

Factors Influencing the Paddy Farmers' Intention to Purchase Crop Insurance: A Study Case in Kedah

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Abstract

Agricultural risks in Malaysia are caused by a range of variables, including climate unpredictability and change, uncertainty in yields and pricing, an imperfect market, inaccessibility to financial services, and a lack of risk mitigation measures. Crop insurance may be a significant formal document for rural farmers in developing countries to reduce alternative risks and protect against production hazards caused by climate and weather change. This study examines the factors that influence paddy farmers' intention to purchase agriculture crop insurance in Pokok Sena, Kedah. One hundred eleven paddy farmers with farmland size under 1 hectare are selected, and a structured questionnaire is used to collect data from the respondents. The data are analysed with descriptive statistics, correlation, multiple linear regression, and ANOVA analysis. The significant variables influencing paddy farmers' intention to purchase crop insurance are knowledge, risk attitude, and social factors, with a p-value of 0.038, 0.001, and 0.001, respectively. The highest factors influencing paddy

farmers' intention are social factors, with a standardised Beta of 0.569. There is no significant difference in intention between age (0.841) and income level (0.913). From the findings, it is urged to promote crop insurance in Malaysia. The government may need to implement a strategic approach to persuade farmers of the reliability of the insurance scheme, such as increasing farmers' awareness and understanding of crop insurance through advertising and training.

Keywords: Crop Insurance, Paddy Farmers, Knowledge, Risk Attitude, Social Factors, Intention

Introduction

Over half of the world's population consumes rice as their staple food, and cultivation in Asia produces 90% of the world's rice. Malaysia has eleven primary paddy granary locations, which may be viewed as the country's rice bowl and source of food security. Generally, rice granaries are distributed across Peninsular Malaysia, Sabah and Sarawak: (1) Muda Agricultural Development Authority (MADA), (2) Kemubu Agricultural Development Authority (KADA), (3) North Terengganu Integrated Agriculture Development (KETARA), (4) Project Barat Laut Selangor (PBLs), (5) Krian, (6) Seberang Perak, (7) Seberang Perai, (8) Kemasin, (9) Rompin, (10) Kota Belud and (11) Batang Lupar (Dorairaj & Govender, 2023). The National Agricultural Policy (NAP) of 1984–1991 set aside designated wetland paddy regions when it established main granary areas. While other small paddy fields are dispersed nationwide, paddy farmers have settled in these main granary areas. Numerous assistance programs are provided to the granary areas, improving the economy and paddy farmers' livelihoods.

In Malaysia, agricultural risks are caused by various factors, ranging from climate variability and change, uncertainties in yields and prices, imperfect markets, inaccessibility of financial services and a lack of risk mitigation instruments. Insurance gives many advantages; however, the spread of crop insurance is not popular in the Asia-Pacific region. Climatic change (Berg and Lidskog, 2018), natural disasters, diseases, and attacks from pests and insects are also seen as threats to paddy plantations (Abdul Razak and Cruse, 2017). If paddy farmers do not have crop insurance in their management of paddy, all the threats to paddy plantation can be a severe problem. Given this situation, crop insurance could be a better option for financing the paddy farmers' output. Crop insurance may be an important formal document for controlling alternative risks for rural farmers in developing economic systems to safeguard against the production risks brought on by climate and weather changes. Generally, a farmer's decision to protect their land depends on various socioeconomic variables, including money, education, farm size, and natural occurrence elements like drought, wildfire, and flood. Paddy farmers who do not subscribe to crop insurance are significantly influenced by age, farming experience, farm size, household size, and the proportion of their plant to their total income. These factors can also change the farm income they have available to them as compensation for agricultural insurance. The farmers' low level of understanding and negative opinions on crop insurance might be the cause. They consider it to be pricey and created for wealthy farmers.

Crop insurance plays a pivotal role in the lives of farmers worldwide, serving as a financial safety net in the unpredictable realm of agriculture. In an era marked by increasing climate variability, pest outbreaks, and market uncertainties, the importance of crop insurance cannot be overstated. It is a crucial tool that empowers farmers to mitigate the risks associated with their livelihoods, providing them with a sense of security and stability in an otherwise volatile industry. Depending on how the insurance products are created, they can

handle a variety of risks caused by both climatic and non-climatic origins. In underdeveloped nations, insurance is frequently subsidised, particularly in agriculture. In the agricultural sector, crop insurance has become crucial for controlling economic and environmental risks. Many developing nations, like Malaysia, experience frequent agricultural disasters that can be expensive and slow agrarian progress. Crop insurance is the most practical and important risk management method for dealing with environmental disasters and the finest new tool for confronting climate change.

. This introduction explores the significance of crop insurance to farmers, highlighting how it not only safeguards their investments but also fosters resilience, encourages sustainable farming practices, and contributes to global food security. Thus, this study determines factors influencing the paddy farmers' intention to purchase crop insurance. This research aims to understand the factors that limit crop insurance from spreading throughout the agriculture sector. With this background, the study examines how Malaysian paddy farmers perceive crop insurance and how much knowledge they have about it. Crop insurance is a vital tool for farmers to mitigate these risks and safeguard their livelihoods. Understanding the factors that influence farmers' intention to purchase crop insurance is essential to promote the adoption of this crucial financial instrument. This study aims to provide insight into the motivation behind researching the intention to purchase crop insurance and its significant contributions to the field. This study seeks to motivate the adoption of crop insurance and improve economic resilience in the agricultural sector. Besides, this research aims to provide policymakers with a deeper understanding of the factors affecting farmers' intentions to purchase crop insurance, thereby assisting in the formulation of more effective and targeted policy measures. Lastly, a more comprehensive understanding of the factors influencing farmers' decision-making regarding crop insurance will help insurance companies and agricultural service providers tailor their products to better suit farmers' needs. This, in turn, can foster the development of a more robust and responsive crop insurance market.

Literature Review

Risk is defined as the possibility of harm, injury, liability, loss, or any other undesirable consequence caused by external or internal vulnerabilities that can be avoided through proactive measures. Uncertainty and exposure are two components of risk. If neither is present, there is no danger. Risk can also be classified as systematic, nonsystematic, or calamitous. Systematic risk is associated with incidents that repeat over time in a predictable manner that can be quantified. It can be evaluated to estimate the likelihood of various events. Crop insurance has been a risk management method in agriculture for over 200 years (Smith and Glauber, 2012). In agriculture, climatic extremes, such as natural disasters, floods, drought, and market risk, can cause a considerable production risk (Birthal and Hazrana, 2019; Gatto et al., 2021). Natural disasters caused by climate change, such as floods, droughts, and cyclones, are important sources of risk and uncertainty, resulting in wide fluctuations in agricultural output. Farm households are sensitive to idiosyncratic shocks like disease or yield loss due to poor soil quality and 'covariate shocks' like flooding, drought, or natural calamities. According to Senapati (2020), rural families are vulnerable to both idiosyncratic shocks, such as injuries, disease or yield loss, fire or theft experienced by a single household, and covariate shocks, such as flood, drought, or natural catastrophe encountered by all households in a particular area.

The influence of farmers' knowledge on crop insurance is a critical factor in its successful implementation and utilisation. Numerous studies have shown that farmers well-informed

about crop insurance are more likely to adopt it as a risk management tool (Ajiboye et al., 2018; Fadhliani et al., 2019). Based on the knowledge of crop insurance, the farmers understand the benefits it offers in terms of protecting their investments and stabilizing their income in the face of unforeseen events. Knowledgeable farmers are also better equipped to make informed decisions about coverage options, premiums, and claim processes, leading to more effective risk management strategies. Moreover, their understanding of crop insurance can foster trust in the agricultural insurance system, positively impacting insurance penetration rates within farming communities (Barnett et al., 2015; Clarke et al., 2019). Therefore, efforts to enhance farmers' awareness and knowledge of crop insurance through targeted education and outreach programs are essential for promoting its widespread adoption and effectiveness in safeguarding agricultural livelihoods. Increasing knowledge and access to crop insurance can empower farmers to mitigate the financial risks associated with farming, ultimately leading to more sustainable and resilient agricultural practices. A study by Senapati (2020) found that education has been identified as an important method for raising knowledge of the insurance program in the Cuttack district. Therefore, it can be claimed that a farmer is more likely to be interested in purchasing insurance and paying a larger insurance premium the more formal education they have received. Farmers may encounter information bias and cautious judgments in rural locations where education levels are often low and information is limited. Farmers with a greater degree of education are more aware of and accept insurance and are likelier to purchase policy-based planting agriculture insurance. This also indicates that the higher the farmers' educational level, the greater their degree of adopting new things, receiving and interpreting news, and the higher their risk aversion (Bao et al., 2022).

The influence of farmers' age on their participation in crop insurance programs is a multifaceted aspect of agricultural risk management. Research suggests that age can significantly shape farmers' attitudes and decisions regarding crop insurance. Younger farmers, often more open to technological advancements and risk-taking, may be more inclined to adopt crop insurance as a risk management tool (Koundouri et al., 2006). In contrast, older farmers may exhibit a degree of skepticism or resistance towards novel insurance mechanisms, primarily if they have relied on traditional farming practices for years. However, it is important to note that these trends can vary based on cultural and regional factors. Older farmers may also have a wealth of experiential knowledge that influences their insurance decisions positively. Therefore, the impact of age on crop insurance adoption should be considered alongside other contextual factors to develop effective policies and outreach strategies that cater to the diverse age demographics within the farming community.

Farmers' income is pivotal in influencing their participation in crop insurance programs. Research consistently indicates that income levels significantly determine farmers' decisions to purchase insurance coverage. Generally, higher-income farmers are more likely to afford insurance premiums and view crop insurance as a viable risk management tool (Farrin et al., 2016). They can better absorb the financial costs associated with insurance, making it a more attractive option. Conversely, lower-income farmers may perceive insurance premiums as an additional financial burden, potentially limiting participation (Hardeweg et al., 2019). Recognizing this income-based disparity is crucial in designing inclusive agricultural insurance policies that cater to the needs of smallholders and marginalised farming communities. It underscores the importance of subsidy programs and targeted interventions to ensure crop

insurance is an equitable risk mitigation strategy for all income groups within the farming sector.

Social factors can significantly influence farmers' decisions regarding crop insurance adoption. These factors encompass the influence of social networks, community norms, and local agricultural practices on farmers' perceptions of insurance. Research has shown that farmers in tight-knit communities or social networks promoting risk-sharing are more likely to consider crop insurance a viable option (Clarke et al., 2017). Understanding and leveraging these social dynamics is crucial for successfully implementing crop insurance programs and ensuring that they resonate with the needs and values of the local farming communities.

Farmers' risk attitudes play a pivotal role in shaping their decisions regarding crop insurance adoption. Risk aversion, risk neutrality, or risk-seeking behavior can significantly influence whether a farmer purchases insurance coverage. Risk-averse farmers, who are averse to taking on financial risks and prefer more stable outcomes, are more likely to see the value in crop insurance as it provides a safety net against potential losses (Hardeweg et al., 2019). Conversely, risk-neutral or risk-seeking individuals may be less inclined to invest in insurance, as they may have a higher tolerance for uncertainty and may perceive insurance premiums as an unnecessary cost (Liu et al., 2018). Understanding the diverse risk attitudes within farming communities is essential for insurance program design and marketing strategies. Tailored approaches that address different risk profiles' specific needs and preferences can contribute to higher adoption rates and more effective agricultural risk management.

Methodology

This study focuses on the paddy farmers in Pokok Sena and whether they are purchasing crop insurance. From the population, which is 111, the sample size will be 87 respondents. This study will get a list of names of paddy farmers from PPK (Pertubuhan Perladangan Kawasan) to survey factors that influence paddy farmers to purchase agriculture crop insurance. Simple random sampling is a type of probability sampling in which a participant selection is chosen randomly from a population. This research surveyed paddy farmers about the factors influencing them to purchase crop insurance by conducting a questionnaire. The questionnaire used in the survey consisted of 5 parts. Answers to the questionnaire for the respondents were stated on a scale of 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The data obtained from the questionnaire are statistically analysed by using Statistical Package for Social Science (SPSS v.27). Determination of knowledge, risk attitude, social factors, and intention of the respondent, which is a correlation, multiple linear regression, and ANOVA analysis have been used to answer every single objective.

Results and Discussion

The demographic of respondents includes age, gender, education level, farm size, and income per month, as shown in Table 1.

Table 1

Demographic of respondent farmers

Category	Indicator	Frequency	Percentage (%)
Age	20 – 29	4	4.2
	30 – 39	5	5.3
	40 – 49	15	15.8
	50 – 59	21	22.1
	More than 60	50	52.6
Gender	Male	78	82.1
	Female	17	17.9
Education level	Primary school	35	36.8
	Secondary school	53	55.8
	Diploma	3	3.2
	Degree	4	4.2
Farm size (ha)	Less than 0.20	1	1.1
	0.21 – 0.40	16	16.8
	0.41 – 0.60	13	13.7
	0.61 – 0.80	21	22.1
	0.81 – 1.00	44	46.3
Income (RM)	Less than 1,000	48	50.5
	1,001 – 2,000	38	40
	2,001 – 3,000	9	9.5

The analysis result indicates that most paddy farmers surveyed on the factors influencing their purchase of agricultural crop insurance demonstrate certain common characteristics. These characteristics include being predominantly aged over 60, mainly comprising male respondents, having a background of secondary school education, managing farm sizes within the range of 0.81 to 1.00 hectares, and earning less than RM 1,000 per month. The age of farmers is found to be between 20 and more than 60 years old. The majority of the farmers, 52.6%, are from the age group of more than 60 years old. Thus, it can be concluded that elderly farmers are the majority planting paddy in that area. It is reported in Table 1 that 82.1% of the respondents are males, while 17.9% are females. Males were projected to outnumber females since rice production requires a lot of energy, and men are more capable of completing challenging tasks than women. Regarding their education level, 55.85% of the respondents had attained a secondary school education, whereas 36.8%, 4.2%, and 3.2% had completed primary school, obtained a bachelor's degree, and achieved a diploma, respectively. Table 1 also reveals that 46.3% of respondents hold the highest farm size, which is 0.81 – 1.00 ha, while less than 0.20 ha, 0.21 – 0.40 ha, 0.41 – 0.60 ha, and 0.61 – 0.80 had 1.1%, 16.8%, 13.7%, and 22.1% respectively. The result of the study also indicates that 50.5% of farmers have a net income of less than RM 1,000, while 40%, 8.4%, and 1.1% have between RM 1,001 and RM 2,000, RM 2,001 and RM 3,000, and the lowest between RM 3,001 and RM 4,000 respectively.

Table 2

Correlation analysis of knowledge, risk attitude, social factors, and intention

		Knowledge	Risk Attitude	Social Factors	Intention
Knowledge	Pearson	1	-0.11	.508**	.213*
	Sig. (2-tailed)		0.286	<.001	0.038
Risk Attitude	Pearson	-0.11	1	.287**	.367**
	Sig. (2-tailed)	0.286		0.005	<.001
Social Factors	Pearson	.508**	.287**	1	.598**
	Sig. (2-tailed)	<.001	0.005		<.001
Intention	Pearson	.213*	.367**	.598**	1
	Sig. (2-tailed)	0.038	<.001	<.001	

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

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

The correlation analysis results show that social factors and intention have (r) 0.598, p-value < 0.001, which implies that the two variables have a highly correlated relationship. Similarly, risk attitude and intention have (r) 0.367, p-value < 0.001, which also means that the two variables have a relationship and are correlated. Likewise, knowledge and intention have (r) 0.213 and a p-value of 0.038, which implies that the two variables have a relationship and are correlated. The correlation is significant at a 1% significant level for social factors and risk attitude and 5% for knowledge as independent variables. The highest relationship was seen in social factors, followed by risk attitude and knowledge. Social factors significantly influence the intention to purchase crop insurance.

A study by Chakravarty et al. (2016) revealed that trusted intermediaries within these social networks, such as local leaders or agricultural extension officers, can play a critical role in disseminating information and positively influencing farmers' intentions to purchase insurance. Like social factors, risk attitude also significantly correlates with the intention to purchase crop insurance. This result is supported by Hardeweg et al. (2019) and Goodwin and Smith (2013), who found that risk attitude, specifically risk aversion, plays a significant role in farmers' decisions to buy crop insurance. Risk-averse farmers, who have a lower tolerance for financial uncertainty and are more concerned about potential losses, are generally more inclined to purchase insurance coverage to mitigate agricultural risks. Aziz et al. (2015) also highlighted the influence of perceived risk on intention to participate in Agriculture Takaful among farmers. These studies supported the findings that risk attitude significantly correlates with farmers' intention to purchase crop insurance. Knowledge is also found to be significantly related to intention. This is supported by Gauraram et al. (2022), who state that once farmers become more aware of the benefits of crop insurance, they are more likely to purchase it than those who do not. Dragos et al. (2023) in their study conducted among Romanian farmers, found that knowledge is one of the key factors in purchasing crop insurance and risk assessment.

Table 3*Regression analysis on knowledge, risk attitude and social factors toward intention.*

	Unstand ardised B	Coeffi cients Error	Std. rdised Coefficients Beta	Standa rdised	t	Sig.
(Const ant)	0.266	0.929		287	0. 775	0.
edge Knowl	-0.031	0.057	-0.054	0.541	- 59	0.
itude RiskAtt	0.583	0.263	0.197	216	2. 029	0.
actors SocialF	0.518	0.094	0.569	53	5. 001	<.

Dependent variable: Intention

The regression coefficient of knowledge, risk attitude and social factors as independent variables are -0.031, 0.583, and 0.518, respectively. The regression analysis reveals that risk attitude and social factors emerged as noteworthy independent variables in predicting the outcome, as indicated by their p-values below the threshold of ($p < 0.05$). This illustrates that a 1 unit increase in risk attitude and social factors will bring a 0.583 and 0.518 increase, respectively, in intention. Risk attitude has a standardised beta of 0.197, and social factors have a standardised Beta of 0.569. Since social factors have the highest beta among the two, it can be stated to have the most significant influence in establishing intention. A study by Liu et al. (2018) highlighted that farmers less willing to take risks have a higher tendency to purchase crop insurance since they view it as an effective method to counter the uncertainty they face.

Knowledge has non-significant results since the respective p-value are greater than ($p > 0.05$). However, this result is not surprising as the study by Wąs and Kobus (2018) also found that education level is insignificant in the purchase of crop insurance in Poland. Despite knowing the advantages of purchasing crop insurance, other factors might immensely influence the intention to purchase crop insurance. Fadhliani et al. (2019) asserted that despite participating in the crop insurance program, farmers in Aceh Besar have limited awareness of the significance of crop insurance. Knowledge has also been shown to have a negative significant relationship with the willingness to pay for crop insurance among farmers in Ghana (Adjabui et al., 2019).

Table 4*ANOVA analysis between age and intention*

	Sum Squares	of df	Mean Square	F	Sig.
Between Groups	0.882	4	0.22	0.353	0.841
Within Groups	56.115	90	0.623		

Total	56.996	94
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Table 5

ANOVA analysis between income level and intention

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.113	2	0.056	0.091	0.913
Within Groups	56.883	92	0.618		
Total	56.996	94			

Table 4 illustrates the One-way ANOVA analysis results between age and paddy farmers' intention to purchase crop insurance. There is no significant difference between variances. The significance of ANOVA is 0.841, which is greater than 0.05, so it rejects the hypothesis. Thus, the result from ANOVA analysis can be used. There is also no significant difference between age and intention. The results of One-way ANOVA analysis between income level and intention of paddy farmers to purchase crop insurance. There is no significant difference between variances. Thus, the result from ANOVA analysis can be used. The significance of ANOVA is 0.913, which is greater than 0.05, so it rejects the hypothesis. There is no significant difference between income level and intention.

Although the study by Afroz et al. (2017) found that age significantly impacts the willingness to pay for crop insurance among paddy farmers, the result from this study is not that surprising. Other studies showed similar results where age is insignificant to willingness to pay for crop insurance. Abebe and Bogale (2014) highlighted that age is not a significant factor that influences farmers' willingness to pay for crop insurance against rainfall in Ethiopia, while Abdullah et al. (2014) examined the willingness of paddy farmers to pay for crop insurance also found that other factors such as farming experience, farm size and attendance to paddy production courses positively influence willingness to pay but negatively by age. There is no significant difference between income and intention to purchase crop insurance among farmers. This may be due to other factors such as farm size since the respondents of this study were farmers who owned 1 hectare or fewer paddy farms. Ellis (2017) also found the same result in the study conducted in Eastern Ghana, where income level is found to be insignificantly related to willingness to purchase crop insurance. The study implied that farmers with higher household incomes are probably less vulnerable to production risk. Thus, they are less likely to purchase crop insurance.

Conclusion

Insurance is a crucial risk management tool for agricultural businesses, and its popularity is slowly growing in our region. This study evaluated the factors that influence paddy farmers' intention to purchase agriculture crops in insurance. The findings highlight an essential insurance component in the agricultural industry, especially in crops. The study result demonstrates a clear relationship between farmers' intentions and a variety of variables such as knowledge, risk attitude, and social factors. Social factors play the most significant role among the various aspects that influence paddy farmers' intentions. Paddy farmers in the area appear to have a strong feeling of community, which fosters a setting favourable to

cooperative decision-making. The results show no differences in intention between age and income level.

This study provides empirical insights into the various factors influencing farmers' intentions to purchase crop insurance, including knowledge, risk attitude and social factors. These insights can help identify areas for improvement and strategic interventions. By shedding light on farmers' intentions to purchase crop insurance, this study can contribute to the enhancement of risk mitigation strategies in agriculture. Farmers will be better equipped to safeguard their investments and ensure their economic stability. Furthermore, policymakers will benefit from this study's findings, which can guide the development and implementation of crop insurance policies that are more attuned to the needs and preferences of farmers. This can lead to increased participation in crop insurance programs. Finally, the study's results can be used by insurance companies to design more appealing and tailored crop insurance products. A more responsive and inclusive market can emerge, promoting the adoption of crop insurance among farmers.

In conclusion, the intention to purchase crop insurance is a crucial aspect of the agricultural landscape. This study is motivated by the pressing need to better understand the factors influencing this intention, with the ultimate goal of enhancing risk management, economic resilience, and policy effectiveness in agriculture. The contributions of this study will be invaluable to farmers, policymakers, and the entire agricultural sector in achieving a more sustainable and secure future.

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