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Farmers' Perception Towards Agroforestry Practices in Siburan

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ABSTRACT

Climate change increasingly affects agricultural output and productivity, prompting a search for resilient and sustainable land use practices. Among these, agroforestry has gained recognition as a crucial strategy, offering mitigation against climate change and providing environmental, economic, and social benefits. Agroforestry is a practice that integrates trees and crops for sustainable land management to mitigate climate change and generate income. Although there are successful pilot projects for wet rice cultivation in Kampung Skuduk and Kampung Chupak, agroforestry activities in the paddy fields have yet to be documented. Therefore, it is crucial to introduce agroforestry practices to farmers in order to diversify their income sources and aid in their adaptation to climate change. Thus, this study aimed to determine farmers' perception towards agroforestry, as it will influence farmers' attitudes and the likelihood of them adopting agroforestry practices to adopt agroforestry practice. Data was gathered via structured questionnaire interviews, employing a five-point Likert scale to evaluate respondents' views on agroforestry. The data were analysed using SPSS and the trend of the composite score was used to interpret the five-point Likert scale data. The results show that the respondents have a positive attitude toward agroforestry practices. They also expected awareness-raising activities and workshops on agroforestry, indicating that they are willing to learn more about these practices. Eighty percent of respondents who do not practice agroforestry are interested in practicing agroforestry if there are no obstacles. This positive attitude indicates that farmers in the study area are ready and willing to practice agroforestry if there are no obstacles, because a positive attitude towards an agricultural innovation will increase the likelihood of adoption.

Keywords: Agroforestry, attitude, climate change, paddy farmers, perception

INTRODUCTION

Agricultural productivity, crop choice, and food security are affected by climate change worldwide (Vaghefi *et al.,* 2016). The increasing volatility of climate variables such as temperature fluctuations, changes in precipitation patterns, soil moisture variability, floods, droughts, and other natural calamities directly undermines the sustainability of agricultural systems on economic, social, and environmental fronts (Tang, 2019). These changes, particularly in yield, cultivated land area, and crop value, challenge the long-term viability of agricultural practices, threatening the stability of food systems and economic security (Vaghefi *et al.,* 2016). In response, agroforestry has emerged as a promising land use strategy, recognized for its potential to combat climate change's adverse effects while offering various environmental, economic, and social benefits (Brown *et al*., 2018).

Agroforestry is a method of integrating trees with crops to address environmental, economic, and societal issues (Köthke *et al.,* 2022). Numerous studies have shown that agroforestry practices can contribute to carbon sequestration and maintain soil health and ecosystem integrity (Castle *et al.,* 2022). A study by Santos *et al*. (2019) found that agroforestry systems provide up to 45-65 % benefits for biodiversity and ecosystem services. These ecological advantages fortify the environment and translate into tangible social and economic gains for farmers, providing increased profitability and sustainability. The potential of agroforestry to deliver financial benefits is undeniable, as it improves soil quality, enhances crop yields, and diversifies income sources (Castle *et al*., 2022).

Agroforestry is a well-established practice in paddy cultivation across Southeast Asian countries, including Vietnam, Indonesia, the Philippines, Myanmar, Laos, and Thailand, where it has proven instrumental in mitigating the impacts of climate change (Wangpakapattanawong *et al*., 2017). However, despite its proven success, agroforestry activities have yet to be documented in the paddy fields in Kampung Skuduk and Kampung Chupak. These villages are successful pilot projects for wet rice cultivation in Sarawak (Kong, 2014), and rice cultivation is one of the most important economic activities in Siburan. Farmers who only grow rice on their farms are considered more vulnerable to climate and market shocks (Wangpakapattanawong *et al.,* 2017). This is because monocropping increases exposure to risks such as floods and droughts. Trees, by contrast, offer greater resilience against these extreme weather events, providing a buffer that rice alone cannot. Farmers who integrate tree crops are able to maintain food production and income even when rice yields face challenges. Therefore, it is important to provide farmers in Kampung Skuduk and Kampung Chupak with opportunities to diversify their sources of income and thus help them adapt to the climate change crisis.

However, before introducing agroforestry to farmers, it is crucial to determine their attitudes towards agroforestry practices to ensure the successful implementation of agroforestry. This is because the first step in the decision-making process when adopting new practices depends on their knowledge of the practice, e.g. how to apply it and what results it brings in terms of products, yields, potential environmental benefits, risks and costs (Rogers *et al.,* 2014). This knowledge then forms the basis for a person's perceptions and attitudes towards the practice (Meijer *et al.,* 2014). Knowledge refers to the information and understanding about agroforestry, while perception refers to the farmer's view based on their needs and experiences. Both knowledge and perception determine the farmer's attitude toward agroforestry (Meijer *et al.,* 2014). Therefore, this study aimed to determine perceptions and attitudes toward agroforestry practices. Few studies conducted in Bangladesh and Malaysia indicate that most farmers have a positive attitude toward agroforestry, especially middle-aged farmers who prefer to adopt agroforestry techniques (Islam *et al.,* 2021; Sheikh *et al.,* 2021).

METHODOLOGY

Study Area

This study was conducted in Kampung Skuduk and Kampung Chupak, located in the Siburan district, about 32 kilometers (about 19.88 miles) from Kuching, the capital of Sarawak (Figure 1). These two villages are primarily inhabited by the Bidayuh ethnic group, who rely heavily on paddy cultivation as their main economic activity (personal communication). According to the records from the Siburan District Agriculture Department, there are 89 registered paddy farmers in the area in 2023.

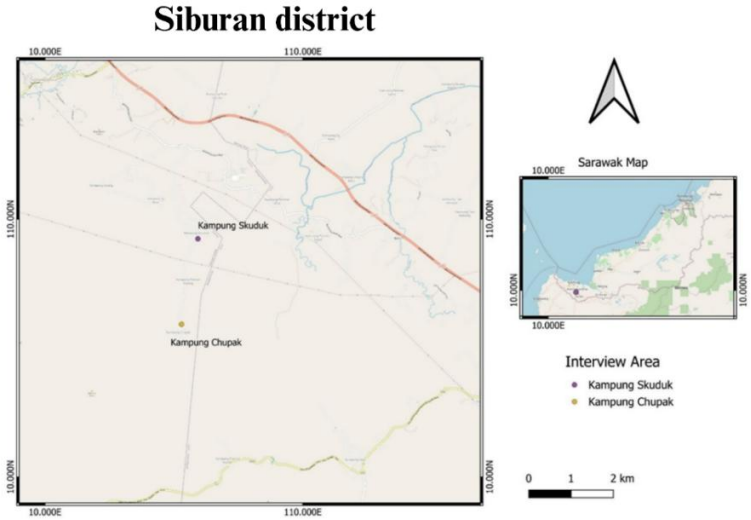

Figure 1. The location of study area, Kampung Skuduk and Kampung Chupak

Questionnaire Interview

A formal questionnaire interview was conducted targeting the registered rice farmers listed by the Jabatan Pertanian Daerah Siburan (Siburan District Department of Agriculture). Five trained enumerators were tasked with administering the questionnaires. Before the survey, the enumerators were familiarised with the questionnaire and the study's objectives. The questionnaires consisted of seven sections:

1. Socio-demographic information about the respondents
2. Information about rice cultivation
3. Respondent's perception of rice cultivation
4. Awareness and knowledge about agroforestry practices
5. Respondent's awareness of the benefits of agroforestry
6. Respondent's perception of agroforestry practices
7. The challenges in adapting agroforestry practices

The socio-demographics of the respondents were collected during the interview and their perceptions were rated using a five-point Likert scale (1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree, 5 = strongly disagree). Before eliciting their views on agroforestry, respondents were provided with a comprehensive explanation of the concept and its associated benefits.

Data Analysis

The socio-demographics of the respondents were analysed using IBM SPSS Statistic 27. The responses to the Likert scale were analysed using the method of Alonazi *et al.* (2019). Weighted means were calculated for the Likert scales, from Strongly Agree=1 to Strongly Disagree=5 (see Table 1), so that the tendency of the composite scores could be determined (Alonazi *et al.*, 2019).

Table 1. Weighted means for five-point Likert scale adapted from Alonazi *et al*. (2019)

Weighted Mean	Result
1 - 1.79	Strongly agree
1.8 - 2.59	Agree
2.60 - 3.39	Neutral
3.4 - 4.19	Disagree
4.2 -5	Strongly disagree

RESULTS

Socio-Demographic of the Respondents in the Study Area and their Perception Towards Agroforestry

Table 2 shows the socio-demographic data of the paddy farmers who participated in this study. Of the 89 registered farmers, 43 responses were obtained, and the analysis revealed that 42% of respondents actively engaged in agroforestry, while 58% did not (Figure 2). Gender distribution among the surveyed group indicates a predominance of male farmers (63%), with females constituting 37%. Most of the respondents were older than 65 years old (49%), and most of them were married (91%). Most of the farmers in Kampung Skuduk and Kampung Chupak belong to the older generation, so most of them have been cultivating paddy for more than 21 years (74%). As most of the respondents belonged to the Bidayuh ethnic group (77%), many of them practised the Christian faith (98%). Most of the respondents (72%) have formal education, i.e. they have completed primary or high school, and only 1% of the respondents have higher education. Meanwhile, 26% of respondents have no formal education. More than half of the respondents primarily engaged in rice farming as their main occupation (84%), and most of them (84%) have a monthly income of less than RM1300.

Most respondents indicated a solid inclination to recommend agroforestry practices to their friends or acquaintances (WM = 1.60). They strongly agreed that agroforestry should be practised in agriculture (WM = 1.51), as shown in Table 3. The respondents also anticipated increased awareness programs, and skill-

development workshops focused on agroforestry practices (WM = 1.40 for both). The results of this study show that the respondents have a positive perception and attitude towards agroforestry practices after being informed about the benefits of agroforestry. Moreover, 80% of the respondents who do not practice agroforestry were interested in practising agroforestry if there were no obstacles (Figure 3).

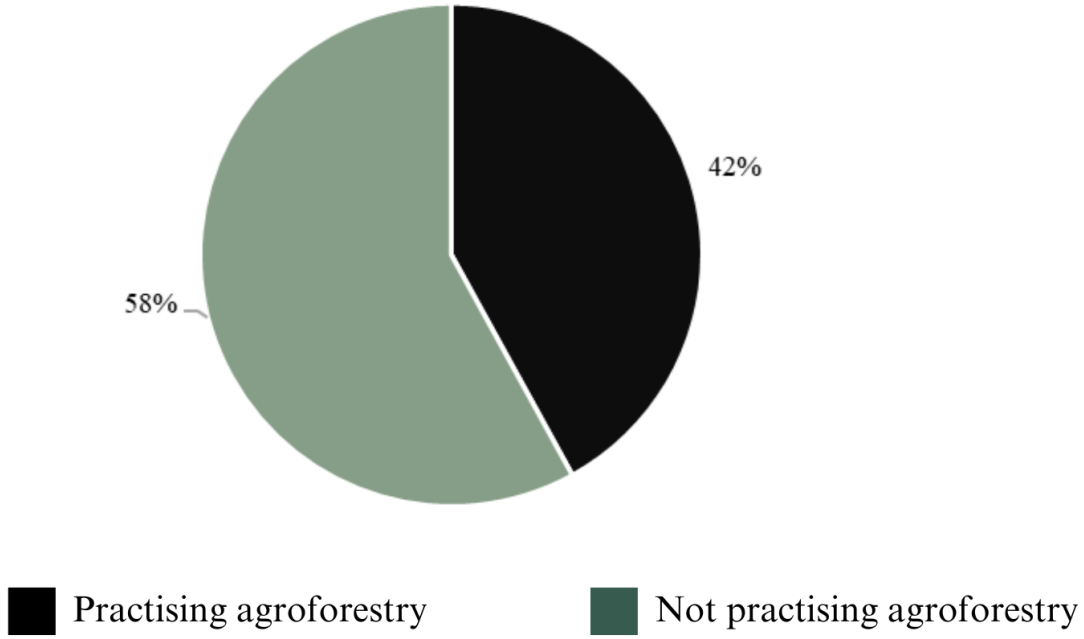

Figure 2. Respondents practising agroforestry and not practising agroforestry

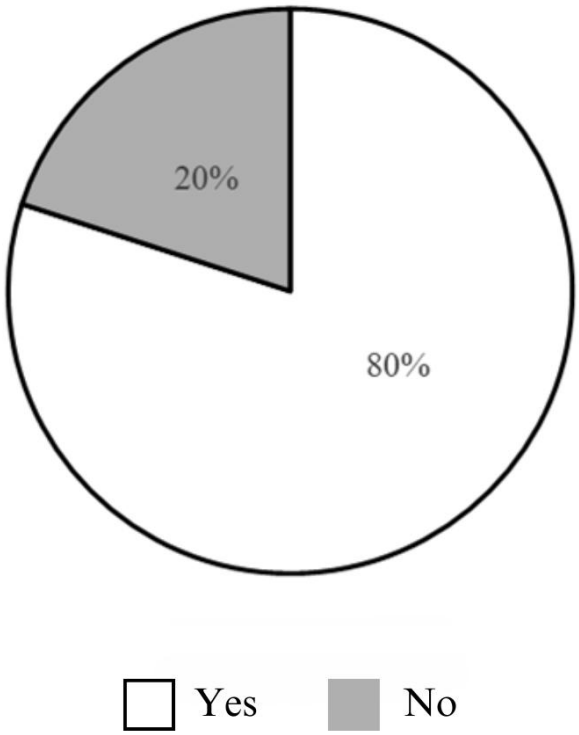

Figure 3. Non agroforestry practitioners that interested in practising agroforestry if there are no obstacles

Table 2. Socio-demographic of respondents in Kampung Skuduk and Kampung Chupak, Siburan, Sarawak

	Variables	No. of Respondents (%)
1.	Gender	
	Female	16 (37%)
	Male	27 (63%)
2.	Age	
	35 – 44	1 (2%)
	45 – 54	10 (23%)
	55 – 64	11 (26%)
	≥ 65	21 (49%)
3.	Marital Status	
	Single	1 (2%)
	Married	39 (91%)
	Divorce/Widow	3 (7%)
4.	Race	
	Iban	4 (9%)
	Bidayuh	33 (77%)
	Cina	4 (9%)
	Orang Ulu	1 (2%)
	Others	1 (2%)
5.	Religion	
	Christian	42 (98%)
	Islam	1 (2%)
6.	Education	
	No Formal Education	11 (26%)
	Formal education	31 (72%)
	Higher education	1 (2%)
7.	Paddy Cultivation Status	
	Full Time	36 (84%)
	Part Time	7 (16%)
8.	Income	
	Less than RM 1300	36 (84%)
	RM 1300 – RM 1400	5 (12%)
	RM 1401 – RM 1700	1 (2%)
	More than RM 1701	1 (2%)
9.	Experience	
	5 – 10 years	6 (14%)
	11 – 20 years	5 (12%)
	≥ 21 Years	32 (74%)

Table 3. Farmers' perception on agroforestry practices. Weighted means for the Likert Scale were calculated and the weighted mean tendency was determined (Refer Table 1)

Descriptions	Weighted mean	Result
Recommending agroforestry practice to acquaintances	1.60	Very likely to recommend
Agroforestry practice must be practised in agriculture	1.51	Strongly agree
More awareness activity on agroforestry must be organized	1.40	Very anticipating
Workshop skills on agroforestry practices must be organized	1.40	Very anticipating

DISCUSSION

Respondents' Socio-Demographics and Their Attitude Towards Agroforestry Practice

The respondent's socio-demographics play a crucial role in determining their perceptions and attitudes towards adopting or rejecting new ideas (Phondani *et al.*, 2020). Various studies have shown that socioeconomic characteristics significantly influence adoption behaviour in relation to new practices. Various studies have shown that socioeconomic characteristics significantly influence adoption behaviour in relation to new practices. Education plays a crucial role in shaping respondents' perceptions and attitudes toward agroforestry because it enables farmers to comprehend the knowledge associated with this practice. This understanding is the foundation for individuals' perceptions and attitudes about agroforestry (Meijer *et al*., 2014). Given that most respondents in this study have formal education, they may find it easier to understand and adopt agroforestry if provided with the proper information.

After learning about the benefits of agroforestry, most respondents expressed a desire to recommend these practices to their acquaintances. They believe that agroforestry should be adopted in the agriculture sector, as they recognise its potential to improve land productivity and quality of life. These findings indicate that they are likely to recommend agroforestry to others and have a higher tendency to apply agroforestry in the future. Furthermore, their anticipation of awareness activities and workshops indicates a willingness to learn about agroforestry practices. This positive attitude demonstrates that the farmers in the study area are willing and ready to adopt agroforestry, provided there are no significant obstacles. This finding is further supported by the fact that the majority (80%) of respondents not currently practising agroforestry expressed interest in doing so. Such positive attitudes towards agricultural innovations increased the likelihood of adoption, whereas negative attitudes typically lower adoption probabilities (Meijer *et al*., 2014).

CONCLUSION

In summary, the farmers in Kampung Chupak and Kampung Skuduk have a positive attitude towards agroforestry. They express a desire for awareness activities and skills workshops related to agroforestry, indicating their willingness to learn more about this sustainable practice. This positive attitude suggests that farmers in the study area are ready and willing to practise agroforestry if there are no obstacles. A positive attitude towards agricultural innovation will increase the likelihood of adoption. Therefore, the government and the private sector should collaborate to disseminate knowledge and information about agroforestry to the community, as a lack of understanding can hinder the adoption of agroforestry.

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