Developing Agriculture Skills to Alleviate Poverty in Malaysia: A Case Study in Perlis

Mukaramah Harun[1&2*], Mohd Saifoul Zamzuri[1], Noor Ruhaida Saidon[1], Zunarni Kosim[1], Shahril Shafie[1], Siti Hadijah Che Mat[1&2], Mohamad Helmi Hidthiir[1], Khairul Anuar Adnan[1], & Norzahirah Mat[1]

[1]School of Economics, Finance and Banking, Universiti Utara Malaysia, 06010 Sintok, Kedah, Malaysia.
[2]Economic and Financial Policy Institute (ECOFI), Universiti Utara Malaysia, 06010 Sintok, Kedah, Malaysia.

Abstract

This study explores the characteristics of hard-core poor individuals on agricultural skills in reducing poverty, with a focus on traditional and alternative agriculture. The study sample consists of 315 hard-core individuals participating in the *Basmi Miskin Tegar* (BMT) program in Perlis, selected from e-Kasih data provided by the Perlis Implementation Coordination Unit (ICU). Through descriptive analysis, the majority of respondents were found to be male, married, and have secondary education. Most of the respondents work in labor and services, followed by agriculture, food & traditional goods, with a smaller group in fisheries. A key contribution of the study is the development and application of a Skills Index (SI) to measure human capital in agriculture. Regardless of occupation, most respondents possess moderate skill levels, with few achieving high skill levels. This highlights challenges in workforce skills and productivity in agriculture due to limited human capital. The research advocates for government interventions tailored to the specific needs of the agriculture workforce, particularly focusing on gender-specific training, skill development workshops, and support for alternative livelihoods. By addressing these skill gaps, the study posits that poverty in Perlis can be significantly reduced, leading to improved economic stability and better livelihoods for the agriculture rural hard-core poor.

Keywords: Agriculture, Human capital, Poverty, Skills, Malaysia

1.0 Introduction

The agriculture sector is vital to the global economy, providing millions of people with food, raw resources, and jobs. The value of human capital, particularly skills and education, has become increasingly recognized as an important factor in raising productivity and individual income in this industry. As agriculture techniques change in response to technological advances and evolving market demands, the need for skilled and knowledgeable farmers grows in optimizing production and improving economic outcomes. As a result, human capital plays an increasingly essential role in this sector, aligning with Becker's (1964) human capital theory, which posits that investing in education and skills increases productivity and enhances economic outcomes.

* Corresponding author. E-mail address: mukaramah@uum.edu.my

Yusof and Kalirajan (2021) found that enhancing human capital, particularly in the agricultural sector, is crucial for reducing regional disparities in Malaysia. They argue that agricultural development combined with skills training, can significantly boost productivity and economic growth. Besides, past studies have shown that improving farmers' education, skills, and access to technology can substantially increase crop yields, farm incomes, and poverty reduction (Aker, 2011; Muyanga & Jayne, 2019). However, the effectiveness of such programs depends on a range of contextual factors, including the specific needs and constraints faced by farmers, the design and implementation of the programs, and the broader policy environment (Fabregas et al., 2019; Hoffmann et al., 2007).

Incorporating skill development into agriculture not only meets short-term financial demands but also promotes sustainable growth and development over the long run. According to Lubis et al. (2020), it is unsurprising that the agricultural sector significantly contributes to economic development in many countries. This aligns with the World Bank (2024) assertion that investing in agriculture can increase shared prosperity, end extreme poverty, and feed an estimated 10 billion people by 2050. It also can increase the incomes of the poorest people by two to four times compared to investing in other industries. Besides, Ninh (2020) examined the effect of education on the productivity of rice farming households in Vietnam and stated that better education for rural populations has a positive impact on agricultural output, leading to increased income and long-term economic prosperity.

Furthermore, education and skills enable farmers to optimize the combination of inputs, especially as the quantity increases with farm size. Therefore, this study aims to explore the association of skill development in the agriculture sector and its effect on poverty alleviation, focusing on the state of Perlis, Malaysia. Notably, this study specifically focuses on two types of agriculture namely traditional and alternative agriculture. Traditional agriculture refers to farming practices passed down through generations, frequently distinguished by utilizing traditional knowledge, inadequate external inputs, and techniques that reflect local environmental conditions (Norgaard, 1984). Alternative agriculture, on the other hand, refers to new farming methods that prioritize sustainability and ecological balance, and frequently incorporate organic farming, permaculture, and other environmentally friendly activities (Peterson, 2000).

Perlis is Malaysia's smallest and northernmost state, bordering Thailand. The economy of Perlis is led by five important sectors: agricultural, mining, construction, manufacturing, and services. Among the components of the agricultural sector are farming, fisheries, and forestry and lodging. According to the Economic Planning Unit (2023), the GDP growth rate for the agriculture sector in Perlis between 2018 and 2023 shows fluctuated over this period (Figure 1). In 2018, the growth was modest at 1.2%, which was followed by a significant increase in 2019, reaching 5.9%. This makes 2019 a benchmark year, as it marks the highest point of growth during this time frame. It can be used as a reference point for evaluating the sector's performance in the subsequent years. However, 2020 saw a severe downturn, with the growth rate plummeting to -18.5%, possibly due to external economic shocks due to the Covid-19 pandemic. In 2021, the sector was still in decline but showed signs of recovery, recording a less severe contraction of -6%. In the following years, the agriculture sector in Perlis experienced a recovery, with positive growth rates of 2.2% in 2022 and further improvement to 4.1% in 2023. This gradual rebound from the lows of 2020 and 2021 illustrates the resilience of the sector.

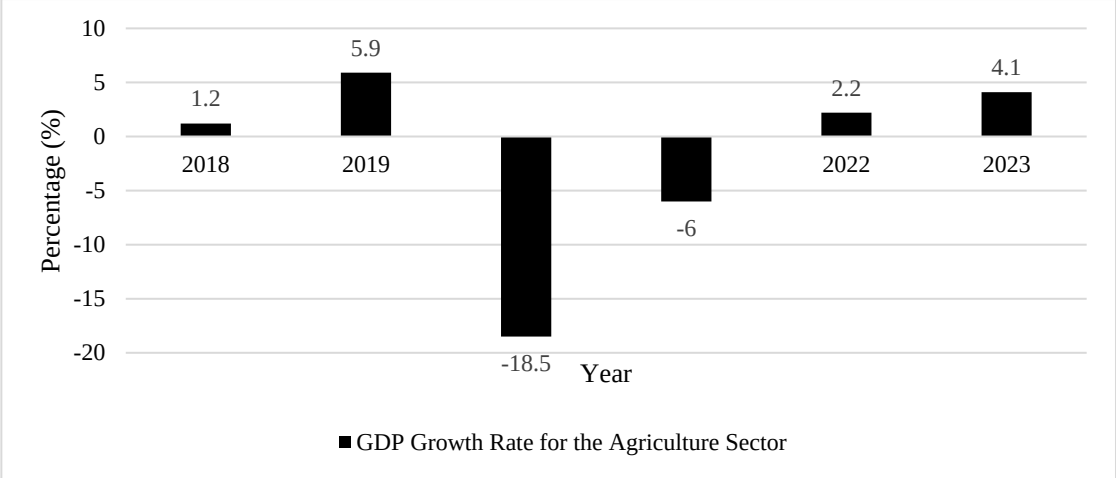

Figure 1: GDP Growth Rate for the Agriculture Sector, Perlis (2018-2023)

Besides, Figure 2 depicts the incidence of hard-core poor in Perlis from 2002 to 2022. In 2002, the incidence of hard-core poor stood at 1.8%, and it remained relatively high at 1.7% in 2004. By 2007, there was a noticeable decline, with the incidence dropping to 1.4%. The decline continued in 2009, with a reduction to 0.8%, and further improved in 2012, where it decreased to 0.5%. From 2014 onwards, there was a significant shift, as the incidence of hardcore poverty reached 0.0% and maintained this rate up until 2016. However, in 2019, there was a slight increase to 0.3%, followed by a further reduction to just 0.1% in 2022.

Then, Figure 3 illustrates the number of skilled workers in agriculture, forestry, animal husbandry, and fishing in Perlis from 2015 to 2023. The number of skilled workers fluctuated, starting at 11.2 thousand in 2015, decreasing to 9.5 thousand in 2017, and rebounding to 11.4 thousand in 2018 before dropping sharply to 8.4 thousand in 2019. During the Covid-19 pandemic (2020–2021), the number of skilled workers increased, rising to 9.9 thousand in 2020 and peaking at 12.6 thousand in 2021, possibly due to the essential nature of agricultural sectors. However, post-pandemic (2022–2023), the numbers declined significantly, falling to 8.5 thousand in 2022 and 7.9 thousand in 2023, reflecting potential challenges in economic recovery and labor demand in the sector. In addition, this indicator can be attributed to several factors that impede agriculture development in Perlis, including small farm sizes, restricted access to technology and inputs, inadequate irrigation and water management, weak market connections, and a lack of skills and knowledge.

As a whole, developing agriculture skills serves as one of the platforms for reducing hard-core poor in Perlis, where the sector plays a key role in the state's economy. Despite challenges such as fluctuating growth and skilled labor shortages, investing in skills development and addressing issues like limited technology access and market inefficiencies, Perlis can achieve sustainable growth in agriculture and further alleviate hard-core poor in the region.

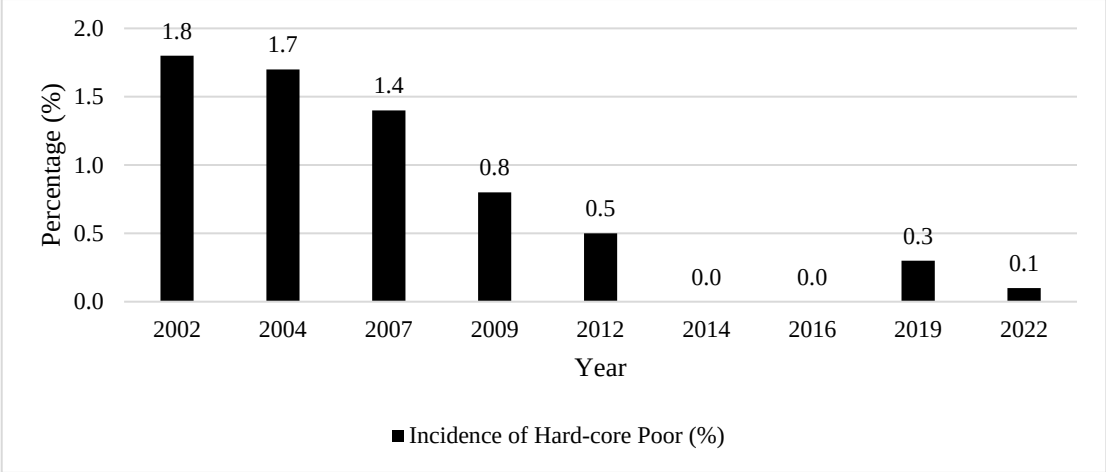

Figure 2: Incidence of Hard-core Poor, Perlis (2002-2022)

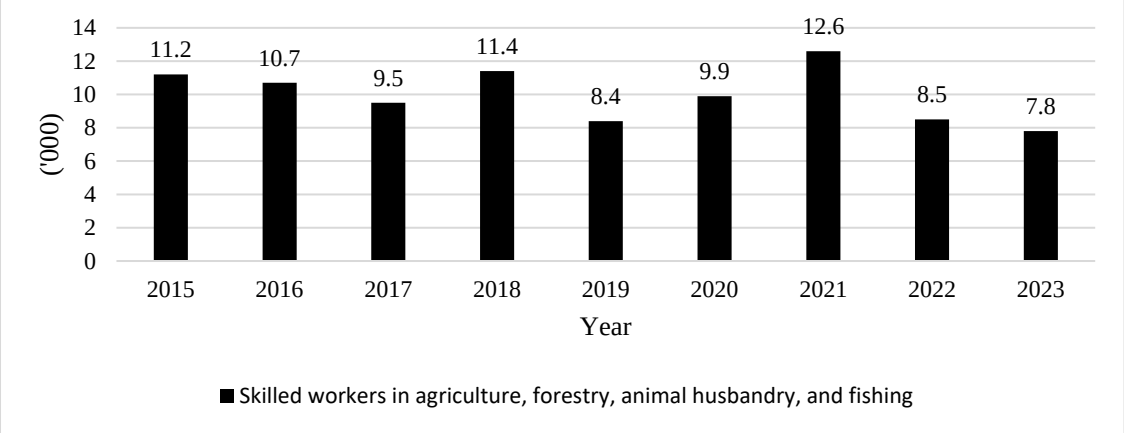

Figure 3: Numbers of Skilled Workers in Agriculture, Forestry, Animal Husbandry & Fishing, Perlis (2015-2023)

2.0 Literature Review

Several studies have explored the influences of agricultural skill development programs in Malaysia and other countries. In Malaysia, a study by Mustaffa et al. (2019) shows that skill development has a major impact on reducing poverty. For instance, smallholder farmers can alleviate poverty by increasing farm productivity and market supply through modern agricultural practices and entrepreneurship. This approach not only contributes to broader economic stability, but improves individual livelihoods. The efficacy of skill development programs is also shaped by the quality of extension services.

A recent study has also highlighted the importance of agricultural skill development in reducing poverty and driving economic prosperity. For example, Rehman et al. (2016) emphasize the importance of agriculture in decreasing poverty in developing nations. They claim that agricultural expansion is far more effective in assisting the poorest portions of the population than non-agricultural industries, highlighting the need for skill development in this area. Ganguly et al. (2019) performed a scoping study in India on policies and institutions related to skill development in agriculture and food. Their findings show that skill development initiatives are critical for increasing production and revenue, implying that quality training, evaluation, and certification are required to maximize the potential of these programs.

Furthermore, Fabregas et al. (2019) discovered that well-designed programs can result in considerable increases in farmer knowledge, acceptance of new technologies, crop yields, and income. However, the authors point out that the effectiveness of such programs is determined by a variety of factors, including farmers' requirements and limits, the quality of training material and delivery, and the availability of complementing supplies and services.

Whereas in Ethiopia, Hoffmann et al. (2007) discovered that a farmer field school program resulted in a 20% increase in maize yields and a 15% rise in household income. The authors attribute these effects to increased awareness and acceptance of better agronomic methods such as timely planting, adequate spacing, and integrated pest management. However, the study showed that the consequences were lower for poorer farmers who had more difficulty getting inputs and loans. However, climate change poses serious dangers to agricultural output and poverty alleviation efforts. Afroz and Akhtar (2021) discuss the impact of climate change on rice farmers in Malaysia, arguing that improved education and non-farm income alternatives are critical for mitigating these consequences. This emphasizes the necessity for flexible and resilient farming techniques. These findings indicate that boosting educational possibilities for farmers in Perlis could considerably improve their potential to alleviate poverty. Overall, agriculture skill development is a comprehensive method that can help to alleviate poverty and promote sectoral growth in Perlis, Malaysia. While the benefits are evident tackling current difficulties through targeted, inclusive, and adaptive ways is critical. Regions such as Perlis can achieve long-term economic development and better livelihoods for their citizens by developing a trained and knowledgeable agricultural workforce. Policymakers should also address the specific requirements and limits of different types of farmers, such as smallholders, women, and youth, to ensure that skill development initiatives are inclusive and equitable.

3.0 Methodology

3.1 Data & Analysis Procedure

This study focuses on the impact of strengthening agriculture skills towards poverty alleviation in Perlis, Malaysia. The respondents in this study are hard-core poor individuals who participated in the *Basmi Miskin Tegar* (BMT) program. The sampling frame was derived from e-Kasih data provided by the Perlis Implementation Coordination Unit (ICU), and a total of 315 head-of-household samples were engaged in this study. The responses are sorted into two categories: traditional agriculture and alternative agriculture.

Following data collection, descriptive analysis will be performed to describe the demographic characteristics of the respondents, such as gender, marital status, education level, and occupation, by calculating the frequency and percentage for each category. Following the descriptive analysis, a score index for traditional and alternative agriculture will be generated using respondents' self-assessed skill levels. These scores will be used to assess the level of skill in both traditional and alternative farming approaches. The Likert scale answers will be transformed into numerical values, and each respondent's average score will be generated to reflect their ability level.

4.0 Findings and Discussions

4.1 Descriptive Analysis

Table 1 presents a descriptive analysis of the demographic characteristics of 315 respondents. The majority of the respondents are male and married. A significant portion has secondary education, with fewer having primary or tertiary education, and a small percentage having no formal education. In terms of occupation, the largest group works in labor and services, followed by agriculture and food & traditional goods, with a smaller percentage engaged in fisheries.

Table 1: Descriptive Analysis of Respondents' Demographic

n = 315

Variables	Frequency	Percentage (%)
Gender		
Male	239	76
Female	76	24
Marital Status		
Single	6	2
Married	252	80
Divorced	57	18
Education		
None	20	6
Primary	48	15
Secondary	225	72
Tertiary	22	7
Types of Work		
Agriculture	53	22
Fisheries	7	7
Food & Traditional Goods	46	20
Labor & Services	142	51

4.2 Skills Index (SI) for Traditional Agriculture and Alternative Agriculture

The measurement of human capital in the agriculture sector, particularly regarding skills, has gained significant attention in academic research. Applying a skill index in agriculture is highly beneficial in reducing poverty and enhancing income among farmers by providing a targeted approach to improving human capital. This index effectively identifies where interventions are most needed, such as in fundamental agriculture practices, modern technology adoption, or financial management. By improving these critical skills, farmers can engage in more efficient and sustainable farming, resulting in higher yields and better-quality products. This skill index is adapted from the past study by Abd Rahman (2013) and constructed by four key items: knowledge, involvement, skills, and interest. The index categorizes skill levels into four distinct ranges.

(i) $0.75 < SI \leq 1$ – High-skill level
(ii) $0.5 \leq SI < 0.75$ – Above moderate-skill level
(iii) $0.25 \leq SI < 0.5$ – Moderate-skill level
(iv) $0 \leq SI < 0.25$ – Low-skill level

Irrespective of the respondents' occupation, the graphs present the percentage of respondents involved in traditional agriculture (Figure 4) and alternative agriculture (Figure 5). In traditional agriculture, only 2% of respondents demonstrate high-level skills (SI > 0.75), while

27% possess above-moderate skills (SI between 0.5 and 0.75). The majority, 42%, fall within the moderate skill range (SI between 0.25 and 0.5), indicating that most respondents have mid-level skills. Meanwhile, 29% of respondents have low skills (SI below 0.25), reflecting a relatively large proportion with limited expertise in traditional farming.

In contrast, no respondents in alternative agriculture possess high skills (SI > 0.75), and only 7% exhibit above-moderate skills (SI between 0.5 and 0.75), suggesting that advanced skills are rare in this sector. The majority of respondents, 58%, fall within the moderate skill level (SI between 0.25 and 0.5), indicating a concentration of mid-level skills in alternative agriculture. However, 35% of respondents have low skills (SI below 0.25), a significant portion that highlights the prevalence of limited expertise in this sector. Comparatively, traditional agriculture has a wider distribution of skills, with more representation in the above-moderate and high-skill categories, while alternative agriculture is more concentrated at the moderate skill level, with a higher percentage of respondents in the low-skill category.

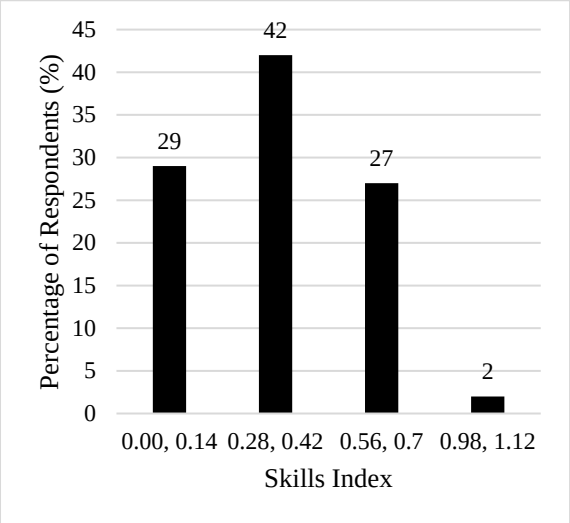

Figure 4: SI for Traditional Agriculture

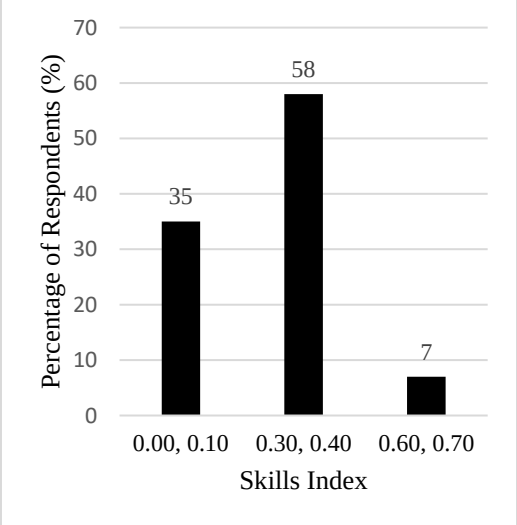

Figure 5: SI for Alternative Agriculture

4.3 The Distribution of Traditional Agriculture and Alternative Agriculture on Agriculture Skills Index

Table 2 shows the distribution of the agriculture skill index in traditional agriculture based on gender, types of work, and education. In terms of gender, males generally have a higher percentage in the above-moderate skill level (30.1%) compared to females (15.8%), though females dominate in the moderate skill category (56.6% versus 37.7% for males). Both genders have almost similar proportions in the high and low skill levels in agriculture, with males at 2.5% for high skills and 29.7% for low skills, compared to females at 1.3% and 26.3%, respectively. For the types of work, those involved in agriculture have the highest proportion in the high skill level (9.4%), while fisheries workers are largely concentrated in the low skill level in agriculture (71.4%), with none in the high or above-moderate categories. Workers in food and traditional goods mostly fall into the moderate skill level (65.2%), and labor and services workers are also largely represented in the moderate skill range (49.3%), with no workers in the high skill category.

When it comes to education, respondents with tertiary education stand out, having the highest percentage of individuals with high skills in agriculture (14.3%) and the lowest proportion in the low-skill category (14.3%). Those with secondary education have a substantial share in the

moderate and above-moderate skill levels, while primary education is linked to a larger percentage of respondents in the low skill level in agriculture (45.7%). Interestingly, respondents with no education are spread more evenly across skill levels, with 5% in the high skill category, 50% in the moderate skill level, and 20% each in the above-moderate and low skill levels. This overall analysis suggests that education plays a significant role in determining skill levels in traditional agriculture, with higher education correlating with higher skill levels, while certain types of work, such as fisheries, exhibit a concentration of low skills in the agriculture sector.

Table 2: The Distribution of Traditional Agriculture

	Percentage (%)			
Variables	High Skill Level	Above Moderate Skill Level	Moderate Skill Level	Low Skill Level
Gender				
Male	2.5	30.1	37.7	29.7
Female	1.3	15.8	56.6	26.3
Types of Work				
Agriculture	9.4	43.4	20.8	26.4
Fisheries	0	0	28.6	71.4
Food &Traditional Goods	2.2	6.5	65.2	26.1
Labor & Services	0	28	49.3	22.7
Education				
None	5	20	55	20
Primary	2.2	23.9	28.3	45.7
Secondary	0.7	29.9	41.6	27.7
Tertiary	14.3	28.6	42.9	14.3

Whilst, Table 3 shows the distribution of agriculture skill levels in alternative agriculture. For gender, males are predominantly in the moderate (56.5%) and low (36.8%) skill levels, with very few in the above moderate skill category (6.7%) and none in the high skill level. Females show a slightly different pattern, with 1.3% in the high skill level and 6.6% in the moderate (above) category. A majority of females (64.5%) fall into the moderate skill level, while 27.6% are in the low-skill category.

For the type of work, respondents involved in agriculture tend to be more concentrated in the moderate (50.9%) and low (43.4%) skill levels, with no representation in the high skill level. Fisheries show a contrast, with 71.4% in the low skill level and none in the high skill level in agriculture. On the other hand, those working in food and traditional goods have a small portion of highly skilled level in agriculture (2.2%), with the majority in the moderate skill level (67.4%). Labor and services workers are also largely in the moderate skill level (69.3%), with no individuals in the high skill level.

In terms of education, individuals with no formal education have some representation in the high skill level in agriculture (5%), but the majority (60%) are in the moderate skill level. Those with primary education are mostly split between moderate and low skill levels, while secondary-educated individuals are predominantly in the moderate skill level (58.4%). Remarkably, tertiary-educated individuals show no high-skill representation, but 60% fall into

the moderate-skill category. Overall, the table suggests that most individuals involved in alternative agriculture activities in Perlis fall into the moderate or low skill categories, with very few achieving high skill levels, regardless of gender, type of work, or education level.

Table 3: The Distribution of Alternative Agriculture

Variables	High Skill Level	Above Moderate Skill Level	Moderate Skill Level	Low Skill Level
Gender				
Male	0	6.7	56.5	36.8
Female	1.3	6.6	64.5	27.6
Types of Work				
Agriculture	0	5.7	50.9	43.4
Fisheries	0	0	28.6	71.4
Food &Traditional Goods	2.2	2.2	67.4	28.3
Labor & Services	0	6.7	69.3	24
Education				
None	5	5	60	30
Primary	0	4.3	47.8	47.8
Secondary	0	8.8	58.4	32.8
Tertiary	0	10	60	30

4.4 Discussion

Based on the findings, the government should consider implementing targeted interventions for hard-core poor respondents under the BMT program to improve their skills in the agriculture sector, as previous studies have shown that skill development has a significant impact on reducing poverty (Fabregas et al., 2019; Mustaffa et al., 2019). To achieve this, several strategies can be implemented. First, gender-specific training programs. Since males involved in agriculture have higher skill levels compared to females, particularly in traditional agriculture, the government should design and implement gender-specific training programs aimed at improving agriculture skills among women. This could involve providing women with access to agriculture tools, resources, and knowledge that cater specifically to their needs and challenges. Second, skill development workshops. Given that skill levels are significantly influenced by the type of work, the government should offer specialized programs or workshops that cater agriculture sectors. Third, support for alternative livelihoods. For individuals in other sectors like fisheries, where skill levels are lower, the government could provide support for diversifying their income sources. This might include training in alternative agriculture practices or other income-generating activities that complement their primary work. Fourth, agriculture extension services. Strengthening agriculture extension services that offer on-the-ground support and advice could help bridge the skill gap, particularly in traditional agriculture. These services can provide continuous education on skills and support, helping farmers to implement new practices effectively. Finally, access to credit and resources: Facilitating access to credit and agriculture inputs can empower low-skill farmers to improve their productivity. This could be paired with financial literacy programs to ensure that resources are used efficiently and effectively. By focusing on these interventions, the government can help to uplift skill levels across different demographic groups, particularly those most in need,

thereby improving agriculture productivity and increasing income among the poor under the BMT program.

5.0 Conclusions

In conclusion, the application of a skill index in the agriculture sector has shown to be a valuable tool for assessing and improving human capital, especially in poverty reduction efforts among BMT respondents. It also provides a clear and structured way to measure and evaluate the skill levels of individuals involved in farming. By quantifying skills, the index helps identify gaps in knowledge, technical ability, and practical expertise, enabling targeted interventions to enhance productivity. It allows for a more precise understanding of which areas need improvement, such as in financial management or technology adoption, thus making training programs for developing skills become more effective. Additionally, the skill index facilitates comparisons across different demographic groups, such as gender, education level, and type of work, enabling policymakers and stakeholders to design more inclusive and focused development programs. Ultimately, using a skill index helps optimize resource allocation and contributes to the long-term sustainability and growth of the agriculture sector, leading to higher yields, better economic outcomes, and poverty alleviation in Perlis, Malaysia.

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