

FACTORS INFLUENCING INTENTION TO COMPLY WITH THE PESTICIDES REGULATION AMONG RICE FARMERS

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Abstract: This study analyses the effects of attitude factors, subjective norms, and control of the behavior of rice farmers' desire to comply with pesticide regulations. As stated in the planned behavior theory, farmer intentions are influenced not only by their attitudes but also by subjective norms and behavior control factors. The results show that the relative importance of attitude, subjective norm, and behavior control might vary according to farmer's strategy regarding the agricultural activity and the type of pesticide they use. The socioeconomic background factor of rice farmers is an important variable affecting compliance intentions. Furthermore, the level of education and training will take part as two critical variables in establishing the intention of pesticide handling with the correct technique. This study shows the importance of training to rice farmers to improve their compliance with pesticide regulations.

Keywords: Intention, compliance, pesticides, Malaysia.

I. INTRODUCTION

The agricultural sector plays a strategic role in the economic development process of a country. While the services sector has taken over the function of the agriculture sector as a significant contributor to economic growth and the agricultural activities - especially food production activity remains as essential actions since it provides food and employment opportunities for the rural population. Malaysia is a country that gets enough supply of water and has a wet soil condition that can sustain water supply over an extended period. This condition is suitable for rice crop activity. Based on data released by Department of Statistics, 689.7 million hectares of land has utilized for paddy crops in Malaysia, and rice production reached up 1,704 thousand tons in 2014 [1].

To increase rice production, farmers face various challenges due to attacks from pest organisms such as leaf folders, plant hopper and so on that can reduce agricultural yields [2]. Farmers have taken actions to use pesticides as an option solution to ensure their rice production sustainable at the desired level [3.] Previous studies show how pesticide use as the best treatments to prevent pest attack on paddy fields [4]. Pesticides have well-known being used widely for agriculture despite all aware of adverse side effects on farmers' health and negative impacts on the environment. In recent years, the government has taken steps to strengthen the laws relating to pesticide regulations.

Although various strategies have been established and enforced to control the pesticides applied by rice farmers, the level of compliance with these regulations is still shallow among rice farmers [5]. The regulations made do not comply with rice farmers because enforcement of regulation does not reach target groups [5]. Policy makers assume that farmers have accepted and abided by the rules made without taking into account the importance of moral, cultural and motivational aspects in influencing their compliance behavior [6].

Also, the policies made require attention for voluntary compliance activities [7]. The voluntary compliance with regulation may drive by certain factors such as financial influence, social influence and the influence of communication that can help target groups, objectives and benefit from such voluntary compliance. Previous studies say the compliance target can achieve through law enforcement using threats to farmers, breeders, and entrepreneurs [9]. The policymakers should use the principle of legal threats to safeguard the agricultural sector in a controlled environment and ensure sustainable development. [10] [11]. However, the rules applied to ensure compliance with agricultural operations found insufficient to encourage and assist the community to comply with the regulations. The effectiveness compliance requires strong commitment and efficient management.

The issue of adherence to pesticide regulations in the agriculture sector was conducted by exclusive researchers to study agrochemical markets of cocoa factories in Nigeria [12]. The research also found that the pesticide issues and compliance with personal protective equipment among farmers in Southern Mindanao [13], and the issue of farmers about compliance to food safety protection through vegetable exports in Suriname [14]. Therefore, the issue of compliance which influenced by the behaviors has apparently made the crucial part, and it is necessary to study further in the agricultural sector throughout promoting effective mechanisms for the implementation of regulations on the use of pesticides.

II. LITERATURE REVIEW

Theory of Planning Behaviour (TPB) was thus introduced by Icek Ajzen (1985) to complement the Theory of Reasoned Action (TRA). TPB was growing up by stages based on individual theory [9]. Based on the Theory Planned Behaviour, behavioral can measure how the actions taken by persons when guided and considered as predictions [16]. TPB combined with an understanding of behavioral most give the best result since interconnected with understanding will describe information behavior based on held beliefs [16] [17] [18] [19] [20]. TPB can be observed clearly with a combination of attitudes, subjective norm and perceived behavioral control which affect the behavior [21]. The individual behavior was driven by intentions that related to the perception of particular actions [22]. That means good intentions influenced the positive behavior but the negative behavior influenced by bad intentions [20]. Based on the intention of compliance behavior in the agricultural sector, attitudes are affected by agency perceptions such as institutions and societies [13]. So, the various government policies definitely become an opportunity and may change the community behavior if the majority of the people adopt it. Also, subjective norms based on motivational beliefs which affect the intention behaviors [16] [17]. Refer to the intention of compliance behavior concept; the motivation is conceptualized as an internal force, while the action produced is viewed as the external effect of this internal force. The higher the intensity of internal pressure, the larger is the degree of motivation to respond emotionally [20]. The subjective norm parameters use as an internal factor that can explain through intention behaviors [16]. The perceived behavioral control which means the perception of the ease or difficulty of the particular behavior, is linked to control beliefs, which refers to beliefs about the presence of factors that may facilitate or impede performance of the intention behaviors [18]. Refer to the intention in compliance; perceived behavioral control with related actions taken by using information has been received [17].

III. MATERIALS AND METHODS

A. Conceptual Framework

Figure 1 shows the conceptual framework of the study based on the Theory of Planned Behavior (TPB) to examine the attitude, subjective norms, perceived behavioral control and social demographic profile. The element of attitude, subjective norms and perceived behavioral control can influence farmer's intention in agriculture policy [6]. These elements are crucial in determining the influence of both internal and external factors of the farmer explaining the response to policies introduced by the government [7] as each government policy requires a constant and uniform method [24]. Furthermore, demographic profiles such as age, experience, education, training, and health status and farm size also used to determine the factor influencing farmer's intention to comply with pesticides regulations. The social demographic profile is significantly reflected personality [8] [9] which relates to the trust that is owned [11].

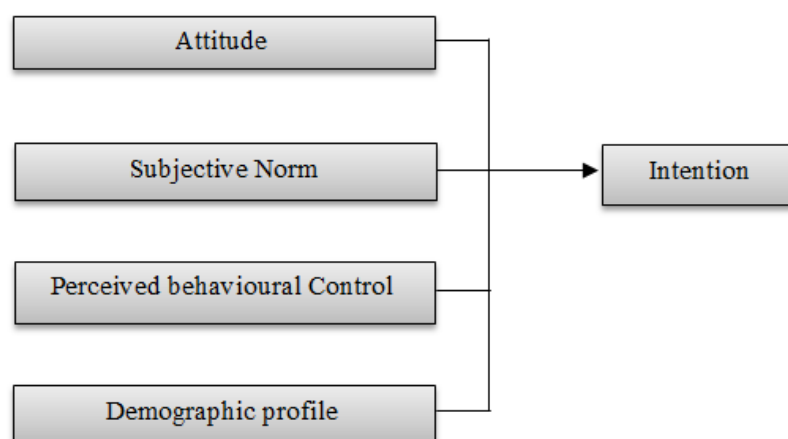


Figure 1: Conceptual framework of paddy farmer's intention to comply with pesticides regulations in Kedah, Malaysia (Source: Modified from Ajzen, 2011)

B. Sample and Questionnaire

The TPB questionnaire has administered through structured to 321 respondents who were purposively sampled based on their participation in applying for pesticides in the rice farming operations in Kedah, Malaysia. The question distributed by researcher and NGO staff in paddy sector during the self-collect of pesticides to the farmer. Before the full-scale implementation of the TPB questionnaire, an elicitation study was undertaken to draw out the target population concerning attitudes, subjective norms, and Perceived Behavioural Control (PBC) towards on compliance in pesticide use. The respondents have questioned regarding the intention of compliance the pesticides regulation for paddy. The questionnaire divided by four section; 1) Social demographic profiles of respondent 2) Intention toward complying in pesticides regulation 3) Attitude toward the regulation of using pesticides 4) Subjective norm included motivation in pesticides regulation 5) Perceived behavioral control or awareness in pesticides regulation. The TPB constructs were measured using 5-point Likert Scale and items measuring attitude, subjective norm and perceived behavior control towards on intention to comply the pesticides regulation. Attitudes were measured directly using a semantic differential item (e.g., I think that will comply the pesticides regulation on my paddy crops in the coming season: strongly agree, agree, undecided, disagree and strongly disagree). Indirect measures of attitudes gauged the relevant beliefs which identified during the elicitation study, and questionnaire items asking respondents about behavioral beliefs (e.g., applying the pesticide regulation to my paddy farm for pests in the coming season will increase my yield. – likely/unlikely)

Subjective norms were measured directly (e.g., People who are important to me request me applying pesticide regulation to my paddy crops for pests in the coming season – strongly disagree/strongly agree). Subjective norms also measured indirectly by addressing normative beliefs (e.g., My friend do/do not apply the pesticide regulation to their paddy crops) and motivation to comply (e.g., Doing what my neighbours practice in pesticides application for paddy production is important to me – not at all/very much).

Perceived Behavioural Control (PBC) measured directly (e.g., for me to apply pesticides regulation to paddy crop in the coming season would be extremely difficult/extremely easy). While indirectly measure is through Addressing Control Beliefs (e.g., The regulation of pesticides use is being enforced into my pesticides management – extremely unlikely/extremely likely). Whereas, Power of Control Beliefs (e.g., Even if the pesticide regulation is complicated, I will apply all rules to my crop – strongly disagree/strongly agree).

C. Method of Analysis

Multiple regression tests are applied to the Ordinal Least Square (OLS) estimation to see the relationship between independent variables and dependent variables (intention to comply). We explore the relationship of farmers' intention to comply pesticides regulation as a dependent variable and also other matters as independent variables such as farmers' demographic profiles, and the three parameters mentioned above of the Theory of Planned Behavior. Based on TPB, attitude towards the behavior indicating a favorable or unfavorable evaluation of the behavior, subjective norms indicating perceived social pressure to perform or not to perform the behavior and Perceived Behavioral Control for perceived capacity to deliver the behavior [11]. In this study, elements from the TBP such as intention, subjective norms, perceived

behavioral control, and attitude was given an average score based on Likert scale as conducted on a set of questions related to each element of pesticides used.

The OLS model is used because the INTENTION parameter is measured by continuous scale (continuous variable). The INTENTION function to comply is as follows:

$$Y = a + b_1 X_1 + \dots + b_j X_j + u \quad (1)$$

Where:

Y = Intention to comply pesticides regulation

X1 = Subjective norms

X2 = Attitude

X3 = Perceived behavioral control

X4 = Farmers' age in years old

X5 = Experience

X6 = Farmers education

X7 = training/ courses in pesticides used

X8 = Health status

X9 = Farm size

X10 = Ownership

IV. RESULT AND DISCUSSION

The results of this study showed that all the TPB variables are significant relationships with intentions. The previous literature has proved that elements of TPB (attitude, subjective norms, and perceived behavioral control) measures were influenced the farmers' intentions with pesticides used in agriculture sector [25]. Refer to Table 1, attitude variables are significant with intentions to comply with pesticides regulation at 1 percent significance level. A study in Bangladesh showed that attitude is important factors in influencing farmers' intentions to comply with regulations related to pesticides handling [26]. The study also confirmed that positive attitudes would lead to good intentions for farmers to comply with regulations although they are uncertain about the need for compliance.

The subjective norms have significant relationships with the farmers' intentions to comply with pesticide regulations. Previous studies have shown that subjective norms influence farmers' decisions on pesticides to be used in vegetable crops in Cameron Highlands [25]. It demonstrates the importance of using subjective norms to improve compliance with pesticide use regulations.

Additionally, it is found that behavior control variables are seen to have significant relationships with the intention of complying with the rules at the 1 percent level of significance. Literature review explains that there is the influence of control measures to farmers' intentions to comply with the rules of pesticide use [27]. It proves that farmers can control their behavior in the use of pesticides if they have the intention to comply with pesticide regulations.

When we look at social demographic profile factors, educational variables are found to have a significant relationship with farmers' desire to comply with pesticide regulations. Studies on the behavior of pesticide use in the Philippines also show that educated farmers are more likely to understand the instructions on the use of pesticides correctly and follow the instructions given [8]. Therefore, educational factors are essential in the development of comprehensive behavior through the ability to receive information and take action [5].

Training variables also have significant relationships with the intention to comply with pesticide regulations at the 10 percent significance level. This study suggests that farmers who have involved in pesticide training will likely comply with pesticide regulations. The training was linked to the increased level of farmers' knowledge of pesticides and the adverse effects of pesticide use to enable forming positive behaviors to take appropriate security measures in the use of

pesticides [9]. Previous studies have also pointed out that training will improve general knowledge and have a positive connection with the intention to comply with the regulation [28]. Also, the level of knowledge can increase farmers' motivation to carry out good agricultural practices in their daily activities. [29] In addition, pesticide handling training can reduce the health risks, environmental risks and other pesticide hazards [30].

TABLE 1: INTENTION IN COMPLYING THE PESTICIDES REGULATION

Variables	Coefficient	Standard Deviation
Attitude	.1353809***	.0332988
Subjective norm	.2613327**	.0427039
Perceived behavioral Control	.2151944***	.0543449
Age	.0363024	.0291896
Experience	-.0109611	.0199877
Education	.0165873*	.0184719
Training	.0279086*	.0624068
Health status	-.0104103	.021834
Farm size	-.0218805	.0190803
Ownership	.0480918	.0554617
cons	***1.553833	.2895705
N = 321 R ² = 41.7; Sig. F Change = 0.000		

Notes: ***, ** and * represent significant at 1%, 5% and 10% respectively

V. CONCLUSION

The findings from this study show that rice farmers in Kedah have intentions to comply with the rules of pesticide use. The intention to comply with these rules is influenced by positive attitudes, subjective norms, and behavioral control. These factors may affect compliance intentions even though rice farmers still do not use pesticides in the right way. The study also found that education and training factors can increase the intention to comply with the rules regarding pesticide use. Hence, the findings prove that the TPB model is relevant for analyzing compliance behavioral related to pesticides handling. The results of this study also supported the findings of earlier studies on methods of increasing farmer's compliance with pesticide use regulations in the agricultural sector [6] [8] [25] [26] [28].

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