



Prevalence and Determinants of Household Food Security in Resettled Areas in Sekong Province, Lao PDR

INPONG SILIPHOUTHONE*

*The United Graduate School of Agricultural Sciences, Tottori University, Tottori, Japan
Email: inpong007@gmail.com*

KUMI YASUNOBU

Faculty of Agriculture, Tottori University, Tottori, Japan

Received 11 November 2015 Accepted 11 April 2016 (*Corresponding Author)

Abstract Relocating isolated villagers from upland to lowland areas is an important rural development strategy to eradicate poverty and food insecurity in Laos. However, previous research found several social and livelihood problems after resettlement, including poverty and food insecurity. This study investigated the level of food insecurity after resettlement and identified factors influencing household food security. We surveyed 60 households through a structured questionnaire in Tok Ong Keo village of Lamam district, Sekong province. The U.S. Food Security/Hunger Survey Module was employed to measure the severity of food insecurity. In addition, we applied a logistic regression model to examine the factors influencing food security. The results show that about 55% of the sample households experienced rice shortages for about 1–3 months and 61.7% were food insecure with moderate hunger. The education level of household heads, household size, and livestock ownership all had statistically significant influences on food security.

Keywords food security, determinants, resettlement, upland areas, Sekong province, Laos

INTRODUCTION

Food security is defined as “a situation that exists when all people, at all time, have physical and economic access to sufficient, safe and nutritious food for an active and health life.” Food security remains one of the critical challenges for developing countries owing to multifaceted factors, such as persistent poverty, rapid population growth, and natural disasters (Smith et al., 2000). More than 868 million people (or 12.5% of the global population) are estimated to suffer from chronic undernourishment in terms of dietary energy supply. Approximately 64.8% of undernourished people (563 million people) live in rural areas in Asia, including Lao PDR (FAO, 2012). Lao PDR is a poor country in Southeast Asia with an estimated per capita gross domestic product (GDP) of USD 1,320 in 2012, and with roughly 68% of the population residing in rural areas. According to the Lao Expenditure and Consumption Survey 2007/08, about 27.6% of Lao people live below the national poverty line and 24.6% are classified as food insecure (Government of Laos, 2010). The highest food insecurity levels are found mostly in mountainous areas, in particular, in Sekong province, where food insecurity affects 50.3% of people, about 60% of children less than 5 years of age are stunted, and nearly half are underweight. The mountainous terrain is a major constraint in eradicating food insecurity; most upland villagers live in scattered small villages where they are unable to access roads, markets, and social services, such as education and health care.

In order to improve the livelihood of villagers, the government has combined households from various ethnic groups and scattered villages in the remote highlands to lowland areas and along roads. Through implementation of the policy, there have been several positive changes in villagers’ lives,

including improvement of roads, electricity, education, health services, water, and sanitation. Nevertheless, it is expected that the level of food insecurity will remain high at the start of relocation for various reasons. For example, based on a literature review, a number of land-use conflicts and social and livelihood problems have occurred in the resettled areas (Douangsila, 2012). High mortality rates and the prevalence of water-borne diseases and malaria have arisen (Romagny, 2006). Some newcomers in resettled villages have had access to less land and a shorter fallow period of shifting cultivation, resulting in rice deficiency (Evrard, 2004). In addition, there has been inadequate availability of natural resources and social services (World Food Programme, 2007). Even so, there is limited literature on household-level food security among resettled households. In addition, understanding the cause of food insecurity at the household level is essential to provide information to local, national, and international organizations in order to eradicate food insecurity and improve the livelihoods of rural people.

Our research sought to address the following two questions. First, what is the food insecurity situation after resettlement? Second, what are the socioeconomic factors and individual resource factors that influence food security among resettled households? Therefore, the aims of this study were to 1) investigate the incidence of food insecurity in resettled villages, and 2) identify the factors affecting household food security.

METHODOLOGY

Background Information of the Study Village

This study was conducted in Sekong province, which is located in the southern region of Laos and has an area of 8,742 km², comprising 229 villages, 17,158 households, and a total population of 104,499 in 2012. In this province, people from several small mountainous villages were moved to villages in the lowland areas, which have more opportunities to access social services. For our study area, we selected Tok Ong Keo village of the Lamam district in Sekong province.

In 1978, the villagers were relocated from the original highland areas to a plains area near roads (about 2 km away from the original highland place). For the first year of resettlement, the local government provided households with zinc roofing sheets and, in some cases, goats and pigs. All villagers continued to cultivate upland rice through shifting cultivation methods in their original upland fields; the total land available for cultivation was about 336 ha with an average fallow period of 6–10 years. Thereafter, in 2010, all villagers were moved again to a larger permanent location, which was about 1 km away from the previously settled place. This was because the government had selected the village for implementing the Focal Site Development (FSD) project, and the previous location of the houses was reclaimed for lowland paddy fields. Of the total village area of 2,100 ha, about 48 ha are used to grow rice in the lowland paddy field, but only 36 households are able to use the areas owing to insufficient land for development. Consequently, all villagers continue to rely on upland rice cultivation for their primary livelihood activities. However, the land available for upland rice has reduced from 336 ha during 1978–2010 to 220 ha after resettlement in 2010 as a result of the government policy to promote resettlement, which has led to the reduction of shifting cultivation. Accordingly, the average fallow period has been shortened to 3–5 years. Above all, we consider the data of our study, which was collected in 2013, as the initial stage of resettlement because more than 30 years has passed between the first and second resettlement stage.

Measurement of Food Insecurity at Household Level

To measure the severity of food insecurity, a subjective method, namely the U.S. Household Food Security/Hunger Survey Module (U.S. FSSM) was used. The U.S. FSSM is one of the most reliable

indicators and has widely used to access food security. It was first developed in the early 1990s by the federal interagency Food Security Measurement Project (Bickel et al., 2000). The reliability and validity of this indicator has been proven by previous research, and a mean score of the U.S. FSSM has a statistically significant correlation with calorie and nutrient intake, income poverty and weekly food expenditure (Tarasuk, 1999; Edward et al., 2007).

The concept of the U.S. FSSM is essentially used for 18 items related to experience of food deficit among adults and children due to lack of resources (money and food) over a specific period of 30 days or 12 months. Household food security is categorized by ranging a scale score of the affirmative responses from 0 to 10, with 0 representing no evidence of food insecurity and scores close to 10 indicating cumulative evidence of the severest degree of hunger. The answer from 18 items provides a continuous measure scale score that can be used to classify households into four categories, as follows:

1. Food secure (0–2.32): Households show no or least evidence of food insecurity.
2. Food insecure without hunger (2.33–4.56): Household members are concerned about the adequacy of household food supply and have adjusted to household food management, including reduced quality of food and increased unusual coping patterns.
3. Food insecure with moderate hunger (4.57–6.53): Adults have decreased food intake, meaning they have repeatedly experienced the physical sensation of hunger.
4. Food insecure with severe hunger (6.54–10): All households with children have reduced the children's food intake to an extent indicating that children have experienced hunger.

Data Collection and Analysis

The primary data were gathered through a field survey conducted in January 2013. Of the total 82 households living in the village, 22 households were excluded from the survey because they were not available during the survey; thus, only 60 were interviewed using a structured questionnaire. The questionnaire consists of information on household composition, upland/lowland rice areas, rice production, household income, and experience of food insecurity over 12 months.

We employed a logistic regression model to identify the determinants of household food security. To set up a dependent variable, the food security status was reorganized from four categories into two. Households that were food insecure with moderate and severe hunger were combined into a single broader category and classified as a food insecure or households with hunger ($Y = 0$). In contrast, households that were both food secure and insecure without hunger were classified as food secure or households without hunger ($Y = 1$). With regard to the independent variables, education, household size, number of relatives and friends, cultivated upland areas, upland rice yield, cultivated rain-fed lowland rice, and livestock ownership were selected.

RESULTS AND DISCUSSION

The results show that about 55% of households experienced at least 1–3 months of rice shortages, and 38.3% reported longer rice shortage periods of more than 3 months, from July to October (Table 1). Having said that, only 6.7% households were able to produce sufficient rice to meet the requirements of their households all year round. The results of the U.S. FSSM reveal that about 61.7% of households were categorized as “food insecure with moderate hunger.” This means that most adults in the study area frequently experienced the physical sensation of hunger. They employed rationing as a coping strategy, which includes limiting the amount of food given to each household member at mealtimes and reducing the number of meals eaten in a day. Moreover, about 11.7% of households surveyed were “food insecure with severe hunger,” indicating that the amount for food intake for children living in these households was reduced owing to lack of food and money to purchase food. Conversely, about

21.6% and 5% of households surveyed were categorized as “food insecure without hunger” and “food secure,” respectively.

Table 1 Rice shortage and food insecurity

Month of rice shortage (month)	N = 60	%
No experience	4	6.7
1-3 months	33	55.0
More than 3 months	23	38.3
Food security status (scale score)		
Food secure	3	5.0
Food insecure without hunger	13	21.6
Food insecure with moderate hunger	37	61.7
Food insecure with severe hunger	7	11.7

Source: Author's calculation based on 2013 household survey

The anxiety, experiences, perceptions, and adjustment regarding food insecurity and hunger reported by respondents are illustrated in Table 2. Of the sample households, 96.7% reported that they could not afford balanced meals for both adults and children and they relied on a few kinds of low-cost food for children. In addition, the majority of respondents (93.3%) had worried that food would run out, about 83.3% stated that the food they bought did not last owing to lack of money to purchase more, 75% had cut or skipped meals for adults, and 43.3% had felt hungry but did not eat. Moreover, approximately 66% of households with hunger acknowledged that they had cut the size of children's meals and skipped meals for children (50%). This implies that half of households in the resettled areas relied on non-nutritious food for their children and children did not have enough to eat. Declining food consumption among children can lead to poor health and malnutrition in the future. It was observed that rice was often eaten together with chili paste, vegetables, bamboo shoots, and sometimes, fish and chicken. However, meat was eaten only occasionally, mainly at such events as traditional spirit sacrifices, wedding parties, and village festivals.

Table 2 Affirmative response from the U.S. FSSM questionnaires

Question No. (Q) ^a	List of 18 questions from the FSSM	N = 60 (%)	Household without hunger ^c N = 16 (26.7%)	Household with hunger ^d N = 44 (73.4%)	t-test
2	Worried food would run out	56 (93.3)	12 (75.0)	44 (100)	0.00***
3	Food bought did not last	50 (83.3)	12 (75.0)	38 (86.4)	0.30
4	Could not afford to eat balanced meals ^b	58 (96.7)	15 (93.7)	43 (97.7)	0.45
5	Few kinds of low-cost food for children	58 (96.7)	14 (97.5)	44 (100)	0.02**
6	Could not feed children a balanced meal	58 (96.7)	14 (87.5)	44 (100)	0.02**
7	Children were not eating enough	33 (55.0)	4 (25.0)	29 (65.9)	0.00***
8	Adult(s) cut or skipped meals	45 (75.0)	6 (37.5)	39 (88.6)	0.00***
8a	Adult(s) cut or skipped meals, 3+ months	0 (0)	0 (0)	0 (0)	N/S
9	You ate less than felt you should	44 (73.3)	5 (31.5)	39 (88.6)	0.00***
10	You were hungry but did not eat	26 (43.3)	2 (12.5)	24 (54.5)	0.00***
11	You lost weight because not enough food	N/S	N/S	N/S	N/S
12	Adult(s) not eat for whole day	18 (30.0)	1 (6.3)	17 (38.6)	0.02**
12a	Adult(s) not eat for whole day, 3+months	0 (0)	0 (0)	0 (0)	N/S
13	Cut size of children's meals	29 (48.3)	0 (0)	29 (65.9)	0.00***
14	Children skip meals	22 (36.7)	0 (0)	22 (50.0)	0.00***
14a	Children skip meals, 3+months	0 (0)	0 (0)	0 (0)	N/S
15	Children ever hungry	21 (35.0)	0 (0)	21 (47.7)	0.00***
16	Children not eat for whole day	1 (1.7)	0 (0)	1 (2.7)	0.55

Source : Author's calculation based on 2013 household survey.

Note : *** and ** denotes significance at 1% and 5%; ^a The first question (Q1), which is asked whether do you have enough food to eat or not, is a screening question. This question is not part of the actual scale in the U.S. FSSM so it is excluded from Table 2; ^b Balanced meal is defined as “at least three types of food group, such as rice, meat, fish, egg, green leafy vegetables”; ^c “Household without hunger” refers to those households that are food secure and insecure without hunger; ^d “Household with hunger” refers to those households that are food insecure with moderate and severe hunger.

The results of the logistic regression model show that the education level of the household head is a positively significant influence on household food security. From Table 3, the marginal effect shows that a unit increase in education level of the household head, holding all other variables at their mean, leads to a 6% increase in the probability of the household being food secure. This implies that higher education levels make household heads more likely to have the capacity to use the resources that he or she owns more rationally, and to learn more idea about how to increase agricultural productivity. Moreover, those who are educated seem to have the ability to escape from food insecurity through participating in non-farm income generating activities, such as construction work, petty trade, and other services. It was reported that there were only five people in the village who go to work in towns or big cities. Language barriers are a possible explanation as about 60% of the respondents, especially those among food insecure households, were unable to read and write the official Lao language. As a result, their access to non-farm work was limited and their average non-farm income was only USD 190 per household per year, whereas that of literate households was USD 370 per year. In addition, the impact of education on food security can be viewed as a key factor in accessing public information, such as agricultural information, concerning health, nutrition, and hygiene because most information is often written in Lao language. It was observed that the majority of villagers lived in unhealthy environments and lacked health knowledge, such as information about how to avoid and treat illnesses. Some households did not even boil their drinking water. As a result, about 69% and 62% of households that were food insecure with moderate hunger had experienced malaria and diarrhea, respectively, over the previous 12 months.

Table 3 Determinants and “Marginal” effect of household food security

Variables	Mean	S.D	Coeff.	t-value	dy/dx	t-value
Constant			-1.15	- 0.95		
Education (year)	2.35	2.32	0.43	2.19 **	0.06	2.48 **
Household size (person)	9.95	5.41	-0.35	-2.88 ***	0.05	-2.96 ***
Number of relatives and friends (household)	18.35	16.30	-0.04	-1.29	0.01	-1.42 *
Cultivated upland size (ha)	1.06	0.44	0.68	0.52	0.11	0.75
Upland rice yield (kg/ha)	747	0.45	0.38	0.85	0.06	0.46
Cultivated rain-fed lowland rice(ha)	0.33	0.35	0.57	0.92	0.09	0.53
Livestock ownership (tropical livestock unit, TLU ^a)	0.63	0.46	2.42	2.62 ***	0.51	2.45 **

Log-Likelihood: -23.854 Pseudo R² = 0.314 (Prob.chi : 0.000)

Source : Author’s calculation based on 2013 household survey.

Note : ***, **, and * represent significance at the 0.01, 0.05, and 0.10 levels, respectively; ^a TLU is calculated based on the number of livestock and the exchange ratio for livestock (e.g., cattle = 0.7, pig = 0.2, and poultry = 0.01)

As expected, household size was statistically significant at the 1%. A one-unit increase in the number of household members, computed at sample means, resulted in a 5% decrease in the probability of the household being food secure. This indicates that larger household size may not provide more labor for food production but represents more mouths to feed and higher consumption demand. In the case of the study area, about 51.6% of sample households comprised at least two families who lived in the same dwelling and shared food. Of these, about 90.3% were among the food insecure households. Most were young married couples living with parents and were likely to depend on their parents because of resource constraints to construct a new house. Moreover, the majority did not generate any income owing to limited non-farm income activities around the village and lack of micro credit to start livestock farms.

With regard to livestock ownership, the marginal effect reveals that a one-unit increase in the livestock ownership (TLU), calculated at sample means, resulted in a 51% increase in the possibility of food security. Livestock production, especially pigs and poultry, contributed to about 88% of farm cash income (USD 66 per household per year), which was used mainly for buying rice and other food to

meet the basic nutritional needs of all household members, resulting in increasing self-consumption. Another key point to remember is that about 7% of the households surveyed obtained cash income from selling cattle and buffalo, which was used to cover expenses for building houses. The result shows that the average number of livestock (cattle=1.7, pigs=3, and poultry=25) reared by food secure households were higher than those of food insecure household (cattle=0.4, pigs=1.8, and poultry=8.3). The major problems in livestock rearing were insufficient technical knowledge to prevent livestock disease, lack of funding to purchase young animals, such as calves and piglets, and lack of feed. About 75% of households indicated that their poultry had died from disease, while 50% of households that kept larger livestock, such as buffaloes and cattle, indicated that there was a lack of feed near the village during the dry season. Insufficient number of female laborers was a constraint to keeping more pigs and poultry. In the study area, women played a vital role in not only domestic works, such as food preparation and gathering wild food, but also in productive tasks. According to the survey results, women had 95% of responsibility for poultry and local pig rearing. However, they seem to be overlooked from agricultural programs because the majority of women did not speak or understand the Lao language.

It is essential to note that both the cultivated upland farm size and the upland rice yield were not statistically significant, but positively influenced food security. The marginal effect shows that a one-unit increase in cultivated upland rice areas and rice yields would lead to the probability of food security increasing by 11% and 6%, respectively. This implies that households that have larger cultivated upland rice areas and gain higher yields are likely to have higher production levels to support their home consumption. However, villagers were not allowed to expand upland rice areas owing to a ban on shifting cultivation, resulting in a shorter fallow period (3–5 years). The decline in fallow period was accelerated by land use restriction and resulted in poor soil fertility, a cause of low rice productivity (747 kg/ha). In addition, weeds, rodents, wild pigs, ants, and birds were another important cause of low productivity.

With regard to lowland rice cultivation, the results show that rain-fed lowland areas have no statistically significant correlation with household food security. This is because many resettled villagers lacked knowledge on farm management practices, such as methods of land preparation, fertilizer application, and use of improved rice varieties. They were likely to receive less support from agricultural officers, especially on how to increase lowland rice productivity. Accordingly, the average rain-fed lowland yield cultivated by resettled villagers was very low (904 kg/ha). In addition, most of the resettled villagers from mountainous areas were new rain-fed lowland cultivators, so they could not suddenly adapt to the new technologies of lowland paddy fields (Douangsila, 2012). The number of relatives and friends had a negative influence on household food security. A possible explanation is the tradition and culture of the Alak ethnic group, whose people depend highly on relatives and friends when they face food shortages. It was reported that although the total rice production in resettled households did not cover their annual needs, they shared their own rice or other food with relatives and friends who experienced food shortage.

CONCLUSION AND RECOMMENDATION

The main aims of this study were to investigate household-level food security in a resettled area in Laos, and to identify the factors influencing whether households were food secure. We concluded that the prevalence of food insecurity in the resettled villages was enormously high; approximately 61.7% were “food insecure with moderate hunger” and 11.7% were “food insecure with severe hunger.” However, our findings did not indicate that the resettlement program had a negative impact on the food security of the resettled households. Further studies are needed to monitor whether the prevalence of household food insecurity persists and the living condition improves.

Other important findings of this study were that the education level of household heads, household size, and livestock ownership had a statistically significant influence on household food security in the resettled area. Hence, in order to improve food security in new resettled villages, the education sector should focus on non-formal education for uneducated and unskilled household heads to improve their ability to access information, deal with the markets, and find alternative income source. These efforts should also target women who are unable to read and write in the Lao Language in order to give them access to healthcare information and nutritional knowledge. Agricultural extension officers should provide information, in particular, new techniques to increase pig and poultry production and prevent livestock disease. Another key point is that microcredit to start livestock farming is a vital task that should be considered in the study area.

REFERENCES

- Bickel, G., Nord, M., Price, C., Hamilton, W. and Cook, J. 2000. Guide to measuring household food security. Food Nutrition Service, United State Department of Agriculture Press, U.S.A.
- Douangsila, T. and Pongchompu, S. 2012. Impact of rural development on the poor farmers in upland of Laos. Proceeding in Graduate Research Conference, Khon Kaen University, Thailand, 946-955.
- Edward, M., Weber, B. and Bernell, S. 2007. Identifying factors that influence state-specific hunger rates in the U.S., A simple analytic method for understanding a persistent problem. *Social indicator research*, 81, 579-595.
- Evrard, O. and Goudineau, Y. 2004. Planned resettlement, unexpected migrations and cultural trauma in Laos. *Development and Change*, 35 (5), 937-962.
- Food and Agriculture Organization (FAO). 2012. The state of food insecurity in the world. Rome, Italy.
- Government of Laos. 2010. Lao expenditure and consumption survey 2007-2008. Department of statistics, Ministry of Planning and Investment. Vientian, Laos.
- Romagny, L. and Daviau, S. 2006. Synthesis of reports on resettlement in Long District, Luang Namtha Province, Lao PDR. Action Contre La Faim, Paris, France.
- Smith, L.C., El Obeid, A.E. and Jensen, H.H. 2000. The geography and cause of food insecurity in developing countries. *Agricultural Economics*, 22, 199-215.
- Tarasuk, V. and Beaton, G.H. 1999. Women's dietary intakes in the context of household food insecurity. *Journal of Nutrition*, 129, 672-679.
- World Food Programme. 2007. Comprehensive food security and vulnerability analysis in Lao PDR. Rome, Italy.