommendation**

To make sure all the paddy field farmers have no health issue, make the environment safe when handling the pesticides and practices in using the pesticides, here is several recommendations that I can recommend. First, paddy field farmers themselves need to be responsible in



order to protect their health and environment from the pesticides risk (Recena et al., 2006). Paddy field farmers should read the label of instruction in using pesticides before they are applying it to their paddy field. By doing that, they will know the right steps to handle the pesticides and it will reduce the pesticides risk that will expose to their health and environment. Some study demonstrated the relationship between farmers' awareness of pesticide use and their knowledge of the threat's pesticides pose to the environment and public health. This is corroborated by Sharifzadeh et al. (2018), who claimed that farmers who priorities the environment and the potential consequences of pesticides are those who have high awareness levels regarding getting information on the dose, danger and toxicity level, and safe pesticide management.

Second, government need to play the main role to make sure all the paddy field farmers have high knowledge, best practices to practice when handling the pesticides and high level of awareness about the pesticides risk. Government should provide a suitable PPE to the paddy field farmers. For example, provide the respirators (R95) which is suitable to prevent the inhalation of pesticides. By wearing this respirator, it can reduce the risk of pesticides better than the other respirators. According to Niosh, R95 particulate filtering facepiece respirator filters at least 95% of airborne particles and is somewhat resistant to oil compared the other of respirators. Not only that, the improper use of pesticides might pose a threat to human health, especially in developing countries (Ecobichon, 2001).

Farmers with a minimum of an elementary and secondary education degree appeared to be well conscious of the dangers that pesticide use poses to the environment and public health. It is evident that only 6.4% of farmers have no formal educational background, whereas 90% of farmers have completed basic school or have attended a higher education institution. According to Gaber and Abdel-Latif's (2012) research, farmers with formal education likely to be more aware of the harmful impacts of pesticides. That is why, pesticides distributor should do the training about how to handle the pesticides. The paddy field farmers will properly train and do the proper practice when handling it (Ahmadipour & Nakhei, 2024) at least 6 months once.

Forth, in order to maintain their knowledge about the pesticides risk, community can publish the advertisement and poster in social media to make the community also aware about the risk of pesticides towards human health and environment (World Health Organization, 2006).

## Limitation

The limitation while conducting this study is there is no female respondent which I stated in the inclusion criteria that male and female are accepted to this study. Next, there are 4 respondents that have below 2 years of experience in handling pesticides and 2 respondent that below 18 years old. Furthermore, the weather when the data collection was held was raining heavily. Due to this situation, not all the paddy field farmers were at their paddy field.

## Conclusion

In this study, the objective of this study is to measure the knowledge of pesticides risk towards paddy field farmers health and environmental. From the result that were obtained, we can conclude that paddy field farmers in the sample population have high level of knowledge of pesticides risk towards health and environment among paddy field farmers. The other objective is to determine the pesticides risk safety awareness health and environment among paddy field farmers. From the result, it shows that the paddy field farmers have high level of awareness about the pesticides risk to paddy field farmers health and environment. The last objective in this study is to investigate the practices about handling the pesticides among paddy field farmers. From the result, it shows that paddy field farmers have high level (always) practice 5 over 10 practices that asked. The practices that paddy field farmers practice are they never reused empty containers for others purpose in the house. Second, they wash their hands with soap and water before eating and drinking after using the pesticides. Third, never blow with mouth to clear the blocked nozzles of pesticides out, wear the respirators (R95) while spraying the pesticides to the paddy field. Forth, they also stored the pesticides at the suitable place that far from the children to reach. Fifth, check the wind direction before applying the pesticides.



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