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The Impact of Livelihood Security to Achieve Food Security Among Paddy Farmers in Non Granary Areas, In Malaysia

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Abstract

This study aimed to analyze the relationship between livelihood security and food security attainment among paddy farmers in non-granary areas. Face-to-face interviews were conducted with low-income rice farmers in Kedah and Kelantan States, Malaysia, involving a sample size of 400 households selected through stratified random sampling. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). A total of 388 paddy farmers participated in this study. The results indicate that the overall combination of livelihood security components positively correlates with the achievement of food security. Consequently, improvements in food security among farmers are proposed. Government intervention should be considered to enhance livelihood security among paddy farmers and low-income individuals, aligning with the optimal minimum requirements based on the Malaysian food pyramid. Initiatives to promote a balanced diet will be intensified through the food basket program for the poor.

Keywords: *Livelihood Security, Food Security, Paddy Farmers, Non-Granary Area, Malaysia*

INTRODUCTION

Livelihood security means that individuals and families are able to meet their basic needs and maintain an adequate quality of life by having sustainable access to key resources and opportunities (Mutahara et al, 2016). The concept of livelihood security aims to ensure that people can cope with and recover from stress and shocks while maintaining or improving their skills and assets. To achieve this goal, livelihood security requires a combination of human, social, economic, and natural capital in a given context (Mutahara et al, 2016; Asli & Rahman 2023).

Understanding livelihood is particularly important when addressing the challenges faced by vulnerable populations, such as people affected by climate change, conflict, or extreme poverty. By studying livelihood, researchers and policymakers can better support initiatives aimed at reducing vulnerabilities and promoting equitable development outcomes (Mutahara et al, 2016; Ibrahim et al, 2017; Tora et.al, 2022).

Livelihood security, in the context of rural development, encompasses the availability and accessibility of resources (Figure 1) and opportunities that ensure sustainable livelihoods for individuals and communities (Habib et al., 2023). This includes access to food, income-generating activities, basic services, and social protection. To address livelihood security in rural areas, it's crucial to define it comprehensively. Livelihood security goes beyond just income generation; it encompasses factors such as food security, access to healthcare, education, and social support systems. It also involves ensuring that there is resilience and adaptability to economic, environmental, and social shocks (Barela et al., 2018) . This means that livelihood security is not solely reliant on agricultural practices but also requires a holistic approach that addresses the various dimensions of poverty and vulnerability (Joseph & Andrew, 2008). By clearly defining livelihood security in rural areas, it becomes possible to design and implement targeted interventions that address the root causes of vulnerability and poverty. This involves understanding the specific challenges faced by rural communities and tailoring solutions that are sustainable, inclusive, and environmentally conscious (Ibrahim,2023).

In addition, partnerships and collaborations among various stakeholders including government agencies, non-governmental organizations, community groups, and private enterprises are vital for implementing effective interventions to improve livelihood security. These partnerships can leverage diverse expertise and resources to create holistic solutions that address both the immediate needs and long-term development goals of rural

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communities (Scoones, 1998). Some of the key issues in livelihood security among poor people include limited access to productive resources such as land and capital, lack of skills and education, inadequate infrastructure, limited market access, and social exclusion (Babu & Reidhead, 2000). Addressing these issues requires a multi-dimensional approach that encompasses interventions in areas such as land reform, microfinance, vocational training, infrastructure development, and social inclusion.

Livelihood security among poor people is a pressing concern that requires urgent attention. The challenges they face, including limited access to productive resources, lack of market access, climate change vulnerabilities, and social inequalities, have significant implications for their well-being and economic stability (Brew et al., 2016). To address these issues and improve livelihood security in rural areas, it is crucial to implement comprehensive and integrated approaches

Ensuring livelihood security among poor people involves addressing multiple dimensions of poverty and vulnerability, including access to resources, basic services, and social protection (Beyer et al., 2016).It also requires a comprehensive and holistic approach that involves partnerships and collaborations among various stakeholders. Additionally, it is important to consider the specific context and challenges faced by different regions and communities (Hossain et al., 2011).

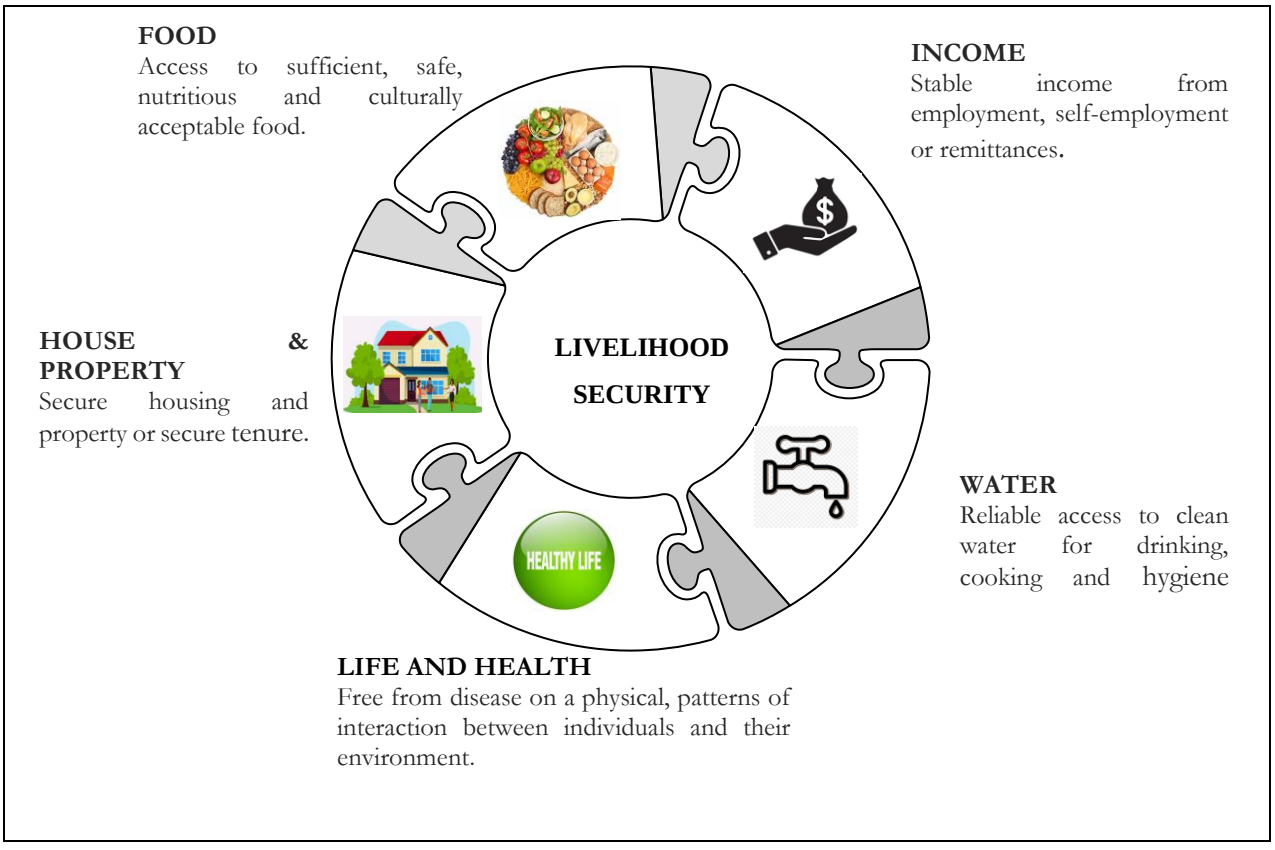

Figure 1: Livelihood Security Resources

Livelihood security is closely related to and significant for food security. The extent to which livelihood security is achieved depends on the level of food security, particularly within households. This is crucial for determining the welfare of low-income communities, especially paddy farmers. Enhancing each dimension of food security will improve farmers' well-being. Household livelihood security reflects the achievement of food security, specifically in terms of food availability, access, utilization, and stability (Ibrahim, 2023).

Food security is a subset of livelihood security, indicating that meeting nutritional needs is more critical than other basic household needs. Food security is achieved when all individuals have physical, social, and economic

access at all times to sufficient, safe, and nutritious food that meets their dietary needs and preferences for an active and healthy life. Household food security applies this concept at the family level, focusing on individuals within households. The details of the dimensions of food security are explained in Figure 2

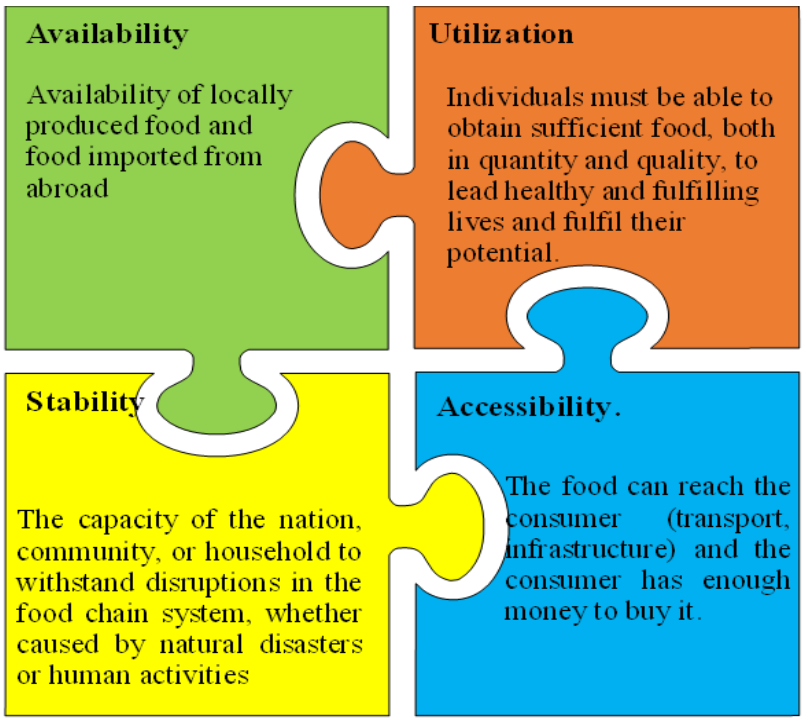

Figure 2: Dimension of Food Security

Source: modified FAO, 2008

Previous research has generally only examined livelihood security (Naz et al. 2020; Namubiru et al. (2019)). Few studies examine the impact of livelihood security on the dimensions of food security (food availability, food access, food utilization, and food stability) among the vulnerable groups. Thus, this study aims to find out, to analyze the relationship between livelihood security and food security attainment among paddy farmers in non-granary area. Compared to the present study, most previous studies focused on the Indigenous people (Orang Asli) (Gan et al. 2020; Siti Fatihah et al. 2020; Law et al. 2018; Chong et al. 2018; Wong et al. 2018; Nurfahalin et al. 2015; Wong et al. 2015; Haemamalar et. al 2010.

METHODOLOGY

Study Area

This study is implemented in Malaysia. The geographical coordinate of Malaysia is 30 8'N, 1010 41'E, and located at the Southeast Asia region. It is located at the South of Thailand and at the North of Singapore. Geographically, the total land area of Malaysia is 330,803 km2 with a total population in 2022 was about 33.87 million. In Malaysia, paddy production is produced by the "granary area" and "non-granary area". This term is often used to describe regions based on their agricultural characteristics, particularly rice cultivation.

Granary Area: Granary areas are regions where rice cultivation is highly developed and supported by advanced agricultural infrastructure, including irrigation systems, drainage networks, and other facilities. These areas are characterized by high productivity and efficiency in rice production. These areas typically have better access to resources and technology, leading to higher yields and income for rice farmers.

Non-Granary Area: Non-granary areas, on the other hand, are regions where rice cultivation is less developed and relies more on natural conditions such as rainfall rather than advanced irrigation systems. These areas may

lack the infrastructure and support necessary for high-intensity rice farming. Non-granary areas often face challenges such as water scarcity, limited access to modern agricultural practices, and lower productivity compared to granary areas..

This study was implemented in non-granary areas in Kedah and Kelantan. In Kedah, districts Padang Terap, Pendang, and Kubang Pasu are chosen as a study area, meanwhile, in Kelantan, this study is implemented in districts Pasir Puteh, Tanah Merah, and Tumpat.

Study Design

The study conducted a face-to-face interview of low-income paddy farmers non-granary in Kedah and Kelantan State, with a sample size of 400 households selected using stratified random sampling. The main criterion for selection was the paddy farmers with a monthly income below RM 2500. The questionnaire distributed in Kedah and Kelantan had two main sections:

Section A: Demographic characteristics including gender, age, marital status, occupation, household size, etc.

Section B: Information on the household livelihood components and Food Security dimension

The questionnaire included various types of questions such as continuous data, a five-point Likert scale, and open-ended questions. It's worth noting that the questionnaire was developed in the Malay language.

Data Analysis

Statistical analysis was performed using the SPSS software, ensuring that all data were thoroughly checked to prevent technical errors and missing values. The normality of the data was assessed using Cronbach's alpha. To investigate the relationship between livelihood assets and coping strategies on livelihood outcomes, data was analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM). Variables with loadings above 0.5 were retained, while those below 0.5 were excluded from the analysis (Hair et, al. 2010). The criteria for model acceptance included an Average Variance Extracted (AVE) value greater than 0.5 for each construct and a Composite Reliability (CR) exceeding 0.7. These parameters indicate the reliability and validity of the model (Hair et, al. 2010).

In summary, the research methodology represented in Figure 1

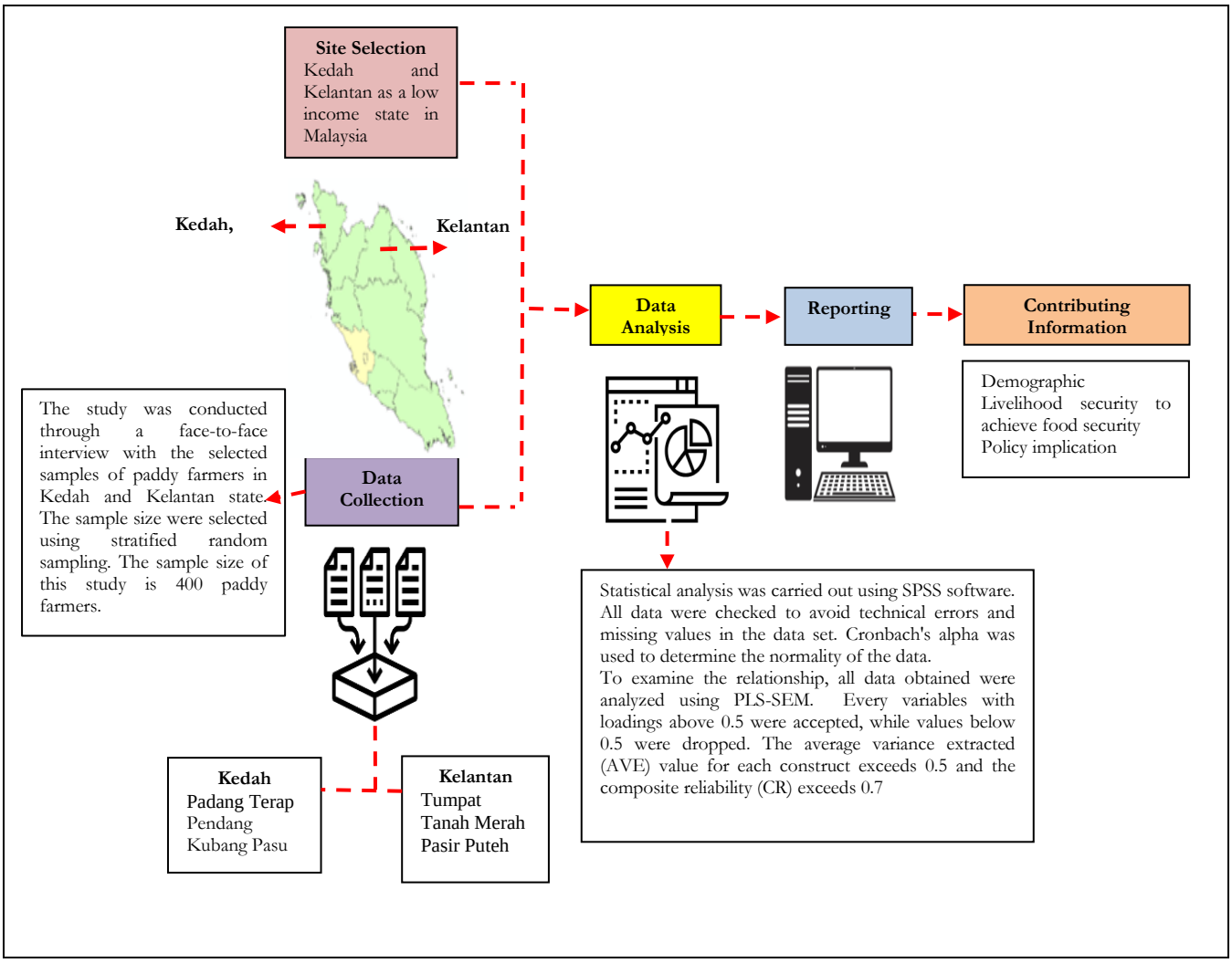

Figure 3 : Research Methodology

RESULTS

Demographic Background

Based on the research conducted, it was found that a total of 388 rice farmers participated in this study. Of these, 328 people paddy farmers are men, and the remaining 60 people are women. The average paddy farmer who participated in this study was married, with 323 people of them being married. Regarding their education levels, 82 people had secondary school education, 64 people had primary school education, 14 people had attended religion school, and 17 people had no formal education. The remaining participants held an STPM degree. The average experience of paddy farmers in rice cultivation is 14.95 years.

The results of the study also show that the average monthly income of this group is RM2520.50. The main income from rice farming contributes 35.22 percent (RM887.82) to the total income of this group, followed by secondary income (such as laborer, taxi driver, and rubber tapper) amounting to RM742.02 (29.44 percent). Spouse's income contributes 12.87 percent, and children's contributions add 11.37 percent to the monthly income of paddy farmers in areas outside the granaries. The study also indicates that paddy farmers in these areas spend an average of RM1505.18 per month on household expenses. More details on the income and expenditure of paddy farmers in non-granary areas such as in Table 1

Table 1, Income And Expenditure of Paddy Farmers in Non Granary Area

INCOME (MONTH)			EXPENDITURE (MONTH)		
Type of income	**RM**	**(%)**	**Type of expenditure**	**RM**	**%**
Main sources (Paddy)	887.82	35.22	Food and beverage	639.99	42.52
Side income (Labor, security guard)	742.02	29.44	Clothes	89.99	5.98
Other income (rubber tapper,)	20.10	0.80	Medicine/Health	69.52	4.62
Spouse income	324.44	12.87	Transportation (diesel, petrol)	187.11	12.43
Children's contribution	286.56	11.37	Installments (Motorcycle, car, furniture, etc.	173.77	11.54
Pension	128.68	5.11	Education (kids)	149.35	9.92
Cash Transfer (Welfare Department, Zakat)	130.88	5.19	Rent House	15.59	1.04
			Utility bill	179.86	11.95
Total	**2520.50**	**100.00**	**Total**	**1505.18**	**100.00**

Based on the Malaysia poverty line income reviewed in 2020, this study found that more than 50 percent of paddy farmers in the non-granary area are classified as poor, with incomes of less than RM2,500. Additionally, 32 percent have incomes between RM2,500 and RM4,849. Overall, nearly 89 percent of paddy farmers in the area belong to the B40 group, while the remaining 11 percent are in the M40 category. This classification allows the government to focus and provide targeted assistance to each paddy farmer according to their income level, ensuring that the social safety net is distributed according to the actual needs of each paddy farmer. More details on the classification of paddy farmers in non-granary can be found in Table 2.

Table 2 Classification of Paddy Farmers in Non-Granary area based on Income.

Household Group		Income Range (RM)	Income Range (USD)	Number	Percentage (%)
B40 Lower-income group	B1	Below 2,500	Below 562.24	215	55.4
	B2	2,500 - 3,169	562.24 - 712.70	53	13.7
	B3	3,170 - 3969	712.71 -892.61	39	10.1
	B4	3,970 - 4,849	892.62 - 1090.52	33	8.5
M40 Middle-income group	M1	4,850 – 5,879	1090.53 - 1322.16	21	5.4
	M2	5,880 -7,099	1322.17 - 1596.54	11	2.8
	M3	7,100- 8,699	1596.54 - 1956.37	12	3.1
	M4	8,700-10,959	1956.38 - 2464.64	4	1.0
T20 Upper class	T1	10,960 – 15,039	2464.65 - 3382.21	-	-
	T2	Above 15,039	Above 3382.21	-	-

Relationship between Livelihood Security to Food Security Among Paddy Farmers

Table 3 and Table 4 demonstrates the convergent validity and discriminant validity of the study's constructs. All constructs satisfy the criteria for individual item reliability, average variance extracted (AVE), and composite reliability. The subsequent table illustrates the discriminant validity of the study's latent constructs, indicating the degree of variance between and among the constructs.

Table 3 Reliability and Convergent Validity Assessment Results

Model Construct	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Community	0.88	0.91	0.94	0.90
Education	0.82	1.17	0.91	0.83
Environment	0.73	0.74	0.88	0.78
Food Security	0.74	0.83	0.85	0.66
Health	0.78	0.85	0.90	0.81
Income	0.60	0.61	0.83	0.71
Livelihood Asset	0.45	0.54	0.77	0.63
Personal	0.71	0.72	0.87	0.77
Protection	0.74	0.87	0.88	0.78
Security	0.87	0.88	0.92	0.79
Vulnerability	0.71	0.74	0.87	0.77
Water	0.87	0.88	0.94	0.89

Table 4 Discriminant Validity Analysis

Construct	Community	Education	Environment	Food security	Health	Income	Asset	Personal	Protection	Security	Vulnerability	Water
Community	**0.95**											
Education	0.35	**0.91**										
Environment	0.28	0.24	**0.89**									
Food Security	0.14	0.17	0.30	**0.81**								
Health	0.09	0.29	0.26	0.23	**0.90**							
Income	0.29	0.40	0.39	0.25	0.37	**0.84**						
Asset	0.48	0.36	0.36	0.16	0.33	0.70	**0.80**					
Personal	0.22	0.13	0.32	0.17	0.34	0.42	0.49	**0.88**				
Protection	0.26	0.35	0.32	0.16	0.41	0.45	0.47	0.37	**0.88**			
Security	0.14	0.20	0.38	0.27	0.49	0.53	0.48	0.61	0.41	**0.89**		
Vulnerability	0.14	0.07	0.36	0.57	0.29	0.21	0.21	0.28	0.20	0.31	**0.88**	
Water	-0.02	0.03	0.29	0.25	0.30	0.27	0.26	0.40	0.28	0.41	0.33	**0.94**

Table 5 Hypothesis Testing Result

Path relationship and Direction	β	Standard Deviation	T Statistics	Results
Action -> Livelihood Security	-0.03	0.06	0.36	Non Significance
Community -> Livelihood Security	0.01	0.05	0.21	Non Significance
Education -> Livelihood Security	0.05	0.05	0.93	Non Significance
Environment -> Livelihood Security	0.08	0.06	1.23	Non Significance
Health -> Livelihood Security	-0.06	0.06	0.97	Non Significance
Income -> Livelihood Security	0.16	0.06	2.57***	Significance
Livelihood Asset -> Action	0.49	0.05	10.69***	Significance
Livelihood Security -> Food Security	0.18	0.05	3.85***	Significance
Personal -> Livelihood Security	0.12	0.06	1.87*	Significance
Protection -> Livelihood Security	0.08	0.06	1.23	Non Significance
Security -> Livelihood Security	0.13	0.07	1.94**	Significance
Vulnerability -> Action	0.09	0.05	1.84*	Significance
Water -> Livelihood Security	0.26	0.05	5.02**	Significance

Note: (***) significant at 1%, (**) significant at 5%, and value without asterisk stand for nonsignificant.

Table 5 shows the results of testing the structural model. These show that (income β = 0.16, T value = 2.57; Livelihood Asset β = 0.49, T value = 10.69; Livelihood security β = 0.18, T value = 3.85; personal β = 0.12, T value = 1.87; security β = 0.13, T value = 1.94, vulnerability β = 0.09, T value = 1.84, water β = 0.26, T value = 5.02) significant and positive relationship with path relationship. However, the construct action, community, education, environment, and health show non-significance and positive except health and action construct to the livelihood security construct. The overall relationship between Livelihood Security to Food Security Among Paddy Farmers in non-granary areas in Malaysia is presented in Figure 4.

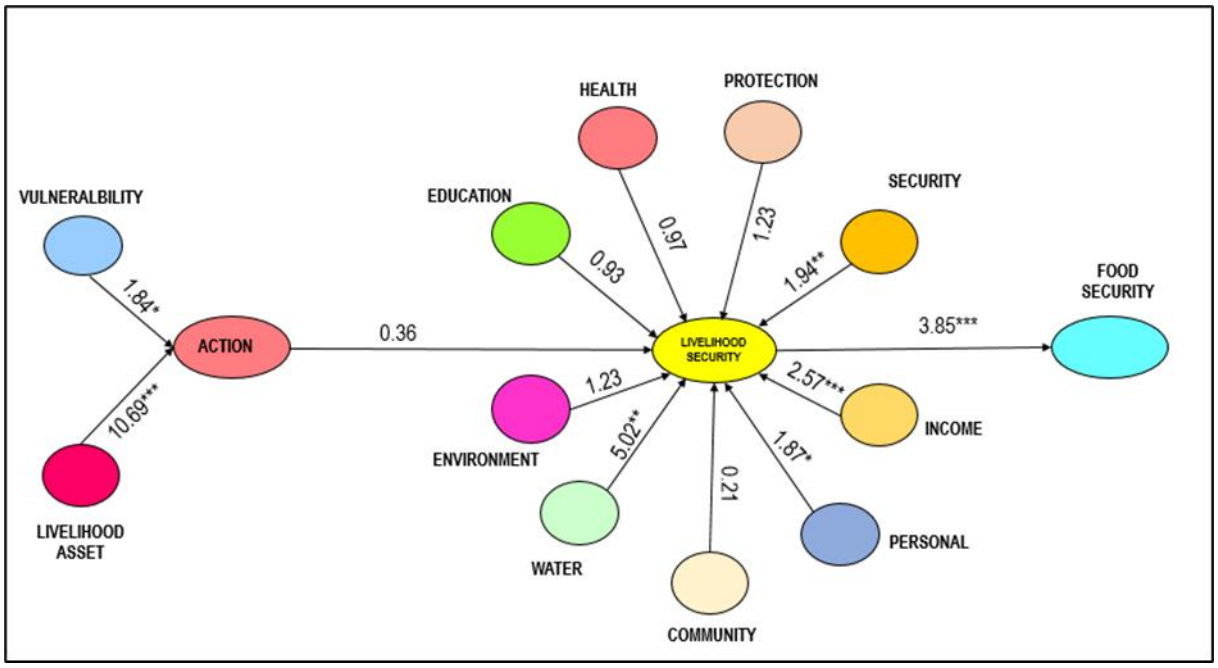

Figure 4 Relationship between Livelihood Security to Food Security Among Paddy Farmers

DISCUSSION AND CONCLUSION

The study results indicate that most paddy farmers in non-granary areas have low education levels and are of advanced age, hindering effective technology transfer. Most farmers have less than 10 years of experience in paddy farming. The average paddy farmer in the study belongs to the vulnerable B40 group, with an income of less than RM4,850. Specifically, 54.9 percent of the farmers earn less than RM2,500, indicating that many are still trapped in poverty. However, a small proportion of farmers have moved into the middle-income M40 category.

Most paddy farmers (43.3 percent) rely primarily on paddy farming as their main source of income, while others work as rubber tappers, laborers, and in similar occupations. The large household sizes of these farmers also impact their household expenditure. The study clearly shows that actions and livelihood measures are negatively correlated, suggesting that owning assets does not necessarily guarantee security for these farmers. However, components such as education, health, housing, environment, security, income, personal, community, and water contribute to achieving food security for this group. Among these, community, education, and environment are positively related to livelihood security, though not significantly.

These aspects should be prioritized to ensure the well-being of this group. However, the health component is negatively related to livelihood security due to poor health among most farmers and the considerable distance to health centers. Additionally, household members often have poor health and are responsible for taking care of the group. Despite this, the overall combination of livelihood security components has shown a positive relationship with the achievement of food security. Improvements in food security among farmers are thus proposed.

To improve the livelihood security among paddy farmers or low-income people, government intervention should be considered to implement (as above) to improve livelihood security and sustain

Upgrading and Diversifying Income

Existing social welfare programs for paddy farmers should be expanded, including cash transfers, and healthcare should continue to be means-tested. Productive welfare programs, such as those focused on entrepreneurship and microfinance, need to be intensified to provide economic opportunities for rice farmers. Additionally, education and training for paddy farmer households should be strengthened to improve employability and the ability to engage in income-generating activities. Basic financial education should also be enhanced to increase the financial literacy of rice farmers.

Access to Basic Services

Improving access to basic services is crucial for poverty reduction. Enhancing access to quality education, training, and healthcare will be prioritized. These initiatives aim to increase the well-being of the poor and improve their standard of living.

Enhancing Quality Education and Training

The provision of quality education must be expanded to improve the educational attainment of members of rice farming households. Subsidization should be continued and expanded to provide more affordable and quality childcare services to rice farmers. Steps will be taken to make early childhood education accessible to all, while efforts will be increased to ensure that children from poor families complete 11 years of compulsory education. Additionally, targeted measures such as scholarships will be offered to reduce school dropout rates in poor households. Scholarships will also be provided to reduce the financial burden of attending skills training, vocational training, and higher education, thereby improving the economic and social mobility and employability of poor households.

Improving Health Services

Efforts to improve the health of rice farmers should focus on better care for the population, from prenatal care to geriatric services. Additionally, awareness of the importance of good health should be further promoted by

emphasizing a balanced diet at all stages of life. Initiatives to promote a balanced diet will be intensified through the food basket program for the poor, in line with the optimal minimum requirement based on the Malaysian food pyramid. These measures aim to reduce infant mortality rates, increase life expectancy, and promote an active and healthy lifestyle. This is particularly important in early childhood, a crucial period for a child's development when the foundations for learning and well-being are established.

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