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Impact of COVID-19 on Food Consumption Patterns among Rural Households in the Northeast of Thailand.

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ABSTRACT

This paper aims to examine changes in food consumption patterns within rural communities and the effects of the COVID-19 situation on household food expenditure. The study utilizes secondary data from TVSEP for quantitative statistical analysis, supplemented by primary qualitative data obtained through in-depth interviews. The results show that rural food consumption patterns have continually evolved, primarily due to economic development and infrastructure improvements. These changes have several impacts. On the positive side, rural residents now enjoy a more diverse, convenient, and hygienic diet. However, the downside includes careless consumption behaviors, resulting in diet-related diseases such as hypertension and diabetes, which pose significant health concerns for rural populations that have fewer healthcare facilities compared to urban areas. Additionally, changes in consumption habits may lead to the disappearance of certain traditional foods, as younger generations tend to prefer convenient foods. During the COVID-19 pandemic, short term issues related to food accessibility were observed. In the long run, however, the COVID-19 situation had positive effects, as rural residents became more cautious about hygienic food consumption, potentially leading to better health outcomes. Econometric results indicate that the COVID-19 pandemic led rural households to reduce expenditures across all categories. However, food remains a necessity for survival, resulting in a higher proportion of food expenditure compared to less essential goods. The research suggests that stakeholders should focus on preserving local food traditions, being cautious about nutrition-related diseases, and promoting the sustainable use of natural resources among rural populations.

Keywords: COVID-19, food consumption, food security, rural areas

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Background and Significance of the Research Problem

The COVID-19 pandemic has disrupted economic activities and food systems worldwide, raising concerns about household food security and consumption behavior. Containment measures such as lockdowns, travel restrictions, and business closures affected labor markets and household incomes, which in turn influenced the ability of households to access food and other essential goods. Globally, the pandemic increased the risk of food insecurity due to both supply chain disruptions and declining household purchasing power (FAO et al., 2021; United Nations, 2020). These challenges highlight the importance of understanding how households adjust their consumption behavior during economic shocks.

Thailand's economy was also significantly affected by the pandemic, particularly because of its dependence on tourism and service-related sectors. International travel restrictions led to a dramatic decline in tourist arrivals, reducing economic activity and employment opportunities (Ministry of Tourism and Sports, 2023). These impacts were particularly pronounced among workers in urban areas, many of whom are employed in informal or service-sector occupations. When lockdown measures were implemented, some migrant workers returned to their rural hometowns, potentially increasing economic pressure on rural households and altering household consumption patterns.

Although rural areas in Thailand are often characterized by agricultural production and relatively better access to locally produced food, rural households have become increasingly integrated into market-based food systems. Changes in income sources, migration patterns, and market access may therefore influence household food consumption behavior. During the COVID-19 pandemic, disruptions in employment and remittance flows may have affected rural households' consumption decisions, including how they allocate expenditures between food and non-food items.

Existing research on food consumption during the COVID-19 pandemic has focused largely on urban populations and short-term food insecurity indicators (Phulkerd et al., 2022; Sereenonchai and Arunrat, 2021). However, relatively little empirical evidence is available on how rural households adjust their food expenditure and consumption patterns during economic shocks, particularly using long-term household panel data. Understanding these behavioral adjustments is important for assessing the resilience of rural food systems and for designing policies that support food security during future crises.

Therefore, this study examines changes in food consumption and household food expenditure among rural households in Northeastern Thailand during the COVID-19 pandemic.

Using panel data from the Thailand-Vietnam Socio-Economic Panel (TVSEP), the study analyzes how rural households adjusted their consumption behavior in response to the pandemic shock.

Research Objectives

1. To examine the overall patterns of food consumption and food security in rural Thailand.
2. To assess the impact of the COVID-19 on food expenditure and consumption patterns of rural households.

Literature Review

Food security has long been recognized as a multidimensional concept encompassing availability, access, utilization, and stability of food systems. According to the Food and Agriculture Organization (FAO, 2008), food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and preferences for an active and healthy life. These four dimensions are particularly relevant when analyzing food systems during crises, as economic shocks can affect not only food availability but also household access and consumption patterns. In rural economies, where households often rely on both market purchases and self-produced food, food security outcomes depend on the interaction between local production systems, market accessibility, and household income conditions.

From an economic perspective, household food consumption behavior is commonly explained through the framework of consumer demand theory and Engel's law. Engel's law suggests that the proportion of household expenditure devoted to food declines as household income increases, even though the absolute level of food expenditure may rise (Engel, 1857). This relationship forms the basis of the Engel curve, which describes the relationship between income and expenditure on specific consumption categories. Empirical studies have widely applied Engel-type models to analyze food consumption patterns and welfare conditions in both developed and developing countries. For example, Deaton and Muellbauer (1980) demonstrate that food expenditure shares provide valuable information about household welfare, particularly in low-income settings where food represents a large proportion of total household expenditure. Similarly, Deaton (1997) emphasizes that food expenditure data are often used as reliable indicators of household welfare in developing countries. When household income declines due to economic shocks, the share of food expenditure typically increases as households prioritize essential consumption.

In addition to Engel's law, household consumption responses to economic shocks can also be explained by the theory of consumption smoothing. According to this framework, households attempt to maintain relatively stable consumption levels despite fluctuations in income by adjusting savings, borrowing, or reallocating expenditure across goods (Deaton, 1997). During economic crises, households often reduce non-essential consumption while protecting essential goods such as food. Empirical studies on rural households show that food consumption tends to be relatively resilient to income shocks, although total consumption may decline when household income falls.

Recent research has examined how the COVID-19 pandemic affected household consumption and food security worldwide. The pandemic disrupted supply chains, reduced employment opportunities, and lowered household incomes, particularly in developing countries. Empirical evidence from several countries suggests that households responded to the pandemic by adjusting their consumption patterns, often reducing non-food expenditures while maintaining food consumption due to its essential nature. For instance, Laborde et al. (2020) argue that the COVID-19 crisis significantly increased the risk of food insecurity due to declining incomes and disruptions in food supply chains. Similarly, Hirvonen et al. (2021) find that the pandemic affected household food consumption patterns through income shocks and mobility restrictions.

Despite the growing body of literature on COVID-19 and food security, most existing studies focus on short-term impacts and urban populations. Empirical evidence based on long-term rural panel data remains relatively limited. In the context of Thailand, research on food consumption during the COVID-19 pandemic has primarily focused on urban food delivery systems or short-term food insecurity indicators (Phulkerd et al., 2022; Sereenonchai Arunrat, 2021). Consequently, there is still limited understanding of how rural households adjusted their food consumption and expenditure patterns during the pandemic. By utilizing panel data from the Thailand-Vietnam Socio-Economic Panel (TVSEP), this study contributes to the literature by examining how rural households in Northeastern Thailand adjusted their food expenditure and consumption patterns in response to the COVID-19 shock.

Conceptual Framework

The conceptual framework of this study is based on the idea that external economic shocks can influence household consumption behavior through changes in income and economic conditions. The COVID-19 pandemic caused disruptions in economic activities,

particularly in sectors such as tourism, services, and informal employment. These disruptions affected household income and remittance flows, especially among rural households that rely partly on income from migrant workers employed in urban areas.

When households experience income shocks or economic uncertainty, they often adjust their consumption behavior to maintain essential consumption. According to household consumption theory, food is considered a necessity good, meaning that households tend to prioritize food consumption even when their income declines (Deaton, 1997; Deaton and Muellbauer, 1980). As a result, households may reduce non-essential expenditure while maintaining food consumption or reallocate their spending toward necessities.

Based on this framework, the COVID-19 pandemic may influence household food consumption through two related channels. First, the pandemic may affect the absolute level of food expenditure, as households adjust their spending in response to income changes. Second, the pandemic may influence the allocation of household expenditure, reflected in the proportion of food expenditure relative to total household spending. These two dimensions form the basis of the empirical analysis in this study. Household demographic and socio-economic characteristics, such as household size, age composition, education, and migration patterns, may also influence food consumption behavior. Therefore, the following hypotheses are proposed:

H1: The COVID-19 pandemic significantly affects the absolute level of household food expenditure among rural households.

H2: The COVID-19 pandemic significantly affects the share of food expenditure in total household expenditure, reflecting adjustments in household budget allocation during the economic shock.

Research Methodology

Data: This study uses both qualitative and quantitative data to examine changes in food consumption patterns and the impact of the COVID-19 pandemic on rural household food expenditure in Northeastern Thailand.

Qualitative information was obtained through in-depth interviews with community leaders from rural villages in Ubon Ratchathani Province. These interviews provide contextual insights into local food systems, changes in food consumption patterns, and community responses to economic and social changes over time.

The quantitative analysis relies on panel data from the Thailand-Vietnam Socio-Economic Panel (TVSEP) project. The TVSEP dataset surveys rural households across three provinces in Northeastern Thailand: Ubon Ratchathani, Buriram, and Nakhon Phanom. The panel includes approximately 2,200 households from 220 villages and collects detailed information on household demographics, income sources, migration, and consumption expenditure.

For this study, household survey data from the pre-COVID period (TVSEP household survey wave 2019) and the post-COVID (TVSEP household survey wave 2022) survey round are used to analyze changes in food expenditure behavior during the pandemic. The panel structure of the dataset allows the study to track changes in household consumption patterns over time.

Methodology: The empirical analysis examines how rural households adjusted their food expenditure during the COVID-19 pandemic. The study focuses on two dimensions of household food consumption behavior: the absolute level of food expenditure and the allocation of household expenditure toward food.

Panel data econometric techniques are employed to control unobserved household characteristics that may influence consumption behavior. Specifically, household fixed-effects models are used to estimate within-household changes in food expenditure before and after the COVID-19 pandemic. The fixed-effects approach controls time-invariant household characteristics, such as cultural preferences, dietary habits, and location-specific factors, which may affect food consumption. Two econometric models are estimated.

Econometric Model: two econometric models are applied.

Model 1: Absolute Food Expenditure

The first model examines whether the COVID-19 pandemic affected the absolute level of household food expenditure. The dependent variable is the logarithm of household food expenditure, which allows the coefficients to be interpreted approximately as percentage changes.

$$\ln(\mathrm{FoodExp}_{it}) = \alpha + \beta_1 \mathrm{PostCOVID}_t + \beta_2 X_{it} + \mu_i + \varepsilon_{it}$$

Model 2: Budget Allocation and Consumption Adjustment

The second model analyzes how households adjusted the allocation of their expenditure toward food during the pandemic. The dependent variable is the share of food expenditure in total household expenditure.

$$\mathrm{FoodShare}_{it} = \alpha + \beta_1 \mathrm{PostCOVID}_t + \beta_2 X_{it} + \mu_i + \varepsilon_{it}$$

In both models, $\mathbf{PostCOVID_t}$is a dummy variable representing the post-pandemic period, $\mathbf{X_{it}}$is a vector of household socio-economic characteristics, $\boldsymbol{\mu_i}$represents household fixed effects, and $\boldsymbol{\varepsilon_{it}}$ is the error term.

These models allow the study to examine how the COVID-19 pandemic influenced both the level of food expenditure and the allocation of household budgets toward food consumption among rural households.

Results

Food System Transition: Historically, rural households in Northeastern Thailand relied heavily on subsistence-based food systems. Most households produced rice for their own consumption and obtained additional food from locally available resources, including vegetables, fish, insects, and other forest products. Meals typically consist of sticky rice accompanied by chili paste, locally grown vegetables, and seasonal side dishes. Food preparation was largely household-based, and dependence on market-purchased food was relatively limited. Such patterns are consistent with the traditional subsistence-oriented food systems commonly observed in rural Southeast Asia (Pingali, 2007).

Over time, rural food systems gradually transformed because of economic development and improvements in infrastructure. The expansion of transportation networks and the development of local markets enabled rural households to access a wider variety of food products, including meat, processed foods, and seasonings previously unavailable in rural communities. Later, improvements in electricity access and refrigeration further facilitated the storage and distribution of processed and packaged foods. Village grocery stores and mobile food vendors expanded food accessibility, allowing households to purchase fresh ingredients and ready-to-eat foods more conveniently. These changes reflect broader structural transformations in food systems that accompany economic development and market integration (Pingali, 2007; Reardon et al., 2003).

These structural changes contributed to a gradual transition from subsistence-based food consumption toward a more market-oriented food system. Economic growth and urban expansion also encouraged the emergence of small restaurants and street food vendors in rural areas, increasing the availability of prepared foods. As a result, households increasingly relied on purchased foods rather than home-produced meals. More recently, improvements in communication technologies and internet access have further transformed rural consumption behavior. In some areas, rural households can now access food through online platforms and

delivery services, reflecting the continuing modernization of rural food systems and consumption patterns. The evolution of food access in rural areas is summarized in Appendix Table 1a.

Food Expenditure Structure Before COVID-19: Data from the TVSEP project indicate an increasing trend in household expenditure on sugar, seasonings, and processed foods between 2007 and 2019 (Figure 1). Similar dietary transitions have been observed in many developing countries undergoing rapid economic and market integration. At the same time, descriptive statistics suggest an increase in the prevalence of chronic diseases among rural households, including hypertension and diabetes. While this study does not attempt to establish a causal relationship between dietary changes and health outcomes, these patterns highlight potential concerns regarding the nutritional quality of modern food consumption in rural areas. (See Appendix Figure 1a)

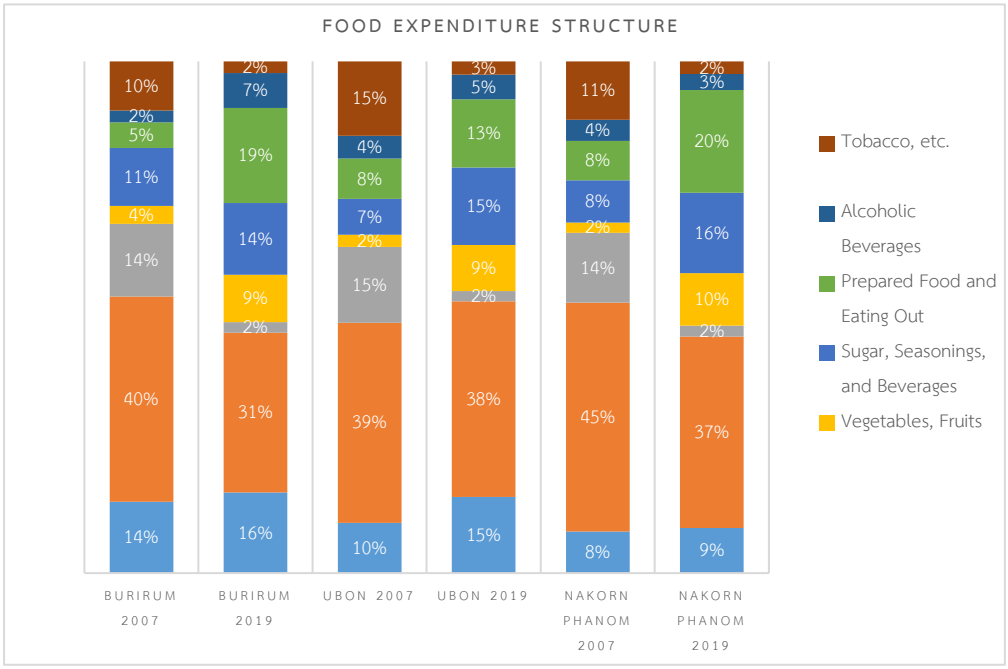

Figure 1 Food Expenditure Structure of Household in 2007 & 2019

Source: Authors' Analysis from TVSEP (2022)

Effect of COVID-19 on food consumption: Figure 2 presents the changes in household expenditure patterns before and after the COVID-19 pandemic. The descriptive statistics show that overall household expenditure declined after the pandemic. Average annual food expenditure decreased from approximately 55,897 baht in 2019 to 38,774 baht in 2022.

Although food expenditure declined in absolute terms, the reduction in other categories of spending was even more substantial. For example, expenditure on social activities declined dramatically from about 18,215 baht per year before the pandemic to less than 1,000 baht after the pandemic. This sharp decline reflects restrictions on social gatherings and reduced mobility during the COVID-19 period. Similarly, expenditures related to health services also declined substantially, possibly reflecting reduced access to healthcare services during the pandemic.

In contrast, transportation expenditures remained relatively stable between the two periods, suggesting that mobility for essential activities such as work or household errands continued despite the pandemic. Non-food expenditures also decreased slightly, reflecting adjustments in household consumption behavior.

Overall, these results suggest that rural households reduced their total consumption during the COVID-19 pandemic, particularly expenditures related to social activities and other non-essential goods. However, food expenditure remained a major component of household spending, highlighting the essential role of food consumption even during periods of economic uncertainty. These descriptive findings are consistent with the econometric results presented later, which show that although the absolute level of food expenditure declined, the share of food expenditure within total household spending increased during the pandemic.

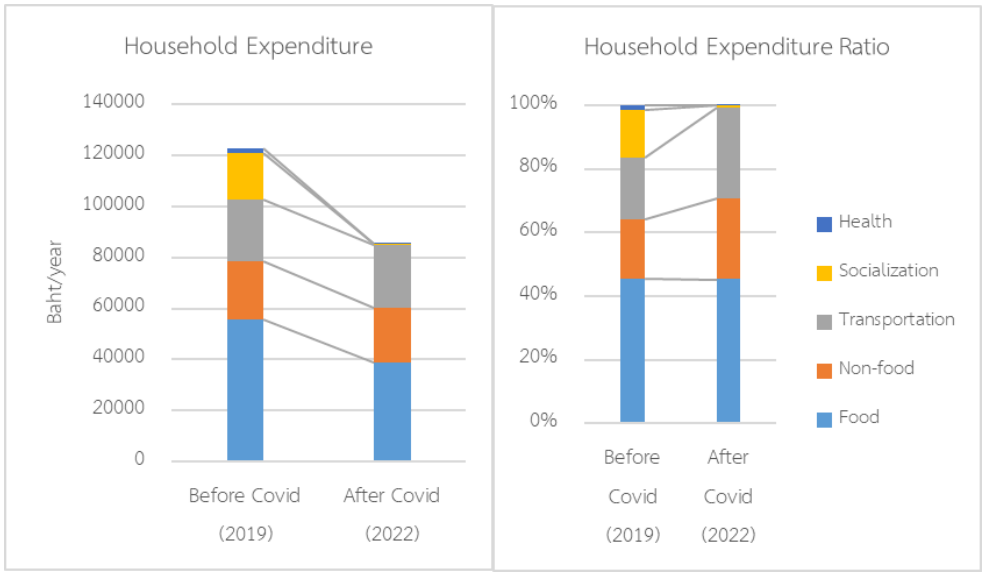

Figure 2 Expenditure Structure by Value Before and After COVID-19

Source: Authors' Analysis from TVSEP (2022)

Food Security Analysis in Rural Areas: The research analyzed food security in the rural areas in 2023, based on the four dimensions of food security defined by the FAO: availability, access, utilization, and stability, as follows:

Availability: This dimension focuses on the quantity of food or the prevalence of food shortages in the area. The survey revealed that none of the sample communities experienced food shortages, and no households faced food scarcity. The availability of food in the area was sufficient to meet the population's needs. Furthermore, when households were unable to obtain food due to poverty or old age, neighboring or related households would share food with them.

Access: The evolution of food consumption patterns, as discussed in section 4.1, shows that rural areas have undergone significant changes in food access, leading to greater food diversity. These changes stemmed from economic development, including infrastructure improvements (such as electricity, roads, and the internet), the growth of small-scale food businesses, and various social contexts that introduced non-local foods to the community. Analyzing the diversity of available food suggests that rural communities now enjoy food variety comparable to urban areas, including seafood, durians, and imported snacks. Rural communities have access to grocery stores, small restaurants, mobile grocery trucks, local markets, and postal food delivery systems, closely resembling urban food access. The primary difference lies in the number of restaurants and larger retail stores.

Utilization: In terms of food utilization, rural communities have achieved nutritional diversity due to the increased variety of foods, allowing them to maintain a balanced diet. Overall, food and water in rural areas are clean and safe. However, there has been an increase in the consumption of unhealthy foods, such as high-salt prepared meals and sweet snacks, which can lead to health issues like hypertension and diabetes.

Stability: During the COVID-19 pandemic, the research found that food stability in rural areas remained relatively high. Rural areas are food-producing regions, and households still have agricultural land. In times of crises, such as unemployment or other issues, rural households can quickly produce food by fishing in natural resources or foraging in forests. They also have space for raising chickens, fish, and growing vegetables, allowing them to sustain themselves without relying heavily on income from work. However, some community leaders noted that natural resources available for forages have been decreasing, due to two main reasons. 1) Degradation or loss of natural resources from prolonged community use leading to contamination and reduced forest areas. 2) Younger generations lack the skills to utilize natural

resources, which may pose challenges in the future. For example, young people who have never fished or cast a net may struggle to catch fish from natural sources when needed. Therefore, if natural resources continue to degrade, rural communities might face food stability issues in the future.

Econometrics Results: Table 1 presents the results of the fixed-effects panel regressions examining the impact of the COVID-19 pandemic on household food expenditure among rural households.

Table 1 Result of Econometric Model.

	Model 1	**Model 2**
VARIABLES	**ln_food_ex**	**Foodex_ratio**
hh_size_work	0.0276***	0.00567
	(0.0105)	(0.288)
hh_mem_young	-0.0101	-0.503
	(0.0192)	(0.525)
hh_mem_old	0.0110	-0.0288
	(0.0183)	(0.473)
hh_edu_all	0.0193***	-0.0329
	(0.00708)	(0.192)
No_migant	-0.102***	0.0840
	(0.0167)	(0.536)
Covid_d	-0.358***	2.376***
	(0.0203)	(0.536)
Constant	8.092***	46.39***
	(0.0570)	(1.565)
Observations	4,198	4,202
R-squared (within)	0.217	0.013
Number of QID	2,101	2,101

Note: [1] Significance levels are indicated as *p<0.10, **p<0.05, ***p<0.01

[2] See variable description in Appendix Table 2a

[3] Robust standard errors in parentheses

Model 1: Absolute Food Expenditure

Model 1 estimates the effect of the COVID-19 pandemic on the absolute level of household food expenditure, where the dependent variable is the logarithm of food expenditure. The results show that the COVID dummy variable has a negative and statistically significant coefficient (−0.358, $p < 0.01$), indicating that household food expenditure declined during the post-COVID period. Given the logarithmic specification, this suggests that food expenditure decreased by approximately 35 percent after the onset of the pandemic.

Among the household characteristics, the number of working-age members has a positive and significant effect on food expenditure, indicating that households with more economically active members tend to have higher food consumption. Similarly, the average level of education within the household is positively associated with food expenditure. In contrast, the number of migrant household members has a negative and significant effect, possibly reflecting the fact that migrant members reside outside the household and therefore reduce the number of individuals consuming food within the household. Overall, the results support Hypothesis 1, suggesting that the COVID-19 pandemic significantly affected the absolute level of household food expenditure.

Model 2: Budget Allocation and Consumption Adjustment

Model 2 examines changes in the allocation of household expenditure toward food, using the share of food expenditure in total household spending as the dependent variable. The results show that the COVID dummy variable has a positive and statistically significant coefficient (2.376, $p < 0.01$), indicating that the share of food expenditure increased after the pandemic.

This result suggests that although total household consumption declined during the COVID-19 period, households allocated a larger proportion of their budget to food. Such behavior reflects consumption adjustment during economic shocks, where households reduce non-essential expenditures while maintaining essential consumption. The findings therefore support Hypothesis 2, indicating that the COVID-19 pandemic significantly affected household budget allocation toward food consumption.

Discussion

The econometric results indicate that the COVID-19 pandemic significantly reduced the absolute level of household food expenditure while increasing the share of food expenditure in total household spending. This pattern suggests that rural households reduced overall consumption during the pandemic but continued to prioritize food expenditure.

These findings are consistent with Engel's law, which states that the proportion of household expenditure devoted to food tends to increase when income declines (Deaton and Muellbauer, 1980). During economic shocks, households often adjust their consumption behavior by reducing non-essential expenditures while maintaining spending on basic necessities such as food. Therefore, although food expenditure declined in absolute terms, its share in household budgets increased.

The results are also consistent with recent studies on household consumption during the COVID-19 pandemic, which show that income shocks led households to reduce discretionary spending while prioritizing essential consumption (Laborde et al., 2020; Hirvonen et al., 2021). In the context of rural Thailand, access to locally produced food and natural resources may have helped households maintain basic food consumption despite declining incomes.

Conclusion

This study examined changes in food consumption patterns and the impact of the COVID-19 pandemic on household food expenditure among rural households in Northeastern Thailand. Using panel data from the Thailand-Vietnam Socio-Economic Panel (TVSEP), the study analyzed how rural households adjusted their consumption behavior before and after the pandemic. The descriptive analysis indicates that overall household expenditure declined during the COVID-19 period, particularly spending related to social activities and other non-essential goods. The econometric results further show that while the absolute level of food expenditure decreased, the share of food expenditure in total household spending increased significantly. These findings suggest that rural households adjusted their consumption behavior by reducing overall spending while maintaining food as a priority consumption item. The results highlight the importance of supporting household income and maintaining stable food systems during periods of economic disruption. Strengthening rural livelihoods and ensuring access to affordable food can play an important role in enhancing the resilience of rural communities during future economic shocks.

Suggestion Based on Study Findings

The findings of this study provide several policy implications for improving food security and supporting rural households during economic shocks.

First, the results show that household food expenditure declined during the COVID-19 pandemic, while the share of food expenditure increased. This indicates that households adjusted their consumption by reducing non-essential spending while maintaining food

consumption as a priority. Therefore, policies aimed at stabilizing household income during economic crises are important for ensuring food security. Government support programs, such as temporary income assistance or employment support, can help rural households maintain their purchasing power and reduce the risk of food insecurity during economic disruptions.

Second, the results highlight the importance of rural households as a safety net during periods of crisis. Access to agricultural land, natural resources, and locally produced food can help rural households maintain basic consumption even when monetary income declines. Therefore, policies that support sustainable use of natural resources and local food production systems may strengthen the resilience of rural communities during economic shocks.

Third, changes in consumption behavior during the pandemic suggest that households reallocate their budgets toward essential goods. Policymakers should therefore monitor food price stability and ensure that basic food commodities remain accessible and affordable for rural households, particularly during periods of economic instability.

Limitations and Future Research

This study has several limitations that should be acknowledged. First, the analysis focuses on rural households in three provinces in Northeastern Thailand, and therefore the findings may not fully represent rural conditions in other regions of the country. Second, the econometric models rely primarily on household expenditure data and do not directly capture changes in nutritional intake or dietary quality. Future research could incorporate more detailed information on food consumption and nutrition outcomes to better understand the health implications of changing food consumption patterns. In addition, further studies may explore the long-term effects of economic shocks on rural food systems and household welfare using additional survey waves or broader regional data.

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Appendix

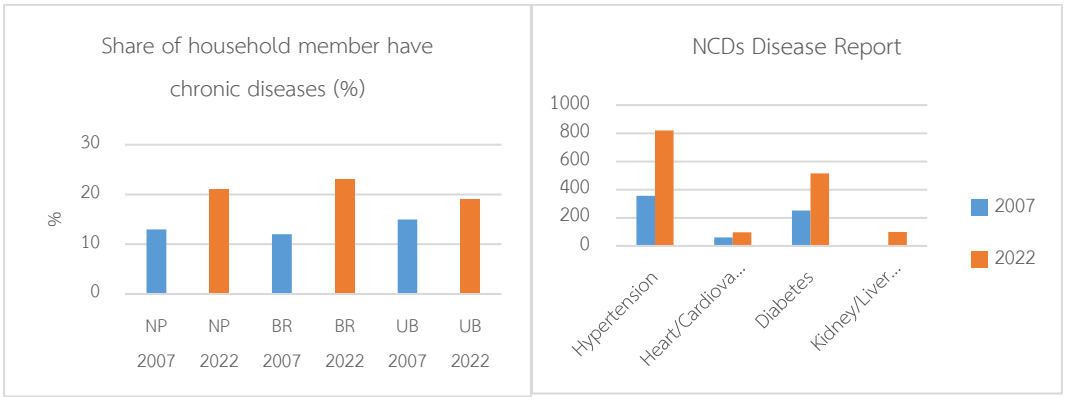
Appendix Table 1 Summary of Changes in Food Access in Rural Areas.

Source of Food	Type of Food	Factors Causing Change	Time Period*
Local Natural Resources	Local foods such as vegetable curry, papaya salad, fish paste, chili paste, pickled bamboo shoots, boiled vegetables	-	Before 1977
City Markets or City Festivals	Pork, beef, dried foods from outside, such as canned fish, dried shrimp, shrimp paste	Transportation infrastructure, roads	Since 1987
Village Grocery Stores	Soft drinks, brewed coffee, snacks, instant noodles	Access to electricity and refrigerators	From 1987-2002 onwards
Mobile Grocery Trucks	Fresh ingredients, seasonings, and food from outside areas, such as seafood, snacks, and various packed foods	Transportation infrastructure, roads, vehicles	From 1987-1997 onwards
Local Markets and Small Restaurants	Cooked food, ready-to-eat meals from shops	Economic development, urban expansion	Around 1997 onwards
Online Applications	Trendy foods, imported foods	Internet network system	Around 2017 onwards

Source: In-depth interviews with community leaders in Ubon Ratchathani Province.

Appendix Table 2 Variable Description

Variable Name	Type of Variable	Variable Description	Unit
ln_food_ex	Dependent	Logarithm of Household food expenditure per month	
Foodex_ratio	Dependent	Proportion of food expenditure to total expenditure	Percentage (%)
hh_size_work	Independent	Number of household members in the working age (15-65 years)	No.
hh_mem_young	Independent	Number of household members in the young age (< 15 years)	No.
hh_mem_old	Independent	Number of household members in the elderly age (> 65 years)	No.
hh_edu_all	Independent	Average years of education received by household members	Years
No_migant	Independent	Number of household members who migrated (lived outside the village for more than 3 months)	No.
Covid_d	Independent	COVID-19 dummy variable	0 = Pre-COVID 1 = Post-COVID



Appendix Figure 1 Share of household members who have chronic diseases and NCDs reported in rural households

Source: Author's Analysis from TVSEP (2022)