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Enhancing Food Security with Strategic Livelihood Asset Utilization in Rural Communities, Kedah, Malaysia

Ahmad Zubir Ibrahim [1*], Aznita Samsi [2], Junaidah Hasan [3]

[1] *School of Government, Universiti Utara Malaysia,* MALAYSIA
[2] *School of Economics, Finance and Banking, Universiti Utara Malaysia*, MALAYSIA*; Email: aznita@uum.edu.my*
[3] *School of Economics, Finance and Banking, Universiti Utara Malaysia,* MALAYSIA*; Email: junaidah.hasan@uum.edu.my*

*__Corresponding Author:__ azubir@uum.edu.my

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ABSTRACT

This research examines the influence of livelihood assets on food security among low-income households in rural Kedah, Malaysia. A sample of 200 households was analyzed using PLS-SEM and SPSS. The results indicated that human and social assets positively affect overall well-being and contribute to improved food security. In contrast, physical, financial, and natural assets did not significantly impact this group's food security. The study suggests that low-income households can achieve food security by strategically managing their human and social resources. Recommendations include enhancing access to financial assets, education, and community support to boost food security, skill development, and income generation efforts.

Keywords: Livelihood Assets, Food Security, Rural Communities

INTRODUCTION

Food security is achieved when every person has constant access to sufficient, safe, and nutritious food to maintain a healthy and active life (FAO, 2001). Poverty significantly impacts food security, as families struggling with poverty often face difficulties in accessing sufficient food (United Nations, 1998), thereby contributing to household food insecurity. Research in Malaysia has shown that low-income households struggle to achieve food security. The struggle for food security is directly linked to the livelihood resources that poverty-stricken households possess. Factors such as low incomes, large family sizes, limited employment opportunities, low education, and a lack of skills and training contribute significantly to these challenges. Furthermore, financial burdens like monthly payments for furniture and appliances and debts from housing, vehicles, personal loans, and investments (averaging RM3,612 monthly) further limit their ability to achieve food security (Department of Statistics, 2020).

Natural disasters (floods, droughts, climate change) and economic shocks (such as inflation) also impact the food security of low-income households. Chambers (1989) defines vulnerability as exposure to risks and stresses while lacking the resources to adapt. Vulnerability can involve physical weakness, financial hardship, social dependence, and psychological strain. Ibrahim et., al (2018) emphasized that having more assets can reduce vulnerability, while losing assets increases insecurity. Thus, this study investigates the role of livelihood assets in improving food security for low-income households in rural Kedah, Malaysia.

Food Security Concept

Food security refers to the situation where everyone has consistent access to sufficient, safe, and nutritious food (Zhou et al., 2019). Over the past three decades, the understanding of food security has evolved in tandem

with policy changes (Clay, 2002). It includes ensuring a national food balance and providing families with the resources to purchase or produce food (Chen & Kates, 1994). FAO (2001) outlined four pillars for food security: availability, access, utilization, and stability, all of which must be satisfied (as a Chart 1).

Efforts to ensure food security require equitable access to safe and nutritious food. Local knowledge, which is influenced by various power dynamics, also plays a role (McNamara & Wood, 2019; Ibrahim, 2023). Poor households often allocate a significant portion of their income to staple foods, making them more vulnerable to price spikes. Therefore, reducing poverty is essential for enhancing food security.

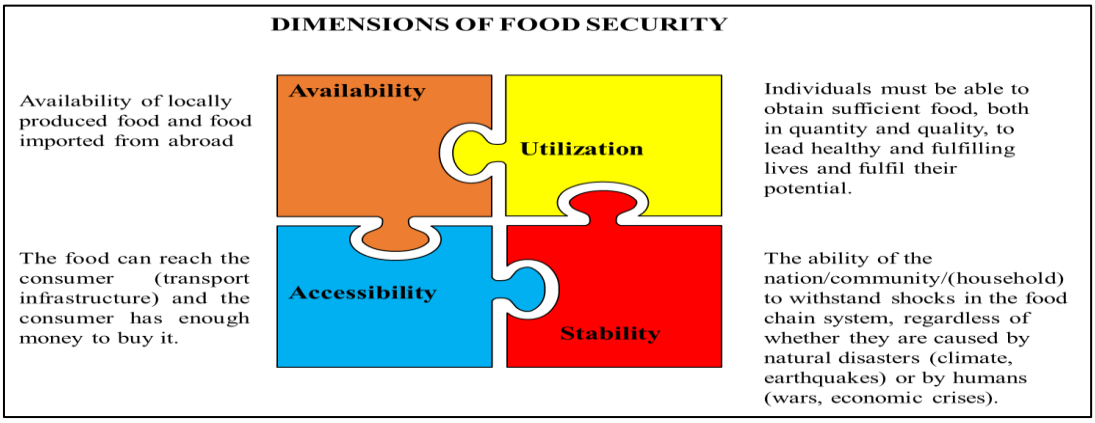

Figure 1: Dimension of food security

Livelihood Assets and Food Security

Livelihood assets encompass the resources and skills individuals possess to support themselves, as illustrated in Figure 2. Lim and Mansor (2016) explain that these assets contribute to increased income, more efficient use of environmental resources, and improved food security by minimizing vulnerability. Ibrahim et al. (2018) identified a strong connection between livelihood assets and positive results such as food security. Ellis (2000) contends that these assets are fundamental to households' capabilities to produce goods, generate income, and engage in exchanges with others. These assets comprise human capital (skills and experience), social capital (community ties), natural resources, and physical and financial resources (Gebrehiwot & Fekadu, 2012).

Figure 2 illustrates the types of livelihood assets, as outlined by Kollmair & Juli (2002). Measuring these assets helps assess the sustainability of households' livelihoods. For instance, Nesar et al. (2010) demonstrated that fishing communities in Bangladesh faced challenges due to inadequate health services, which impacted their income. In Johor, Malaysia, Anna et al. (2011) found that improved infrastructure contributed to enhanced well-being among the population. Lawal et al. (2011) in Nigeria found that land ownership and the use of machinery were associated with poverty reduction. These studies indicate that fundamental infrastructure, including water supply, electricity, transportation, and household appliances, is crucial for sustainable livelihoods.

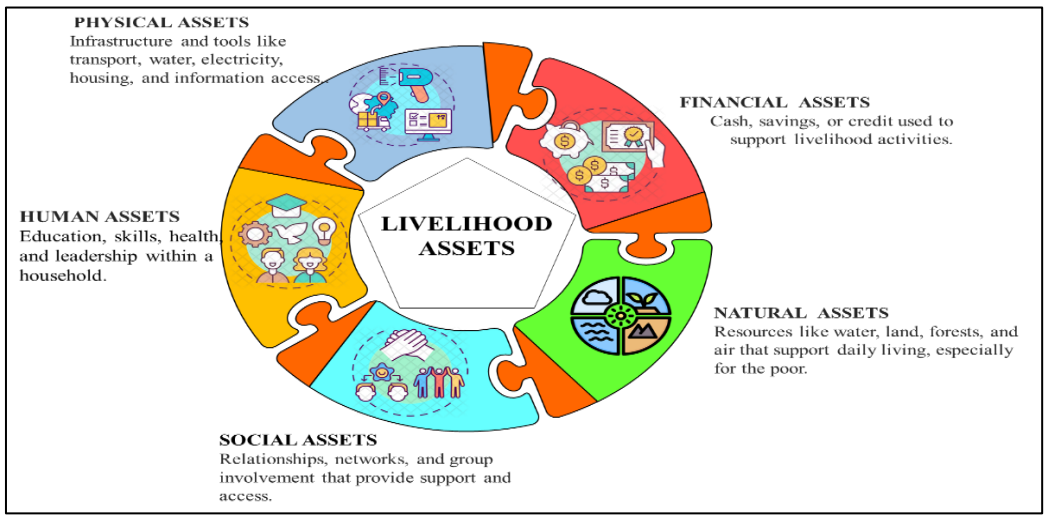

Figure 2: Livelihood Asset
Source: Kollmair & Juli, 2002

Financial assets refer to cash and other financial resources that individuals use to achieve their goals and support various aspects of their livelihoods. Key financial assets include income, savings, access to credit, and remittances (Thulstrup, 2015). There is a direct link between household income and savings, indicating that higher income generally leads to better financial security (Anna et al., 2011). Many studies have found that owning financial assets enhances the livelihoods of individuals with low incomes. Lawal et al. (2011) discovered that cooperative funds reduced poverty by 34% among farmers. However, older adults, women, fishermen, and farmers without financial assets often continue to experience poverty (Mustaffa et al., 2012). Bashir et al. (2012) found that income has a positive impact on food security. This study's financial assets include savings, income, access to credit, and external assistance.

Human assets encompass education, job status, and health (Anna et al., 2011; Mustaffa et al., 2014). These factors significantly influence livelihoods and can help reduce poverty. For example, Lawal et al. (2011) and Ibrahim (2023) found that education, farming experience, and good health all have a positive impact on livelihoods. Bashir et al. (2012) demonstrated that household heads with more education enjoy better food security. Abdullah et al. (2017) emphasized that education leads to better-paying jobs, which are crucial for food security. Mustaffa et al. (2012) found that a lack of education and job opportunities in Che Wong communities increased their vulnerability. Therefore, this study utilizes education, job status, and health as indicators of human assets.

Social assets encompass networks, norms, and trust that facilitate collaboration for mutual benefit (Li et al., 2020). These assets include community involvement and social activities, which can enhance household income (Anna et al., 2011). Social assets bolster livelihoods. Gallaher et al. (2013) found that more social assets contribute to improved food security. Neighbors and community members often support one another during difficult times, whereas the absence of social networks can lead to increased insecurity (Mustaffa et al., 2012). This study assesses social capital by examining participation in community programs, associations, and relationships.

Natural assets are also important. Poor soil fertility can decrease crop productivity and farmer income (Mustaffa et al., 2012). Pollution can harm health and lower people's ability to work (Tacoli, 1999). Effective natural resource management can enhance incomes, whereas poor management can diminish them (Tacoli, 1999). In this study, natural resources are assessed by land ownership and the use of plants as food sources.

Among all asset categories, financial assets are the most flexible because they can be converted into other forms of capital or used directly to meet needs, such as buying food or paying for education. However, since financial assets are often more difficult for the poor to access, other assets are also essential, as they can be exchanged for financial resources when needed (Kollmair & Juli, 2002).

In summary, Figure 3 presents the research framework, which visually connects household livelihood assets with food security and predicts a positive relationship.

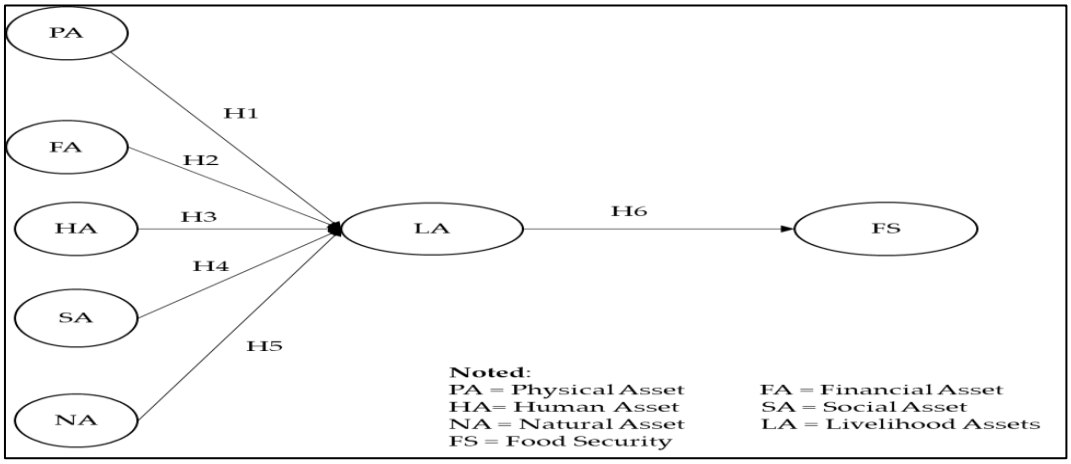

Figure 3: Study Framework

METHODOLOGY

Sampling, Data Collection, and Analysis

The study was carried out in four rural villages in Kedah: Baling, Alor Setar, Pendang, and Padang Terap (see Figure 4). A total of 200 low-income households were surveyed. The questionnaire consisted of three sections:

- Section A gathered demographic details like gender, age, marital status, occupation, and household size.
- Section B focused on what livelihood assets low-income households owned.

- Section C explored how these assets were linked to food security.

The survey utilized continuous data, five-point Likert scales, and open-ended questions. To test the proposed hypotheses (see Figure 3), the study employed the Partial Least Squares-Structural Equation Model (PLS-SEM) and SPSS. Figure 4 illustrates the overall sampling and data collection process.

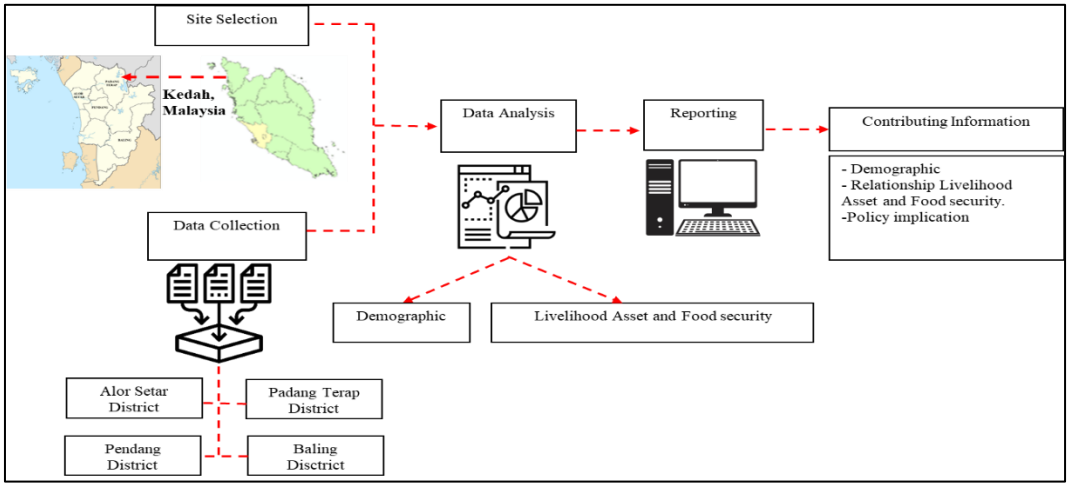

Figure 4: Sampling and data collection process

RESULTS AND ANALYSIS

Demographic Characteristics

Most residents in these rural areas continue to live in traditional villages, engaged in fishing, farming, and paddy cultivation. Household heads were selected as respondents because they generally make significant household decisions. Of the 200 questionnaires distributed to zakat recipients in Kedah State, 193 were usable, reflecting a 96.5% response rate. Chart 1 summarizes the socio-demographic characteristics of the respondents: 42% were male, while 58% were female. The largest age group was 61–80 (48%), followed by 41–60 (37%). Many respondents are elderly, with a smaller proportion (9%) aged 21–40 and only 6% over 80.

Regarding education, 18% had no formal schooling, 11.9% attended only informal religious schools, and 42% received some primary education. Marital status data showed that 60% were married, 7% single, and 33% widowed. "Single" here means never married, "widowed" refers to those whose spouse had died, and "divorced" to those separated from a previous spouse.

Regarding transportation, motorbikes were most common 62.8% of respondents owned one. Cars were owned by 22.3%, while 12.9% used bicycles. For appliances, 86.01% owned televisions, 35.75% owned radios, 83.94% had washing machines, and 64.77% had refrigerators. Regarding communication, 65.8% of respondents owned a mobile phone.

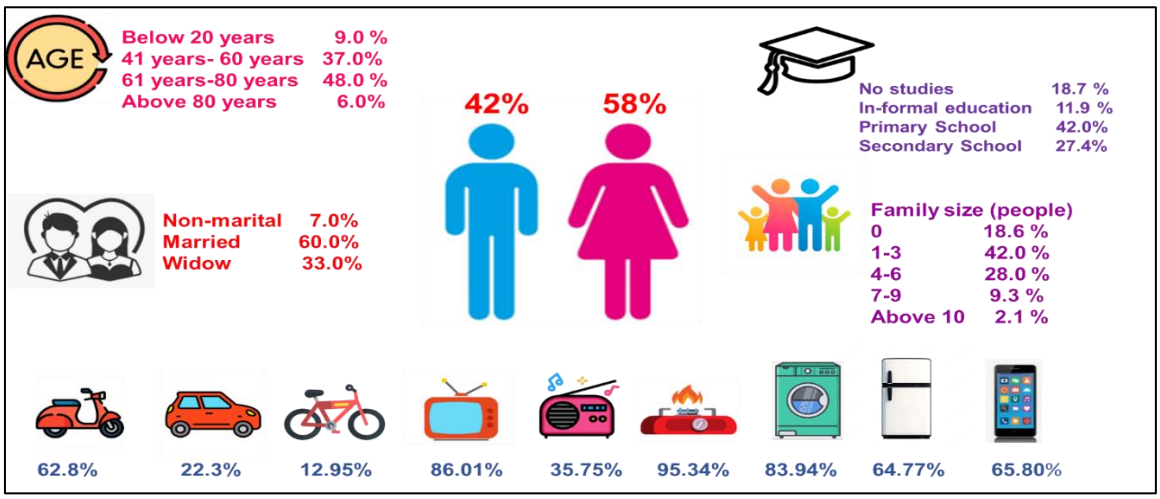

Chart 1: Socio-demographic Characteristics of Respondents

The average monthly income was RM 803.24 (USD 193.67). The monthly income primarily consisted of main income (RM 317.28), spouse's income (RM 173.50), children's contributions (RM 63.46), pensions (RM 140.57), social assistance (RM 56.23), and zakat (RM 52.21). Although zakat contributions were minor, they contributed to the total income (Chart 2). Expenditures averaged RM 672.25 each month, with 24.7% allocated to food and beverages (RM 166.05) and 19.1% dedicated to children's education (RM 128.40). Despite facing financial hardships, this group prioritizes their children's education, demonstrating their hope for a brighter future for the next generation. (Chart 3).

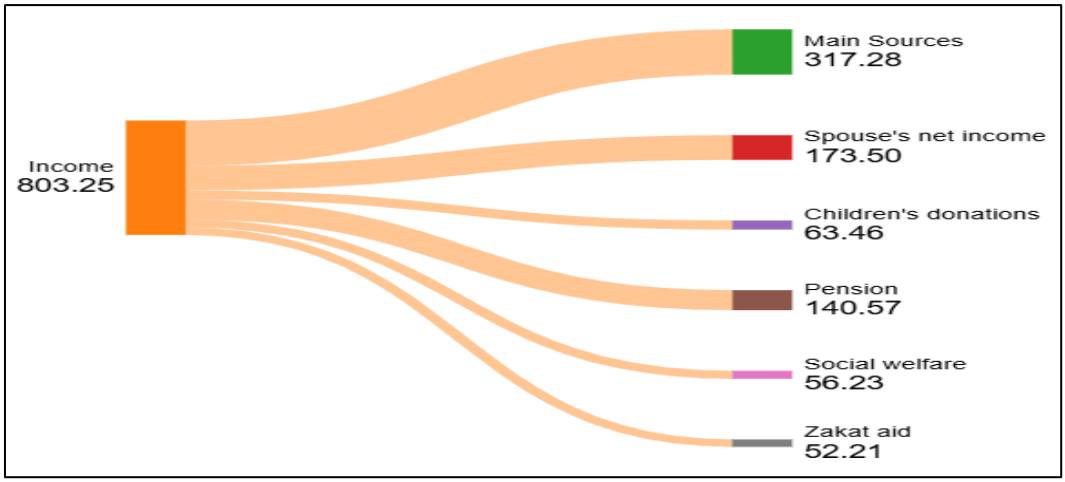

Chart 2: Mean Household Income (RM/month)

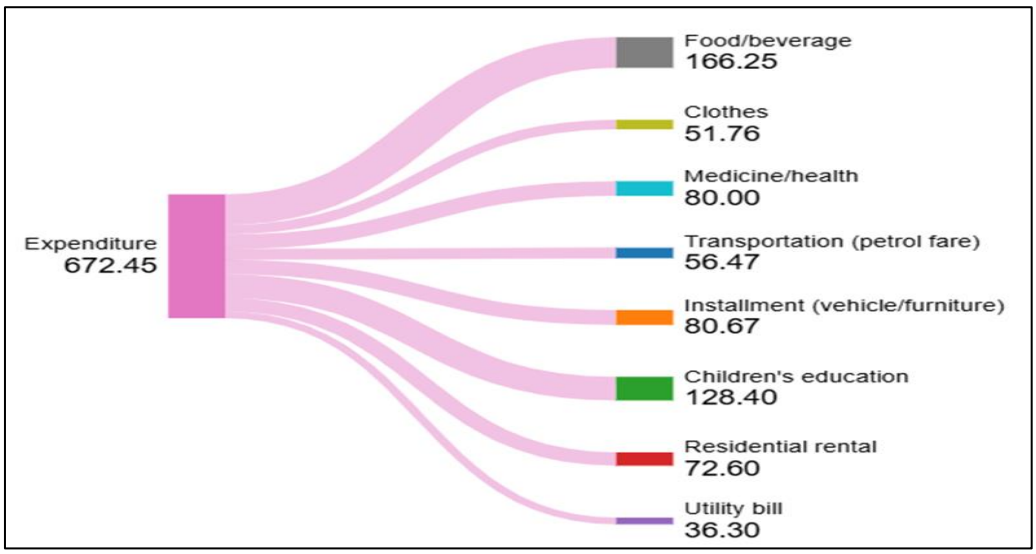

Chart 3: Mean Household Expenditure (RM/month)

Evaluation of the Measurement Model

Item Reliability

In PLS-SEM, item reliability measures how consistently and stably the measurement tools (like survey scales) capture data. Metrics such as Cronbach's alpha and composite reliability are employed to evaluate this, indicating whether the questions reliably reflect the constructs they are designed to measure. A value of 0.5 or higher is generally considered acceptable (Hair et al., 2011). Table 1 summarizes the reliability values for the study's variables.

Convergent Validity

Convergent validity tests whether different items designed to measure the same concept align. In PLS-SEM, this is typically examined through Average Variance Extracted (AVE) and factor loadings. High factor loadings and AVE values (above 0.50) confirm that the indicators consistently represent the same construct (Fornell & Larcker, 1981). Table 1 confirms that the constructs used in this study meet these criteria.

Table 1: Composite Reliability and Convergent Validity

Model Construct	Measurement Item	Loading	Average Variance Extracted (AVE)	Composite reliability (CR)
Physical Asset (PA)	AF1- Mobility Access	0.73	0.54	0.70
	AF3- Basic Utility Access	0.74		
Financial Asset (FA)	AK1- Religious Financial Support	0.61	0.68	0.80
	AK2- Access to Credit	0.99		
Human Asset (HA)	AM2- Household Head Age	0.79	0.68	0.86
	AM3- Well-being Condition	0.80		
	AM4- Educational Awareness	0.87		
Social Assets (SA)	AS1- Community Engagement	0.91	0.81	0.93
	AS3 -Organizational Membership	0.93		
	AS5- Social Connectivity	0.85		
Natural Asset (NA)	ASJ1-Property Possession	0.61	0.68	0.80
	ASJ2- Homegrown Food Resources	0.99		
Food Security (FS)	HP1- Food Supply Access	0.82	0.76	0.91
	HP2- Ability to Obtain Food	0.89		
	HP4- Effective Food Use	0.90		

Discriminant Validity

Discriminant validity determines whether different constructs are genuinely distinct from one another. In PLS-SEM, this is often assessed using the Fornell-Larcker criterion, which compares the square root of AVE with the correlations among constructs. Table 2 indicates that all constructs meet the required threshold, confirming that they measure different aspects of the study.

Table 2: Discriminant Validity (Fornell-Larcker Criterion)

	FA	FS	HA	LA	NA	PA	SA
FA	0.82						
FS	0.15	0.87					
HA	0.42	0.37	0.82				
LA	0.18	0.33	0.25	1.00			
NA	0.15	0.11	0.31	0.10	0.82		
PA	0.06	0.12	0.19	0.14	0.08	0.73	
SA	0.21	0.24	0.21	0.24	0.10	0.31	0.90

Structural Model Estimation

The structural model in PLS-SEM evaluates the relationships between independent (exogenous) and dependent (endogenous) variables. This includes estimating the strength and significance of these relationships using path coefficients, t-values, and p-values (Hair et al., 2014). This study examined the impact of various livelihood assets (human, social, physical, financial, and natural) on food security, as illustrated in Figure 5.

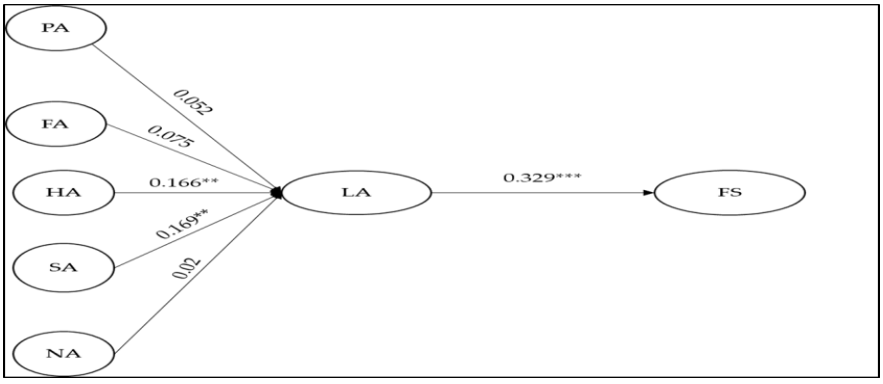

Figure 5: Structural Model

Table 3: Hypothesis Testing Results

Hypotheses	Path Relationship and Direction	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STERR|)	P Values
H1	PA -> LA	0.071	0.071	0.735	0.463
H2	FA -> LA	0.090	0.092	0.813	0.417
H3	HA -> LA	0.167	0.083	1.994	0.047**
H4	SA -> LA	0.171	0.070	2.416	0.016**
H5	NA -> LA	0.015	0.099	0.204	0.838
H6	LA -> FS	0.334	0.074	4.458	0.000***

Based on Table 3, study find out:

- H3 and H4 were supported, showing that human and social assets significantly improve livelihood outcomes.
- H6 was also supported, indicating that livelihood assets significantly influence food security.
- Physical, financial, and natural assets (H1, H2, H5) had positive yet statistically insignificant relationships with livelihood assets.

The insignificant result for natural assets reflects respondents' lack of land ownership, which affects food production and security. The results validate the model predicting that access to livelihood assets, especially human and social ones, and zakat support, positively impacts food security.

RESULTS AND DISCUSSION

This study investigated the impact of various livelihood assets on food security among low-income households in rural Kedah, Malaysia. The findings indicated that most families primarily depend on agricultural work for their income. However, many households lack adequate livelihood resources, particularly financial capital.

This study evaluated human assets based on education, age, and health. A significant portion of the population had low educational attainment, with 42% lacking formal education in government schools. Not surprisingly, the analysis revealed that higher education levels are associated with improved food security. Educated households are generally more capable of securing adequate food, while less educated ones face greater food insecurity (Bashir et al., 2012; Gebre, 2012).

Additionally, 42% of respondents were unemployed, primarily due to old age or poor health. Many of those who were employed held low-income jobs such as rubber tapping and fishing. Health issues also added to financial strain, as many respondents were unable to work and needed to manage medical expenses. These findings confirm that low levels of human capital, particularly in education and health, present significant barriers to achieving food security.

The data also indicated that 91.7% of respondents had no savings. Without a steady income, they relied heavily on support from the Kedah Zakat Board (LZNK), the Department of Social Welfare (JKM), and family members. Approximately 20% of respondents earned less than RM500 monthly. Some were also burdened by monthly payments for household goods, vehicles, and other debts, which further strained their limited income. These financial hardships significantly undermined their ability to purchase enough food.

Previous studies (e.g., Krishna, 2002) have demonstrated that social assets play a crucial role in enhancing economic resilience and food security. In this study, community ties were strong, as respondents frequently participated in local events and programs organized by government and non-government organizations. These social networks served as informal safety nets, providing support to families during difficult times.

Land ownership was minimal among respondents, and many lived a considerable distance from urban markets, averaging around 8 km. This limited their access to affordable and nutritious food. Due to the lack of healthy food options in rural areas, families often had to travel long distances or settle for less nutritious alternatives.

CONCLUSION AND RECOMMENDATIONS

The primary objective of this study was to examine the impact of various types of livelihood assets on food security in low-income rural households. The analysis revealed that human and social assets have a significant and positive impact on households' overall livelihood status, thereby enhancing food security. However, physical, financial, and natural assets did not significantly affect this group.

Despite facing numerous economic challenges, low-income households in northern Malaysia have shown that the strategic use of human and social capital can enhance food security outcomes. However, access to livelihood assets, particularly financial resources, remains limited and requires urgent attention.

RECOMMENDATIONS

Based on the study's findings, it is clear that while human and social assets are crucial in enhancing food security among low-income households in rural Kedah, other vital livelihood assets such as financial, physical, and natural resources remain underutilized or inaccessible. To effectively tackle the food insecurity faced by these communities, targeted interventions must not only strengthen existing human and social capital but also expand access to education, healthcare, income opportunities, and essential services.

The following recommendations seek to provide a strategic framework for improving the livelihoods and food security of rural low-income populations through inclusive, sustainable, and community-driven approaches.

Education and Skills Development

- Household members should receive support through education, vocational training, and skills development programs.
- Community-based initiatives, such as smart farming, digital entrepreneurship, and outsourced services, can provide individuals with practical, income-generating skills.

Promotion of Entrepreneurship

- Promote income generation by supporting micro-businesses and local entrepreneurship.
- Offer opportunities for low-income individuals to participate in e-commerce and utilize local resources for business development.
- Facilitate integration into larger supply chains to support scaling their operations.

Improved Access to Education

- Provide scholarships and financial assistance for children from low-income families, especially for higher education and technical skills training (TVET).
- Ensure ongoing support for children's education to break the cycle of poverty across generations.

Healthcare Access and Affordability

- Improve healthcare infrastructure in rural areas to ensure primary healthcare is accessible and affordable.
- Enhance insurance coverage by implementing initiatives such as Health Skim or group insurance to minimize out-of-pocket medical expenses.
- Establish facilities like dialysis centers and senior care homes to support vulnerable populations.

Strengthening Community-Based Support Systems

- Utilize the existing social capital by promoting collaborative models and engaging community programs.
- Encourage collaboration among government agencies, NGOs, and local communities to maximize the effectiveness of development efforts.

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