

## Hill Rice (*Oryza sativa L.*): Exploring the Malaysian Knowledge, Perception and Intention to Purchase

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### Abstract

Rice has a pivotal role as a crucial staple food for more than 50% of the worldwide population, including the nation of Malaysia. The challenges such as invasive and native pests, water scarcity issues, difficulties in accessing markets, pesticide-related health issues, and farmers' outmigration to find employment affect the production of rice. These challenges, in turn, have indirect implications for achieving self-sufficiency in food security. Hill rice is commonly cultivated by small farmers in Malaysia. Research related to hill rice is still continuous, mainly to investigate the potential value of hill rice to commercialize in order to support rice self-sufficiency in Malaysia. This study aims to explore the Malaysian knowledge regarding hill rice, and to investigate the Malaysian' perception and intention to purchase hill rice. In 2022, a survey was carried out by utilizing the Whatsapp platform as the method of distributing the questionnaire, which was then self-administered by the 133 respondents. The findings indicate that a significant proportion of participants hold a positive view of hill rice, with over 50% expressing an intention to purchase this type of rice. Hence, the results indicate that hill rice had the potential for commercialization. The relevant authorities may consider proposing and implementing an appropriate initiative or project aimed at encouraging smallholders to prioritize the cultivation of hill rice and effectively market this agricultural commodity.

**Keywords:** Intention to Purchase, Hill Rice, Knowledge, Perception

### Introduction

During the pandemic Covid-19, food security became the most important concern. Based on the Food and Agriculture Organisation of the United Nation (FAO), the food security is

referred to as which individuals possess consistent and unrestricted physical and economic means to obtain an adequate supply of safe and nutritious food that aligns with their dietary requirements and personal food choices, enabling them to lead a healthy and active lifestyle. Rice is the staple food for most countries in Asia. The Covid-19 pandemic has impacted Malaysia's agriculture sector, particularly the paddy industry, as the country imports 30% of its rice consumption. The Malaysian rice self-sufficiency level (SSL) is reported in the range of 60%-70% (Sam & Fung, 2022). Malaysia reportedly purchased \$583 million worth of rice in 2021, ranking at the position of 12th highest rice importer in the world. Malaysia imports rice primarily from Thailand, Cambodia, Vietnam, Pakistan, and India (Observatory of Economic Complexity (OEC), 2021). According to the statistics published by Statista Research Department in 2023, Malaysia's imports in 2022 were about 1.24 million metric tons, a slight increase from more than 1.16 million metric tons in the previous year. Since 2020, rice imports have increased to more than 1 million metric tons (Statista Research Department, 2023).

Although Malaysia has the National Agrofood Policy 2011-2020, which aims at improving the agriculture sector performance by 2020, however, this sector still lags behind (Adnan & Nordin, 2021). Malaysia has had significant challenges due to several factors including issues related to invasive and native pests, water scarcity issues, difficulties in accessing markets, pesticide-related health issues, and farmers' outmigration to find employment. The problems affecting traditional rice farming systems can be seen in different developed and developing countries (Hollaus, Schunko, Weissshaidinger, Bala, & Vogl, 2022). In Sarawak, Malaysia, rice field agroecosystems have been affected by exodus of young labour, loss of knowledge about traditional rice farming, as well as the expansion of plantations, infrastructures, industrial logging activities and tourism (Prasad, Shivay, & Kumar, 2017; Tuong & Bouman, 2003).

Furthermore, most rice varieties grow in shallow water created by flooding paddy fields, while upland rice varieties grow on dry land, usually hills or mountains. Hill rice is grown where water levels are below 800 mm throughout the growing season. Most of hill rice soils identified in the topsoil was sandy clay loam, accounting for 70%, followed by sandy loam 24%, and clay loam 6%. Meanwhile, it was found that the proportion of the sandy loam was 59%, whereas the sandy clay loam was only 18% in the subsoil. The hill rice soil has a relatively high proportion of sandy soil, which is more permeable to air, water, and roots, making it suitable for crop growth, but the limitations lie in its low water-holding capacity and poor retention of plant nutrients. Thus, adequate water and nutrient supply are crucial to achieve high crop productivity. Moreover, the growth cycle of the upland rice varieties is different. It takes about 90 to 105 days for early maturing rice varieties, 105 to 130 days for medium varieties, and 130 to 150 days for late-maturing varieties. The upland rice farmers in Sarawak mostly plant late-maturing varieties with a growth cycle of about 150 to 180 days, which are selected for planting through generation due to their colour, aroma, and shape (Hanafi, Hartinie, Shukor, & Mahmud, 2009).

Hill rice farmers in Sarawak, Sabah, and Peninsular Malaysia are practicing shifting cultivation using the slash-and-burn technique for land clearing, which is also used as a method to control weeds, insects, pests, and diseases shape (Hanafi et al., 2009). In order to obtain the optimal yield, farmers also consider the degree of slopes when cultivating hill rice. The steep slopes are not recommended to cultivate hill rice (Hollaus et al., 2022). There are many initiative taken by the Malaysian government such as *Skim Subsidi Baja dan Racun Padi Bukit/Huma* (SBRPB) in 2015, assisted in the form of compound fertilizers, urea fertilizers, and poisons

with a maximum arable land area of 4.04 hectares, in order to help hill rice farmers increase and stabilize rice production, while boosting income. Therefore, a cultivation of certain hill rice varieties, such as *Padi Adan* and *Padi Dari*, has been selectively retained, studied, and improved due to its commercial value, their sedentary farming methods, and the contingencies of history (Khazanah Research Institute, 2022).

The main motivation behind this study is the importance of rice as the dominant staple food and its significance to the food security system. This study aims to explore the Malaysian knowledge regarding hill rice, and to investigate the Malaysian' perception and intention to purchase hill rice. This information is significant as a benchmark in identifying the potential of hill rice to be marketed as a commercial commodity and alternative in supporting the concerns of food security.

### **Methodology**

In this study, a technique known as survey research was utilized, and participants completed the questionnaire independently via the internet. The questionnaire was distributed via WhatsApp from 6th July until 6th August 2022. The questionnaire used for this study is divided into two distinct sections. The purpose of the first section is to collect demographic information from respondents. In Section 2, it inquired about respondents' cognizance of hilly rice, their perceptions of it, and their intentions to purchase it. The survey questionnaire was proposed in both Malay and English to extend the pool of potential respondents from Malaysia. At the end, 133 respondents filled out the questionnaire, providing this study a total of 133 responses. According to the analysis of the data, 133 of the responses merited further thorough research. Microsoft Excel was utilized to analyze the data.

### **Results and Discussions**

This section is divided into Section A and B. Section A describes the respondents' demographic. Meanwhile, Section B elaborates and discusses the results from this study related to Malaysians' knowledge and intention to purchase hill paddy.

A) The respondents' demographic information

Table 1 shows a summary of the respondents' demographic information. A total of 133 respondents participated in this survey. The numbers of respondents based on gender are slightly similar, with 65 males (51.1%) and 68 females (48.9%). Most respondents were 18–30 years old (45.1%). This is followed by the categories of respondents between 31-40 years old (27.1%), 14.3% or 19 respondents at 41–49 years old, and 18 respondents at more than 50 years old (13.5%). Regarding household income, 58 respondents (43.6%) have below MYR 2500. Following this, 37 respondents (27.8%) reported having a household income of between MYR 2500-5000 per month; 12% reported having an income in the range of MYR 5000-7000; and 9.8% reported having an income in the range of MYR 7000–10,000. Interestingly, nine respondents had household incomes of more than MYR 100,000. Meanwhile, the number of households for most respondents is 1-5 persons (63.9%), and 53.8% of respondents are in the 5–10 households' range. Only one respondent has more than 10 households. Furthermore, the highest number of respondents spend on food is MYR 500-1000 per month (n=63, 47.4%). The lowest percentage of respondents spending on food is 1.5% for those spending more than MYR5000 per month. This distribution of food expenses might depend on household income and the number of households.

Table 1

*Summary of Respondents' Demographic Information(n=133)*

Item		Frequency	Percentage (%)
Gender	Male	65	51.1
	Female	68	48.9
	Total	133	100
Age	18-30	60	45.1
	31-40	36	27.1
	41-49	19	14.3
	>50	18	13.5
	Total	133	100
Race	Malay	65	48.9
	Chinese	8	6
	India	2	1.5
	Kadazan-Dusun	40	30.1
	Bajau	4	3
	Bidayuh	8	6
	Others (Lun bawang, Kenyah, Bukitan, Siam & Bisaya)	6	4.5
	Total	133	100
Household income per month (MYR)	<2500	58	43.6
	2500-5000	37	27.8
	5000-7000	13	12
	7000-10000	37	9.8
	>10000	9	6.8
	Total	133	100
Food expenses per month (MYR)	<500	34	25.6
	500-1000	63	47.4
	1001-3000	27	20.3
	3001-5000	7	5.3
	> 5000	2	1.5
	Total	133	100
Numbers of household	<=5 persons	85	63.9
	6-10 persons	47	53.5
	>10 persons	1	0.8
	Total	133	100

B) The Malaysian' knowledge towards hill rice. The percentage of respondents who are familiar with hill rice is displayed in Figure 1. According to the findings, 98 respondents are familiar with hill rice. In the meantime, there were 35 respondents stated that they were unfamiliar with hill rice. This demonstrates that there is a requirement for an effort to promote hill rice to the people of Malaysia.

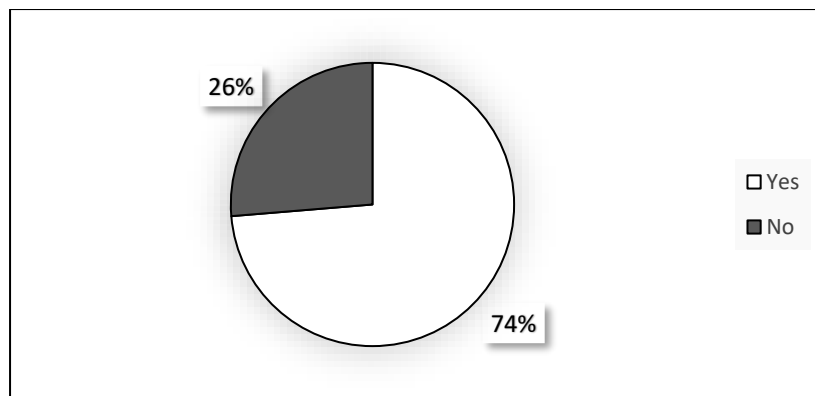


Figure 1. The percentage of respondents who are aware of hill rice (n=133)

Table 2 shows the list of varieties of hill rice that the respondents are familiar with. This study shows 19 hill rice varieties based on their local names. The respondents were given the opportunity to give more than one answer. The findings show that Beras Wangi is the most common hill rice that the respondents noticed. Meanwhile, the varieties of hill rice that were mentioned the least by respondents were Beras Irang, Beras Go Gurahid, Beras Dayak, Beras Bintang (Limbang), and Beras Biasa.

Table 2.

The familiarity with hill rice's variety among respondents

N o.	Variety	Number of responses
1	Bario Wangi	74
2	Bario Merah	55
3	Beras Hitam/Tadong	55
4	Beras Merah	54
5	Beras Pulut Putih	40
6	Beras Pulut Merah	36
7	Beras Mahsuri	30
8	Beras Coklat	28
9	Beras Planta	11
10	Beras Kenawit	6
11	Beras Bajong	5
12	Beras Meridi	5
13	Beras Kalias	3
14	Beras Kurau	2
15	Beras Biasa	1
16	Beras Bintang (Limbang)	1
17	Beras Dayak	1
18	Beras Go Gurahid	1
19	Beras Erang	1

## C) Malaysians' Perception and Intention to Purchase Hill Rice.

Seven items are proposed in order to comprehend the viewpoints of respondents regarding hill rice. The majority of respondents (82.70%) have a favourable opinion of the grade of hill rice compared to the rice currently available on the local market. Additionally, 83 respondents (62.41%) agree that hill rice is safe to consume. The majority of respondents agreed that hill rice is more nutritious than white rice (68%); however, thirteen respondents disagreed (9%). 107 respondents believe that hill rice is devoid of pesticides, while 121 believe that it is safer in terms of its authenticity. The majority of respondents (101, 75.94%) in this study believed that hill rice is safe to consume despite the lack of nutritional information on the packaging.

Table 3.

The Respondents' Perception Towards Hill Rice (n=133)

No.	Item	Strongly Disagree	Disagree	Agree	Strongly Agree
1.	Hill rice has a better quality compared to the existing rice in the local market.	2 (1.50%)	21 (15.79%)	82 (61.65%)	28 (21.05%)
2.	It is safe to consume hill rice.	2 (1.5%)	0	83 (62.41%)	48 (36.09%)
3.	Hill rice has a high nutritional value.	2 (1.5%)	0	84 (63.16%)	47 (35.34%)
4.	Hill rice has a better nutritional value compared to white rice in the local market.	1 (0.75%)	11 (8.27%)	80 (60.15%)	41 (30.83%)
5.	Hill rice is free from pesticides compared to white rice.	3 (2.26%)	23 (17.29%)	76 (57.14%)	31 (23.31%)
6.	Hill rice is safer in terms of its authenticity compared to imported rice.	1 (0.75%)	11 (8.27%)	81 (60.90%)	40 (30.08%)
7.	Hill rice is safe to eat even if nutritional information is not displayed on the packaging.	4 (3.01%)	28 (21.05%)	70 (52.63%)	31 (23.31%)

Respondents' experiences purchasing hill rice are depicted in Figure 2. There are 57% of respondents have prior experience purchasing upland rice. Meanwhile, 43% of respondents (57) had no experience purchasing upland rice. Figure 3 shows that most respondents are willing to pay between MYR10 and MYR15 per kilogramme for hill rice. Some respondents are willing to pay more than MYR20 for hill rice. Figure 4 shows that 57% of respondents intend to purchase hill rice in the local market. This finding is similar to the experience of purchasing hill rice. Hill rice could be stored for over three years, but the taste and aroma would change. Figure 5 shows that 77% of respondents intend to purchase the hill rice even though they know that it could be kept for a longer duration and that there are some changes to the quality of the hill rice. Figure 6 shows the respondents' perception of where they could buy the hill rice. The highest possibility to obtain hill rice is at the supermarket. Therefore, it is recommended that the hill rice producers market their hill rice at supermarkets.

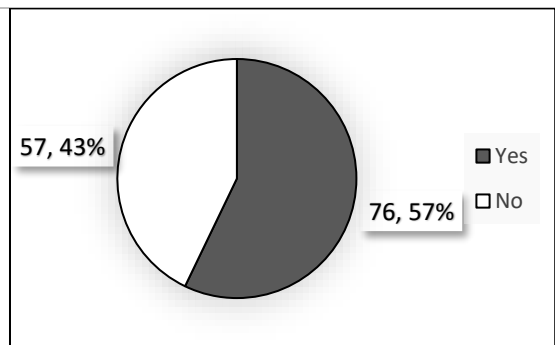


Figure 2. Experience buying hill rice among respondents (n=133)

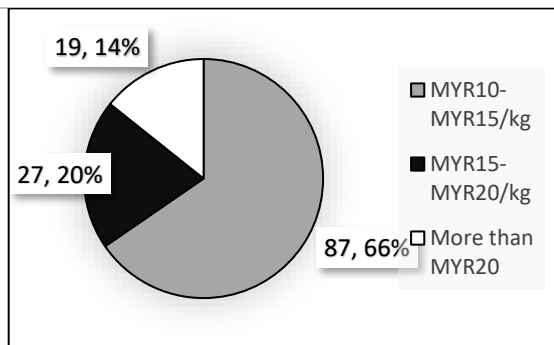


Figure 3. The distribution of hill rice price range that respondents' willing to pay per kg (n=133)

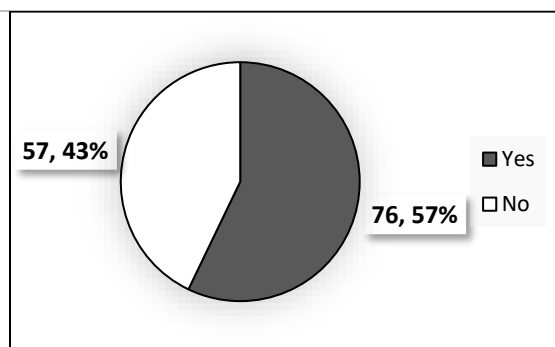


Figure 4. Intention to buy hill rice in the local market (n=133)

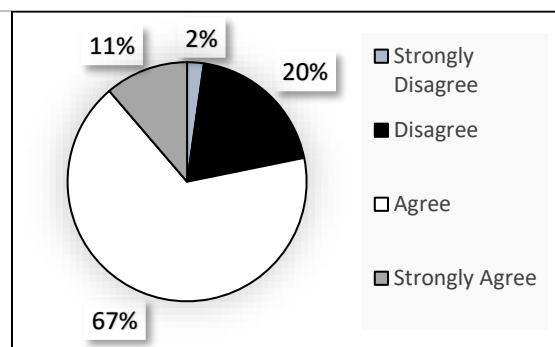


Figure 5. The intention to purchase hill rice (n=133)

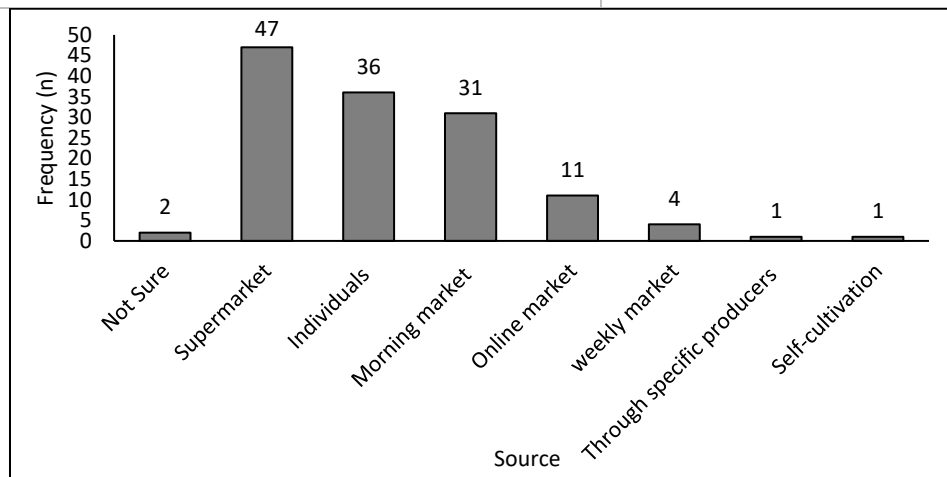


Figure 6. Source to buy hill rice in the local market (n=133)

**Conclusion**

A total of 133 respondents from Malaysia have participated in the survey. The purpose of the study is to explore the Malaysian knowledge as well as their perception and intention to purchase hill rice. According to the findings of this study, the majority of respondents have a favorable opinion of hill rice and are open to the prospect of purchasing hill rice. As a result,



outcomes of this study indicate that there is a possibility of commercializing hill rice. The main contribution of this study is the provision of present data that aids in comprehending how locals perceive hill rice as a potential commercial commodity. Recognizing the value of hill rice could potentially aid in establishing a more secure and environmentally sustainable global food supply. For future research, it is advised to promote more information about hill rice among Malaysians including the quality, source to purchase and in order to increase the awareness about hill rice. It would be beneficial for the authority parties, particularly the government and the policy makers to suggest a more effective initiative, research, and technology in order to increase the production of hill rice.

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