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Knowledge, Attitude, and Perception of The Farmers Pepper Farming Toward Sustainability

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Abstract

Sustainable Pepper Farming (SPF) can be considered one of the ways to increase the production of pepper in Sarawak by the government. Less or low of attitude, values, and perception on SPF become the problem and slow down the process of extending the idea to the pepper farmers. Even though, this issue needs more attention, but the number of studies is still inadequate. The issue of decreasing or neglecting the pepper farm when the price fluctuates is not a new thing in this industry. Hence, the main aim of this concept paper is to critically review and identify groups in current literature on extension agents' value, attitude, and perception of the farmers towards sustainable farming, explore the role around them and come out with recommendation for future research. This study will apply a quantitative approach through the questionnaire form for purpose of data collection. A total of 400 respondents from nine branches in Sarawak (Kuching, Serian, Sri Aman, Betong, Sarikei, Bintangor, Sibul, Miri and Bintulu) will be choosing as respondents for this research. Descriptive statistic and multiple regression method via Statistical Package for Social Science (SPSS) version 26 will be using for analysis the data. The findings of this study will be a reference in formulating the new extension strategy or competency to enhance the sustainability of the commodity through Malaysian Pepper Board and Sarawak Agriculture Department. New formulation needed to enhance the extension and to make sure that the farmers will never have abandoned their pepper farm when the price fluctuates. These findings would be helpful in developing an appropriate approach in the technology transfer and farmers training. Future studies are suggested to include more indicators like training to keep the farming sustainability in Sarawak.

Keywords: Pepper, Extension Agents, Sustainable Pepper Farming, Sustainable Farming, Sarawak

Introduction

Malaysia currently is the sixth largest paper producers according to Statistics of AgriCommodity Pocket for the second quarter of the year 2020 (Anon, 2020). It is a quarterly report from the Ministry of the Plantation and Commodities. According to this report, it showed that Malaysia had increased from seventh place to sixth. Based on Entebang et al., 2020, International Pepper Community (IPC) through its October reported Malaysian is in the

seventh place of world pepper production. Approximately ninety-eight percent of the pepper in Malaysia were cultivated in Sarawak and around ninety percent produced for export market (International Pepper Community [IPC], 2018a & Entebang et al., 2020).

Pepper (*Piper nigrum*) is among an important commodity of Sarawak. In the past four years back, Malaysia has been producing 234,242 metric tons of pepper for trading and contributes to 6.51% of pepper trade in the world. Sarawak Pepper is the commercial name for Malaysian-grown pepper and one of the best in the world marketplace (Rosli et al., 2013). Well known for its quality, aroma, and pungency (Wong, 2008).

Good Agriculture Practice for Pepper (*Piper nigrum*) is part of Sustainable Pepper farming, and it is the most important element in pepper farming as it inclusive of Economically Viable Production, Sustainable Crop Production, Quality Produce, and Integrated Pest Management. From the researcher experience as an extension worker with Malaysian Pepper Board, pepper planted in the class 1 and 2 soils and with a proper management can sustain for a period of more than 30 years of age. While pepper in India can live up to 40 years (Rajan and RanjithKumar, 2018).

Pepper plantation also can last until the age of more than 20 years and even reaches the age of 40 years if continuous practices of rehabilitation or replanting the death pepper vine which mainly caused by drought and basal rot disease (Evizal, 2000; Asnawi et al., 2017; Evizal et al., 2021). Based on the researcher experience as a supervisor of the Pepper Training and Extension Centre, Malaysian Pepper Board. The response given during the courses indicate that most of the farmers still using the old method and starting to accept and recognized that new technology is being transfer to them to increase their productivity and yield.

Problem Statement

Muhammad et al (2018) stated extension services focused on just traditional style of agricultural technology transfer. Tiraieyari et al (2014) indicate that extension agents may or may not share their knowledge on sustainable agriculture even if they are knowledgeable and agree with the sustainable concept. Sustainable farming is not a new thing in the commodity industry, this includes the standard in oil palm in Malaysian Sustainable Palm Oil (MSPO) that have certification scheme for oil palm plantation and processing facilities in Malaysia. Tiraieyari et al (2014) in their previous study, recommended further research need to be done on extension agencies to investigate extension agents' attitude, knowledge, values, and perception of Sustainable Farming. Until now, limited studies have been done on the extension system in the pepper industry especially in Sarawak. Therefore, this study will be focusing on the factors of the extension agent's knowledge and attitude towards SPF.

The issue of decreasing or neglecting the pepper farm when the price fluctuates is not a new thing in this industry. Sustainable farming is still way behind the farming community in Malaysia. Abdulla et al (2015) discover that pepper price is the main driver of total planted area and total demand growth. According to Asnawi et al (2017), the same thing happened in Lampung where the pepper production area was decreasing from time to time and potential to become extinct if it left untreated seriously.

Various issues come up from this research but enlisted is five important or heavily related to this study. The first issue would be what is the level of knowledge among farmer pepper farming in Sarawak. As stated by Rosli et al (2013), pepper farmers inherited farming practices from their parent experiences. Most of the pepper farmers' knowledge is inherited experience and some feel satisfied with the outcome of the knowledge given by their parent

even though modern farming technology is being transfer to them. Farmers can learn to use modern farming methods to manage their farms even though they may have inherited farming knowledge from their parents and learned through experience. Based on the findings of Rosli et al (2020), farmers must improve their knowledge and skills in pepper farming through agronomic education. These factors could influence farmers' decisions in pepper farming practices and efficiency in input utilization, representing the difference between efficiency and inefficiency in farm management.

The second issue for this study is what is the level of attitude among farmer pepper farming in Sarawak. In this matter, the study will focus on the attitude of the pepper farmers towards sustainability. The technology is a technical matter; but the adopter is a human being. Consequently, the adoption process closely relates to human behavior. The social or psychological aspect such as perception, norms, belief, and attitude of people has a crucial role in the adoption process (Herath, 2010; Sharifuddin et al., 2018). Furthermore, the attitude of the farmer on a particular technology also expresses the strength of their favor to accept such technology (Ajzen, 1991; Mathieson, 1991; Bhattacharjee, 2000; Sharifuddin et al., 2018). The acceptance of the sustainability by the pepper farmer depends on the attitude towards the sustainability itself. Some farmers have no intention to change to modern technology since there are comfortable with the old methods of producing pepper.

Apart from that, the third issue is what is the level of perception among farmer pepper farming in Sarawak. Farmers' perception towards sustainability is essential since it can change or improve the farmers' way of dealing with the related issue in pepper farming. Adnan et al., (2017) believe that technology-aided communication will lead farmers to generate a positive perception in adopting and awareness of the sustainability. The fourth issue is what is the relationship between knowledge and sustainability among farmer pepper farming in Sarawak. This study will determine the relationship between the knowledge and sustainability in pepper farming. Knowledge is one of the major factors contributing to the recognition of sustainable agriculture; it is the key with respect to implementation and could improve sustainable practices and improve farmers' attitudes (Khoram et al., 2006; Azman et al., 2013). They can also obtain information about sustainable agriculture from the mass media, extension agents, and their colleagues (Azman et al., 2013). Will the pepper industries survive if the knowledge in modern pepper farming was not accepted by the pepper farmer or the deliverance of the knowledge still at a low pace? This study needs to investigate if there are significant correlation between knowledge and sustainability among farmer pepper farming in Sarawak. The fifth issue is what's the relationship between perception and sustainability among farmer pepper farming in Sarawak. There was a relationship between numbers of socio-economic factors, such as education, information sources use, extension participation and the farmers' sustainable agriculture perception (Bagheri, 2010; Hayran et al., 2018). The negative farmer perception will become an obstacle in accepting the information and the technology transferred to the pepper farmers. Positive perception will make the farmers more open to accept modern farming technology. One of the purposes of changing the farming method is to increase the income of pepper farming. The pepper farmer should accept the perception regarding modern farming positively. To overcome this problem, a research on the relationship between the perception and sustainability among farmer pepper farming must be investigate in order to know if the relationship is significantly correlated.

Objectives

This study seeks to achieve its general objective which is to identify the relationship between knowledge, attitude, and perception toward sustainability among farmers' pepper farming in Sarawak by focusing on the following specific objective.

1. To identify the level knowledge among farmer pepper farming in Sarawak.
2. To identify the level of among farmer pepper farming in Sarawak.
3. To identify the level of perception among farmer pepper farming in Sarawak.
4. To determine the relationship between knowledge and sustainability among farmer pepper farming in Sarawak.
5. To determine the relationship between perception and sustainability among farmer pepper farming in Sarawak.

Literature Review

New mechanisms to foster development and diffusion of innovation needed to strengthen the ways in which information, knowledge and technology are developed and disseminated to ensure that the global changes benefit smallholder farmers, food insecure households and other vulnerable groups (Anandajayasekaram et al., 2008). According to Rivera & Qamar (2003), extension is a non-formal educational function that applies to any institution that disseminates information and advice with the intention of promoting knowledge, attitudes, skills and aspirations, although the term "extension" tends to be associated with agriculture and rural development. Different definition from Farinde & Atteh (2009); Tiraieyari et al., (2014), whereas extension is an educational process with the obligation of distributing knowledge and skills to the farmers with the main aim improve the farmer's standard of living through extension agents. Extension is multidisciplinary. It combines educational methodologies, communication, and group techniques in promoting agricultural and rural development. It includes technology transfer, facilitation, and advisory services as well as information services and adult education (Rivera & Qamar, 2003).

According to Qamar (2013), extension in Malaysia started way in 1974, the same year Malaysia Federal Agreement was signed and led to the establishment of the department of agriculture in every state. Extension was not the main function before the signing and the main role was more to implement agricultural policies. He also added that the key function was to provide the agricultural extension to farmers. This also means extending agricultural technology and implementing the government agricultural policies to farmers.

Based on Shafinah et al (2017), proving that communication in rural areas such as Sg. Asap Koyan, Belaga is less than needed by the pepper farmers, the ratio for a visitation by the extension agents is way too low. It is stated that forty percent respondents receive advice once in the length of more than a year. Thirty-six percent receive advice at least once a year while seventeen percent pepper farmers never had any advice from the agriculture officer or pepper expertise. This showed that communication is the way to convey the knowledge to the pepper farmers and it needs to be delivered as often as it can in creating a knowledgeable pepper farmer.

According to Umar et al (2017), the competency of personnel can be improved through training and non-training. However, for effective capacity development, there is need to understand: the level of competence possessed by the personnel, and the level of competence required by the personnel to perform optimally. From these, the gap or need for improvement could be evaluated and appropriate remedy employed. Their study indicates that there is a need for capacity development among the agricultural extension workers in

Peninsular Malaysia for more efficient performance. As if the extension agents in Sarawak also need similar attention. To develop knowledge, skills, and abilities professionally, is a task that requires strategic planning and resources such as funds and time (Iqbal et al., 2012; Umar et al., 2017).

Van Thanh et al (2015) show there is cause for concern about banana farmers' perception towards sustainable agriculture in the uplands of Vietnam, as pointed out that a majority (84.7%) of the respondents' perceptions about sustainable agriculture were rated as low and moderate. They also recommend that efforts to enhance farmers' perceptions towards sustainable agriculture in the uplands of Vietnam should focus on improvement of their awareness of economic benefits and feasible practices of sustainable agriculture. Van Thanh et al (2015) measured perceptions of the sample farmers towards sustainable agriculture. However, they could not predict whether farmers will readily adopt sustainable agricultural technologies themselves.

Agus Wahyudi, *et al* (2019) believe that pepper farming in East Kalimantan face many obstacles. It is shown by the decline in pepper production in the last five years and the pepper conversion. This condition will affect the sustainability of pepper farming in East Kalimantan, as one of the national white pepper centers.

Based on Tiraieyari et al (2014), there are a positive response regarding attitude, perception, knowledge, values, and beliefs of extension agents towards Sustainable Cocoa Farming. To date, still limited study among sustainable pepper farming. However, Umar et al (2017) in their study indicate that there is need for capacity development among the agricultural extension workers in Peninsular Malaysia for more efficient performance. As if the extension agents in Sarawak also need similar attention. To develop knowledge, skills, and abilities professionally, is a task that requires strategic planning and resources such as funds and time (Iqbal et al., 2012; Umar et al., 2017).

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Apart from that, the results of a studied by Wahyudi, *et al* (2019) on the sustainability level of pepper farming showed that the result is 3.0062, in the good category, but with a very low value. The sustainability analysis of farming was done using weighting and rating methods and the data were collected in Kutai Kertanegara Regency, East Kalimantan in 2016.

The Role of Agricultural Extension Agents

Various extension program had been planned and executed in Malaysia and Shah et al (2013) believes that the agents should recognize their roles as change agents (as a catalyst, solution giver, process helper, and resource linker) and have ability to acquire competencies to accomplish these roles. By 2020, the agricultural sector needs to be at the level of success to help build the image of a developed country (Unit, 2010). To achieve national mission, extension agents play an important role as the change agent to change farmer's knowledge, skills, and attitude. The role of extension agents' is important as state by (Scheer et al., 2011).

They also mention that the 21st century is a time of change for extension organizations; as now, success depends on the knowledge and capabilities of employees.

As time goes by, the system must meet the requirements of the future farmers. The conventional agriculture extension system will not be relevant in the future. A study conducted by Allahyari (2009) stated that the extension system in Iran lacks competency for the achievement of sustainability and needs to shift towards new approaches and models. Agricultural extension agents need to change their normal work which is as a catalyst by transferring the information and technology to something more relevant such as a consultant, advisors, and facilitators to the farmers (Karbasioun, 2007; Allahyari, 2009).

Apart from the Department of Agriculture and The Malaysian Agricultural Research and Development Institute which provide and extend the government policies and agricultural technology. Malaysian Pepper Board was one of the organizations that was responsible for developing and managing the policy and extension for Pepper (*Piper nigrum*). As one of the statutory bodies under the Ministry of Plantation Industries and Commodities. Rosli et al (2013) state that Malaysian Pepper Board is the one that is responsible to provide agronomic education to pepper farmers to maximize pepper yield. They also believe that pepper farming practices are different among farmers as they come from different locations and socioeconomic backgrounds.

Knowledge and Attitude of Farmers Pepper Farming

Based on (Tiraieyari et al., 2013c; Tiraieyari et al., 2014) research indicate delivery of information on sustainable agriculture to farmers is positively related to extension agents' values and beliefs on the concept, perception, and knowledge on sustainable agriculture. This proves that knowledge plays a significant role in ensuring the farmers receive the right and latest information on the sustainable agriculture program which have been planned to help the farmers increase their productivity and household income. This is in line with what (Rahim, 2008; Shah, 2013) stated that the success of extension services depends on the role of extension officers in transferring the technology and technical competence in developing farmers to increase their productivity. Tiraieyari et al (2014) also believe that extension agents' knowledge of sustainable farming is important to persuade them to deliver the program to the farmers. This shows that with correct information would help the farmers in managing their farm. Although the study by Tiraieyari et al (2014) was to investigate the perception, knowledge, attitude, and value of agricultural extension agents towards sustainable cocoa farming in Sabah, Malaysia. It shows that there is a significant relationship between knowledge on Sustainable Cocoa Farming and their attitude towards the concept. But until now based on researcher knowledge it's very limited study among pepper farming especially in Sarawak. The research needs to be done in Sarawak due to limited study and since the issues of the pepper farmers don't really believe in sustainable pepper farming. As we know the pepper price is the main driver of total planted area and have a huge of total demand growth in Sarawak (Abdulla et al., 2015).

Farmers' Perception Towards Sustainability in Pepper Farming

According to Azman et al (2013), Sustainable agriculture practices are known as the best technique by which to cultivate crops. To ensure the continuity of such practices, farmers should accept and apply this method on their yield. To ensure this practice is properly applied, Tiraieyari et al (2013b), stated that extension worker knowledge of the subject matter is another factor that influences how they transfer Sustainable Agriculture Practices. In this

matter it is the extension agents' knowledge on SPF. SPF can only be successful if the extension agents' put all their effort to learn and gain as much knowledge on SPF. Their knowledge about the concept of sustainability is crucial to move the program forward (Minarovic and Mueller, 2000). However, Tiraieyari et al (2014) also stated that sustainable farming in Malaysia is considered as new technology and typically knowledge on this concept is transferred to the farmers by extension agents. Apart from that, the agents work as a catalyst between government agencies and farmers as a source of information and must be able to convince the farmers to adopt new technology. Before the farmers adopt to the new technology, the extension agents must believe the information and technology that their transferring is important to the farmers (Allahyari, 2009; Chizari et al., 2006; Neda et al., 2013, a, b; Tiraieyari et al., 2013, c; Tiraieyari et al., 2014). The extension work of new technology in agriculture requires the extension agents to accept and understand the concept behind the technology itself.

Theory of the Reasoned Action

This study is based on the Theory of the Reasoned Action (Fishbein & Ajzen, 1975) that a person's values and beliefs serve as the foundation for his or her attitude and behaviour. According to Jaap Sok et al (2020) attitude is conceptualized as the evaluation of the behaviour's desirability. Attitude toward the behaviour is but one of two constructs that were assumed to determine behavioural intentions. The second construct was termed subjective norm and it refers to people's perceptions of what important others think they should do, whether others would approve or disapprove of their behaviour.

Jaap Sok et al (2020) added relying with Bandura's (1977) construct of self-efficacy, postulated that the extent to which people believe that they have control over behavioural performance can influence their intentions and thus have an indirect effect on behaviour. In this matter, the intention is to introduce and adapt to the approach of sustainable farming by the extension agents.

Fishbein and Ajzen (1975; 2010); Chen et al (2019) mention that behavioural, normative and control beliefs provide the basis for attitude, subjective norm and perceived behavioural control, respectively. These beliefs are assumed to be formed in daily encounters by way of direct observation; by accepting information from outside sources, such as the news media or the internet; and derived in a process of inference from other beliefs formed in the past.

The Diffusion of Innovation Theory

The Diffusion of Innovation Theory describes how a new idea and technology is to be introduced and disseminated in a community and society's culture. This theory was introduced by Everett M. Rogers in 1964 with the writing of a book entitled 'Diffusion of Innovations'. The process of disseminating information and new discoveries through the process of communication through certain channels and time periods in accordance with the social system that exists in a community (Rogers, 2004).

This study is also based on The Diffusion of Innovation Theory which was first discussed in 1903 by the French sociologist Gabriel Tarde (Toews, 2003; Kaminski, 2011). According to Kaminski (2011), this theory is referring to the process that occurs as people adopt a new idea, product, practice, philosophy, and so on. She added that there are five categories which had been distinguished as adopters of an innovation: innovators, early adopters, early majority, late majority, and laggards.

According to Wubeneh & Sanders (2006); Adnan et al (2019) one of the main assumptions in Diffusion of Innovation (DOI) is that farmers have an objective to maximize the profit, the theory would be used to study innovation that is expected to increase profitability while using innovation attributes. DOI is not only used for the adoption of innovation that is expected to increase profitability, but it also explains the adoption of sustainable and conversation techniques.

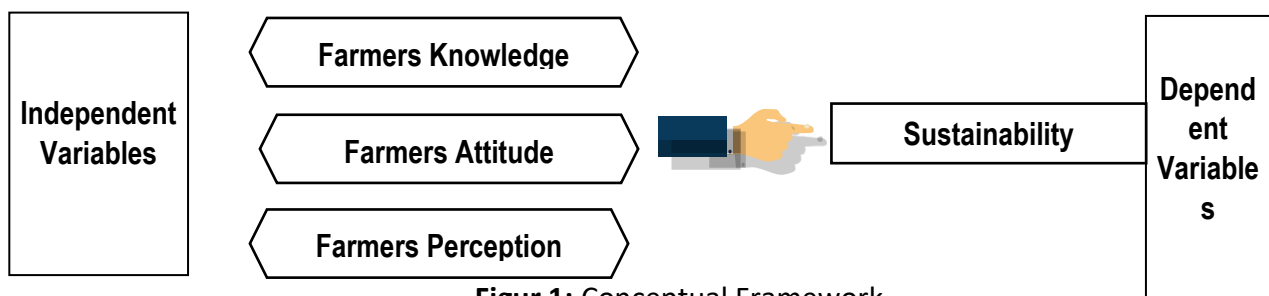
As mentioned in the theory of Rogers, there are four elements involved in the process of idea, practice, or object dissemination: a) it should be classified as innovation; b) it must be communicated through certain channels; c) it must be adopted among members within a social system; d) it must take into account duration or the time factor. The process begins with innovation. Innovation may be an idea, practice, or object that is perceived as new by potential adopters and should be considered as desirable to adapt (Roger, 2003; Dibra, 2015).

Theoretical Framework

Tiraieyari et al (2014) stated that Extension agents' knowledge of sustainable farming is also an important factor that might persuade them to deliver the programme to the farmers. Constant visit to the farmers will help in increase the farmers' knowledge thru a simple conversation, demonstration, and technical explanation. This can also be called as extending the knowledge to the farmers. They even highlighted that the extension workers' knowledge and understanding of the Sustainable Agriculture concept is inadequate. Knowledge is generally considered as prerequisite for the acceptance of a new policy, concept, and innovation (Rogers, 1995; Oladele, 2012; Olorunfemi et al., 2018). Thus, this will influence their attitude towards implementing professionalization. Whereas for the extension agents' attitude is only one of many factors determining behaviour (Fishbein and Ajzen, 1975). Listiana et al (2019) indicate that the formation of attitude is influenced by the presence of stimulants in the social and cultural environment; family, norms, customs, religion together form individual attitudes. In fact, individual attitudes develop in line with their biological development and the environment in which they are located, although attitudes do not always lead to actions; the attitude that leads to action is then called behaviour. Other ways, attitude will not be formed without interaction with other humans or with other objects.

Conceptual Framework

Based on the above discussion, the Figure 1 show the conceptual framework for this study. Knowledge, attitude, and perception will assign as the independent variables. While sustainability as a dependent variable for this study.



Figur 1: Conceptual Framework

Methodology

This study will apply a quantitative approach through the questionnaire form for purpose of data collection. A total of 400 respondents from nine branches in Sarawak (Kuching, Serian,

Sri Aman, Betong, Sarikei, Bintangor, Sibul, Miri and Bintulu) will be choosing as respondents for this research. Descriptive statistic and multiple regression method via Statistical Package for Social Science (SPSS) version 26 will be using for analysis the data. The respondent of this study will be determined by the stratified random sampling method. The population of the current study was the pepper farmers in Sarawak, Malaysia. Pepper farmers refer to individual who is planting and managing pepper either farms as their main source of income or integrate their pepper with other crop such as oil palm and rubber. The data collected through survey forms are analysed using the descriptive statistic methods, frequency, and percentage to determine the research results for each question presented to respondents.

Conclusion and Recommendations

As for the research field, this study will provide information regarding the level of knowledge and attitude of the extension agents towards SPF. The knowledge of the extension agents' is essential as this determines the correct inputs being given or transferred to the pepper farmers. The attitude of the extension agents towards SPF will give a positive message to the pepper farmers that pepper farming will survive even when the price is fluctuating. This study also will provide information regarding the level of perception of farmers towards SPF. The farmers' perception is important as it will determine the acceptability of the SPF. Apart from that, this study will provide information on the relationship between extension agents' knowledge and attitude with the farmer's perception towards SPF. The extension agents' knowledge and attitude will be the main factor that will change the perception of the pepper farmers toward SPF. It is the highlight of the behaviors of the information-seeker that is the pepper farmers. In the point of the organization practice, this study will be a reference in formulating the new extension strategy or competency to enhance the sustainability of the commodity through Malaysian Pepper Board and Sarawak Agriculture Department. New formulation needed to enhance the extension and to make sure that the farmers will never have abandoned their pepper farm when the price fluctuates. These findings would be helpful in developing an appropriate approach in the technology transfer and farmers training.

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