

Small-Scale Farmers' Knowledge and Attitudes Towards Their Perceptions of Pesticide Use of Rice in Monkayo

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ABSTRACT

This study examined the knowledge, attitudes, and perceptions of small-scale rice farmers regarding pesticide use in Monkayo, Davao de Oro, Philippines. Using a quantitative, descriptive, correlational design, data were collected from 60 farmers using an adapted survey questionnaire. Descriptive statistics revealed very high levels of knowledge, a high level of attitude, and very high levels of perceptions regarding pesticide use among respondents. Correlation analysis showed significant positive relationships between knowledge and perception, and between attitude and perception, while regression analysis indicated that knowledge and attitude combined explained 52% of the variance in perception. These results indicate that farmers with stronger knowledge and more favorable attitudes tend to form responsible, benefit-oriented perceptions of pesticide use, supporting the applicability of the Theory of Planned Behavior to explain behavioral tendencies toward pesticide practices. The study highlights that while farmers highly value the economic benefits of pesticides, they also acknowledge associated health and environmental risks, which shape their perceptions and decision-making. Based on these findings, enhancing farmer training in safe pesticide handling, promoting less-toxic alternatives, and strengthening extension programs in Integrated Pest Management (IPM) are recommended further to improve knowledge and attitudes toward sustainable pest control. Institutional support through policies, incentives, and hands-on community education is likewise encouraged to cultivate safer, more informed, and environmentally responsible farming practices among small-scale farmers.

Keywords: correlational design, pesticide use, farmers' knowledge, attitudes, perceptions, sustainable farming

INTRODUCTION

The use of pesticides harms nature by reducing the diversity of plants and animals, disrupting food webs, and putting species such as fish, frogs, and birds at risk (Tahir et al., 2024). Using many pesticides makes pests resistant, meaning the usual methods of controlling them no longer work well. This is why farmers are encouraged to use Integrated Pest Management (IPM), a method that relies less on pesticides and focuses on safer, more natural pest management practices (Belagalla et al., 2024).

In Pakistan, pesticide usage has increased significantly over the past decades. Initially, in 1954, only 254 metric tons were used. This rise is largely attributed to the privatization of pesticide supply in the 1990s, leading to an alarming 1,169% increase in usage over two decades, with some crops receiving more than ten sprays per season. (Sánchez-Bayo, 2021). In Kenya, pesticide pollution has a severe impact on freshwater ecosystems, intensified by agricultural activities and heightened contamination. This contamination poses serious risks to insect populations, which are vital to maintaining the food web (Onyango et al., 2024).

In Bukidnon, Philippines, 55% of insecticides used by farmers were classified as highly hazardous (II) (53%), moderately hazardous (III) (19%), extremely hazardous (Ib) (13%), or unlikely to present an acute hazard (U) (16%). Farmers exhibited unsafe pesticide practices, such as spraying against the wind (77.8%) and re-entering recently sprayed areas (71.7%), increasing their risk of exposure. As a result, directly exposed farmers reported

significant health symptoms, including muscle pain (63.64%), fatigue (88.89%), and difficulty breathing (21.21%), and sought urgent, safer alternatives and proper training (Leocadio & Paler, 2024).

In Monkayo, Davao de Oro, small-scale rice farmers faced similar challenges. Many of them lack formal education and have little access to modern agricultural training, which affects their ability to understand the risks associated with pesticide use. It is estimated that 60-70% of rice farmers use chemical pesticides, with herbicides such as Pyribenzoxim and Butachlor accounting for 30-40% of total pesticide applications. Insecticides such as Chlorpyrifos and Lambda-cyhalothrin make up around 25-35%, while fungicides contribute to 10-15% of overall use (Regional Development Council XI & National Economic and Development Authority XI, 2020).

THEORETICAL FRAMEWORK

The Theory of Planned Behavior (TPB) introduced by Ajzen (1991) provides a framework for understanding how individual actions are driven by intentions, which in turn are influenced by three key factors: attitudes, subjective norms, and perceived behavioral control. Attitudes refer to an individual's positive or negative evaluation of a behavior, subjective norms involve the perceived social pressure to perform or avoid a behavior, and perceived behavioral control relates to an individual's perception of their ability to execute the behavior. TPB suggests that these three factors shape intentions, which, in turn, guide behavior. If individuals have favorable attitudes, feel social support, and believe they have control over the action, they are more likely to engage in the behavior.

In this study, the researcher used the TPB to explore small-scale farmers' knowledge, attitudes, and perceptions regarding pesticide use in rice (*Oryza sativa L.*) cultivation in Monkayo, Davao de Oro. Farmers' knowledge of pesticide types, use, and risks aligns with perceived behavioral control, as better-informed farmers feel more confident in applying pesticides safely. Their *attitudes*, shaped by beliefs about the benefits and harms of pesticides, influence their intention to use these chemicals. Additionally, their *perceptions*, including risk awareness and views on alternatives such as Integrated Pest Management (IPM), will be shaped by subjective norms, as community and peer expectations may affect their decision-making.

The need to conduct this study comes from the growing concerns about the health and environmental effects of pesticide use among small-scale farmers in Monkayo, Davao de Oro. Many farmers rely on chemical pesticides without fully understanding their harmful effects on health, soil, and water. Given most farmers' limited access to proper training, it is necessary to assess their knowledge and attitudes toward pesticide use. This study identified gaps in farmers' understanding and helped develop more effective educational programs and promote safer, more sustainable farming practices. This helped farmers use pesticides responsibly, protecting the environment and future agricultural productivity in the municipality.

Research Objectives

The main purpose of this study was to assess the knowledge, attitudes, and perceptions of small-scale farmers in using pesticides in the cultivation of *Oryza sativa L.* (rice) in Monkayo, Davao de Oro. Specifically, the study sought to achieve the following objectives:

1. To determine the level of farmers' knowledge of pesticide use.
2. To determine the level of attitudes among small-scale farmers toward pesticide use.
3. To determine the level of perceptions among small-scale farmers regarding pesticide use.
4. To determine the relationship between knowledge and perceptions of small-scale farmers.
5. To determine the relationship between attitude and perceptions of small-scale farmers.
6. To determine the combined significant correlation between attitude and perceptions of small-scale farmers.

Hypothesis

The hypotheses were tested at a 0.05 level of significance:

1. There is no significant relationship between the knowledge and perceptions of farmers in pesticide use.
2. There is no significant relationship between the attitude and perceptions of farmers in pesticide use.
3. There is no combined significant correlation between the attitude and perceptions of farmers in pesticide use.

METHODOLOGY

Research Design

In this study, a quantitative descriptive correlational research design was employed to ensure the systematic collection and analysis of numerical data and to determine patterns and relationships among variables. A descriptive correlational design provided a structured approach for examining relationships among variables using statistical techniques, allowing the researcher to describe existing conditions while identifying potential associations (Delos Reyes & Manalo, 2023). This design commonly incorporates descriptive, developmental, experimental, and correlational methodologies, which help explore how variables relate within a given population (Lopez et al., 2022).

In this regard, the descriptive correlational design is most appropriate for this study, as it examines the relationship between farmers' knowledge of pesticide use and their perceptions of agricultural practices within the context of sustainable farming. The design allowed the researcher to investigate how farmers from selected barangays understand and engage with pesticide-related practices without manipulating any variables. The researcher also used a universal sampling technique among 60 small-scale farmers whose reliance on traditional farming methods made Monkayo an ideal setting for exploring issues related to pesticide use. Through this design, the study provided results into how knowledge levels and perceptions influence farmers' pesticide use and contributed to a deeper understanding of pesticide use behaviors among small-scale farmers in Monkayo, Davao de Oro, as well as the implications for promoting safer, more sustainable agricultural practices.

Population and Sample

The researcher used a universal sampling technique to select the 60 respondents for the study. In this case, the objective was to gather data from all small-scale rice farmers in Monkayo, Davao de Oro, regardless of their farm size, experience, or pesticide usage. This approach ensured that the entire population of small-scale rice farmers in the area was represented in the study.

Research Instruments

Adapted survey questionnaires were developed to determine the levels of knowledge, attitudes, and perceptions of small-scale farmers regarding pesticide use. The survey was divided into three main sections: *Knowledge* which focuses on the farmers' understanding of pesticides, safe handling, and associated health risks (Sai et al., 2019); *Attitudes* which included their beliefs about the needs of pesticide, willingness to adopt safer practices, and concerns about environmental impact Rkiek et al. (2022); and *Perceptions* addressing how farmers view the effectiveness, affordability, and accessibility of pesticides, as well as their awareness of government regulations (Udayanga et al., 2024b). The researcher used a 5-point Likert scale, with categories ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Data Collection

The data collection process involved several steps. First, the researcher sought formal letters from local authorities and agricultural agencies in Monkayo, Davao de Oro. Subsequently, the respondents were selected according to the predetermined inclusion and exclusion criteria. The survey questionnaires were then distributed

to the selected respondents, along with clear instructions for completing them. The surveys were administered, and assistance was provided to clarify any difficulties. After completion, the survey instruments were securely collected, and the researcher ensured that all responses were stored in a locked file to maintain confidentiality.

The parameter limits for knowledge, attitude, and perception of pesticide use are also presented below:

Parametric Description Limits for Farmers’ Knowledge, Attitude, and Perceptions on the Use of Pesticides

Rating scale	Parameter Limit	Descriptive Level
5	4.21 – 5.00	Very High
4	3.41 – 4.20	High
3	2.61 – 3.40	Moderate
2	1.81 – 2.60	Low
1	1.00 – 1.80	Very Low

Data Analysis

To analyze the data gathered in the study, several appropriate statistical tools were employed to address the research objectives effectively. **The mean and standard deviation were used to determine** levels of farmers’ knowledge, attitudes, and perceptions regarding pesticide use. The mean provided a measure of the central tendency of respondents’ answers, allowing for the interpretation of overall levels, while the standard deviation indicated the extent of variability in farmers’ responses, reflecting the degree of consensus or diversity among them. **A correlation analysis** was conducted to examine the relationships among knowledge, attitudes, and perceptions regarding pesticide use. This analysis enabled the researcher to determine whether these variables are significantly related and to assess the strength and direction of their associations. Furthermore, **regression analysis** was used to determine the influence of farmers’ knowledge and attitudes on their perceptions of pesticide use. The regression model quantified the predictive power, strength, and statistical significance of these independent variables, thereby providing deeper insights into the factors shaping pesticide-related perceptions among small-scale farmers.

Ethical Considerations

Ethical principles were strictly observed throughout the research. Participation was entirely voluntary, with no forced participation, and respondents were given the right to withdraw at any time. An informed consent process was also in place to ensure that all respondents fully understand the purpose, procedures, potential risks, and benefits of the study before they agree to participate. Privacy and confidentiality were also maintained by keeping the responses secure and stored in password-protected files.

RESULTS AND DISCUSSION

This section discusses the study's results based on data collected from respondents. To clearly present the patterns, trends, and relationships within the data, descriptive analysis and tables are presented.

Table 1. Level of Knowledge

Knowledge	Mean	Interpretation
1. The farmer cleans their hands with water and soap after spraying pesticides.	4.72	Very High
2. The farmer changes clothes and takes a shower after spraying pesticides.	4.55	Very High
3. The farmer reads the label instructions before using pesticides.	4.35	Very High
4. The farmer stores pesticides safely after purchase and handles them with care.	4.35	Very High
5. The farmer does not allow children to enter the field during pesticide spraying.	4.33	Very High

6. The farmer does not smoke during pesticide spraying.	4.28	Very High
7. The farmer does not allow livestock to enter the farm after spraying pesticides.	4.23	Very High
8. The farmer does not eat or drink during pesticide spraying.	4.20	High
9. The farmer washes clothes used for spraying separately from other clothes.	4.20	High
10. The farmer does not use more pesticides than the recommended amount.	4.07	High
11. The farmer uses pesticides that are less toxic and not harmful.	3.58	High
Overall	4.26	Very High

Table 1 presents the level of knowledge among farmers regarding pesticide use, with an overall mean of 4.26, indicating very high knowledge. The highest mean of 4.72 was observed in the statement “*The farmer cleans their hands with water and soap after spraying pesticides,*” indicating strong awareness of personal hygiene after pesticide application. This finding aligns with recent studies that emphasize that proper handwashing significantly reduces dermal pesticide exposure and is among the most critical hygiene behaviors among farmers (Fizulmi & Agustina, 2024).

This is followed by 4.55 for “*The farmer changes clothes and takes a shower after spraying pesticides,*” also interpreted as very high, showing that farmers prioritize post-spraying cleanliness. Similar observations were made in a 2025 study, indicating that while many farmers globally lack adequate protective practices, such as bathing and changing clothes immediately after spraying (Gebretsadkan & Araya, 2025).

Similarly, *reading label instructions and storing pesticides safely* both scored 4.35, while not allowing children in the field during spraying scored a mean of 4.33, all interpreted as very high, reflecting strong adherence to safety practices. These findings are consistent with recent research showing that farmers with greater awareness demonstrate stronger compliance with label reading and safe storage practices to reduce exposure risks (Karki et al., 2025).

Other items such as *avoiding smoking* got a mean of 4.28 and *restricting livestock entry* with a mean of 4.23 also demonstrate very high knowledge. Meanwhile, *avoiding eating or drinking during spraying and washing clothes separately* both scored a mean of 4.20, interpreted as high, along with *using the recommended amount of pesticides* with a mean of 4.07. These findings support that farmers often lack protective equipment, and those with a better understanding of pesticide-related risks practice safer behaviors, such as avoiding contamination through food, drink, clothing, and animal exposure (Yami et al., 2025).

The lowest mean of 3.58 was noted for *using pesticides that are less toxic and not harmful*, still interpreted as high. These results indicate that farmers consistently exhibit very high knowledge of critical safety measures, although there is room for improvement in selecting less harmful pesticides. This result supports that although many farmers are aware of basic safety practices, their awareness and adoption of environmentally safer or less toxic pesticides remain limited, with low levels of understanding about the long-term environmental and health risks posed by conventional chemicals (Udayanga et al., 2024). In addition, pesticide use emphasizes that inadequate use of safer pesticide options and insufficient adherence to integrated pest management practices continue to contribute to exposure risks among farmers, reinforcing the need for improved guidance on selecting less harmful pesticide products (Said, 2026).

Table 2. Level of Attitude

Attitude	Mean	Interpretation
1. The farmer understands that pesticides are related to health problems.	4.33	Very High
2. The farmer believes that pesticide spraying results in air pollution.	4.12	High
3. The farmer acknowledges that pesticides have negative environmental effects.	4.05	High
4. The farmer agrees that pesticides contaminate water resources.	3.90	High

5. The farmer believes that less spraying results in better environmental health.	3.68	High
6. The farmer believes pesticide residues contaminate crops.	3.65	High
7. The farmer agrees that pesticides are harmful to healthy crops (those not infested by pests).	3.63	High
Overall	3.91	High

Presented in Table 2 is the level of attitude toward pesticide use among farmers, yielding an overall mean of 3.91, interpreted as High. This overall result indicates that farmers generally hold a critical yet pragmatic attitude toward pesticide application, reflecting awareness of its implications while still recognizing its role in agricultural production.

Among the individual indicators, the highest mean score ($\bar{x} = 4.33$, Very High) was recorded for the statement that *farmers understand that pesticides are related to health problems*. This finding underscores a high level of awareness of the health risks associated with pesticide exposure, including respiratory issues, skin irritation, and long-term effects. The result is consistent with empirical evidence showing that farmers, particularly those with prolonged exposure to agrochemicals, possess substantial awareness of pesticide-related health hazards, even when economic pressures compel continued use (Shekhar et al., 2024). This heightened awareness suggests that health considerations are a salient factor in shaping farmers' attitudes toward pesticide use.

Furthermore, the belief that *pesticide spraying results in air pollution* obtained a mean of 4.12, while acknowledgment that *pesticides have negative environmental effects* registered a mean of 4.05, both interpreted as High. These results reflect farmers' growing concern over the broader environmental consequences of pesticide application, including air contamination and ecosystem disruption. Such perceptions are consistent with previous studies indicating that agricultural communities increasingly recognize pesticides as contributors to environmental degradation, affecting air quality, soil fertility, and biodiversity (Soheilifard et al., 2025).

Furthermore, the perception that *pesticides contaminate water resources* yielded a mean of 3.90, while the belief that *less spraying results in better environmental health* scored 3.68, both still within the High interpretation. These findings suggest that farmers acknowledge the link between pesticide use and water pollution, as well as the potential environmental benefits of reducing chemical inputs. Similarly, the belief that *pesticide residues contaminate crops* obtained a mean of 3.65, and agreement that *pesticides are harmful to healthy crops* recorded the lowest mean at 3.63, yet both remain interpreted as High. This indicates moderate concern regarding food safety and collateral crop damage resulting from pesticide application.

These results suggest a balanced yet cautious attitude, in which awareness does not necessarily translate into avoidance but rather into a more reflective stance toward pesticide use. This aligns with findings by Gürbüz (2024), who reported that although farmers continue to rely on pesticides for productivity, there is an increasing awareness of contamination risks to human health, environmental sustainability, and crop quality. These results highlight the need for policy interventions and extension programs that promote safer pesticide practices and sustainable alternatives without compromising farmers' livelihoods.

Table 3. Level of Perception

Perception	Mean	Interpretation
1. The farmer agrees that the easiest and best method of pest control is spraying.	4.57	Very High
2. The farmer believes that pesticides lead to their desired result such as increased production.	4.55	Very High
3. The farmer believes that with pesticide spraying, their farm revenue will be sustained.	4.52	Very High
4. The farmer believes that if they do not use pesticides, their crop will be damaged.	4.47	Very High
5. The farmer believes that if they spray less, their income will be reduced.	4.38	Very High

6. The farmer believes spraying is harmful to their health if they do not protect themselves.	4.27	Very High
7. The farmer believes that only trained personnel should be involved in spraying.	2.78	Moderate
Overall	4.22	Very High

Presented in Table 3 is the level of perception among farmers regarding pesticide use, with an overall mean of 4.22, indicating very high perception. The highest mean of 4.57 was observed, with the farmer agreeing *that the easiest and best method of pest control is spraying*, indicating a strong perception that spraying is the most effective pest management strategy. Research shows that farmers continue to view chemical spraying as the most effective and convenient strategy for pest management due to its rapid and visible action (Ullah et al., 2025).

This is closely followed by a mean of 4.55, *where the farmer believes that pesticides lead to their desired result, such as increased production*, and a mean of 4.52, *where the farmer believes that with pesticide spraying, their farm revenue will be sustained*,” both interpreted as very high, reflecting the farmers’ strong belief in the economic benefits of pesticide use. These findings support the idea that improved productivity and economic gains remain the strongest motivators for pesticide use among smallholder farmers, reinforcing their dependence on agrochemicals (Ahmad et al., 2025).

Similarly, the perception that *crops will be damaged without pesticides* had a mean of 4.47, and the belief that reduced spraying would lower income scored a mean of 4.38, interpreted as very high, suggesting that farmers associate pesticide use with financial security. This closely aligns with the findings that many farmers fear crop losses and reduced profits when minimizing pesticide application, especially when alternative pest control methods are unfamiliar or unavailable (Bagheri et al., 2020).

The statement, *"Farmers believe spraying is harmful to their health if they do not protect themselves,"* had a mean of 4.27, indicating very high awareness of health risks despite reliance on pesticides. This is supported by findings that farmers frequently report acute health effects, such as respiratory and skin irritation, from pesticide exposure (Febriana et al., 2023).

The lowest mean of 2.78 was observed when the farmer believed that only trained personnel should be involved in spraying, which was described as moderate, indicating less emphasis on professional handling of pesticides. These results reveal that farmers strongly perceive pesticide use as essential to productivity and income, while health and safety considerations are acknowledged but less prioritized than economic benefits (Khan & Ishaq, 2025).

Table 4. Relationship Between Knowledge and Perceptions of Small-Scale Farmers

Variables	Pearson Correlation (r)	p-value	Interpretation	Decision
Knowledge	0.60	0.00	Moderate to Strong Positive Relationship	Reject the Null Hypothesis
Perception				

Table 4 presents the relationship between knowledge and perceptions of small-scale farmers regarding pesticide use. The computed Pearson correlation coefficient (r) is 0.60, which indicates a moderate to strong positive relationship between the two variables. This means that as farmers’ knowledge of pesticide use increases, their perceptions of its application tend to improve. The result revealed a p-value of 0.00; hence, the null hypothesis is rejected. This finding suggests that farmers who are more knowledgeable about pesticide use are more likely to hold perceptions aligned with safe and effective practices, underscoring the importance of educational interventions to enhance both knowledge and perceptions for sustainable farming. As revealed by Parasram and Choudhury (2025), knowledge and perceptions of protective practices of farmers significantly contributed to informedness about responsible pesticide use, while mere attitudes were not sufficient.

Table 5. Relationship Between Attitude and Perceptions of Small-Scale Farmers

Variables	Pearson Correlation (r)	p-value	Interpretation	Decision
Attitude	0.65	0.00	Strong Positive Relationship	Reject the Null Hypothesis
Perception				

Presented in Table 5 is the relationship between farmers’ attitudes and their perceptions of pesticide use. The computed Pearson correlation coefficient of 0.65 indicates a strong positive relationship, which means that more favorable attitudes toward pesticide use, such as acknowledging both benefits and risks, valuing safe practices, are associated with more positive or informed perceptions about its outcomes and implications. This is consistent with recent findings showing that farmers who understand the economic value of pesticides while also recognizing health and environmental risks tend to form more balanced and responsible perceptions of pesticide use (Muñoz-Bautista et al., 2025). The p-value of 0.00 is less than 0.01, demonstrating that this association is statistically significant.

These findings suggest that when farmers hold a constructive attitude and recognize economic gains while appreciating health and environmental safeguards, their perceptions tend to align with responsible, benefit-oriented views of pesticide use. Similar patterns were observed, with farmers who were more aware of risks and protective measures also expressing more informed perceptions of crop yield stability, revenue, and environmental consequences (Ha et al., 2025).

While the strength of the correlation highlights the importance of attitude formation through training, extension services, and risk communication in shaping perception, it also emphasizes that correlation does not imply causation; targeted interventions must continue to improve both attitude and perception to sustain safe, effective, and economically sensible pesticide practices among small-scale farmers.

Table 6. Regression Analysis on Knowledge, Attitude, and Perceptions of Small-Scale Farmers

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	p-value
		B	Std. Error	Beta		
1	(Constant)	1.02	0.42	---	2.43	0.02
	Knowledge	0.35	0.12	0.36	3.31	0.00
	Attitude	0.44	0.10	0.47	4.35	0.00

a. Dependent Variable: Perception

As shown in Table 6, knowledge and attitude significantly predict the perceptions of small-scale farmers. Specifically, knowledge had a positive, statistically significant effect on perception ($\beta = 0.36, p < .001$), suggesting that farmers with higher levels of knowledge tend to hold more favorable, informed perceptions. This finding implies that access to information, training, and awareness initiatives plays a critical role in shaping how farmers understand and evaluate agricultural practices or innovations. The result aligns with the cognitive perspective, which holds that knowledge serves as a foundation for perception by enabling individuals to interpret experiences and external stimuli more effectively. Prior research supports this relationship, emphasizing that increased agricultural knowledge enhances farmers’ capacity to assess risks, benefits, and outcomes, ultimately influencing their perceptual judgments (Yu et al., 2025).

Moreover, attitude emerged as a stronger predictor of perception than knowledge, as evidenced by the higher standardized coefficient ($\beta = 0.47, p < 0.00$). This suggests that beyond factual understanding, farmers’ affective and evaluative orientations toward agricultural practices or policies substantially shape their perceptions. Attitudes reflect personal beliefs, values, and past experiences, which often exert a more direct influence on perception than knowledge alone. This finding is consistent with the Theory of Planned Behavior, which posits

that attitudes play a central role in shaping individuals’ interpretations and responses to behavioral contexts (Esfandiar & Hadinejad, 2025). Positive attitudes may enhance receptivity to innovations, programs, or interventions by influencing how such initiatives are perceived and interpreted (Ly et al., 2024).

Table 7. Model Summary Between Knowledge, Attitude, and Perceptions of Small-Scale Farmers

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.72 ^a	0.52	0.50	0.50
<i>a. Predictors: (Constant), Attitude, Knowledge</i>				

Table 7 presents the model summary of knowledge, attitude, and perception among small-scale farmers regarding pesticide use. The regression analysis shows an R value of 0.72, indicating a strong positive relationship between knowledge, attitude, and perception. This aligns with recent findings showing that farmers with higher awareness of pesticide risks and proper handling practices tend to form more informed and responsible perceptions about pesticide use (Abdollahzadeh et al., 2025). The R-squared value of 0.52 means that 52% of the variation in farmers’ perception can be explained by their level of knowledge and attitude toward pesticide use. This result suggests that improving farmers’ knowledge and having a positive attitude can significantly predict their perception of pesticide use, leading to more informed and responsible practices.

CONCLUSION AND RECOMMENDATIONS

The study's findings support its central proposition that farmers’ knowledge and attitudes are significantly and positively associated with their perceptions of pesticide use. Knowledge was very high, with an overall mean of 4.26; attitudes and perceptions were likewise high and very high, and bivariate tests showed moderate-to-strong positive correlations. The multiple regression further confirmed a strong combined effect, indicating that 52% of the variance in perception is explained by knowledge and attitude. Collectively, these findings validate the study’s hypotheses and support the anchored Theory of Planned Behavior (TPB), specifically that favorable attitudes and greater knowledge shape intentions and cognitions, such as perceptions, thereby aligning with the study's theoretical framework.

Local Agricultural Offices may strengthen training and extension programs that translate high knowledge into consistent, safe use behavior, such as hands-on modules on label comprehension, Personal Protective Equipment (PPE), post-spray hygiene, and product choice, coupled with Integrated Pest Management (IPM) demonstrations and peer learning. Provide incentives such as PPE subsidies, access to biological controls, recognition, or certification for IPM adopters, and improve access to trained applicators through Local Government Unit rosters and mobile advisory support. Finally, institutionalize risk communication and periodic monitoring to reinforce attitudes and sustain perception gains, ensuring practices remain safe, effective, and economically viable for small-scale farmers in Monkayo, Davao de Oro.

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