

## Assessment of food access in Laos from macro and micro perspectives

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### Abstract

This study assesses the current status of food access in Laos from both macro and micro perspectives. Food security in Laos is evaluated from a macro perspective utilizing the Food and Agriculture Organization (FAO) data. In terms of accessibility of food security, Laos faces acute issues among the Southeast Asian countries. From a micro perspective, we analyze a case study of food access of households in a semi-mountainous village in central Laos, with a focus on plant and animal foodstuffs. Plant foodstuffs were mainly acquired through production (cultivation) and collection during the wet season. Plant foodstuffs during the dry season were primarily obtained through collection and making purchases at a market. By contrast, animal foodstuffs were mainly acquired by collection and purchase in both dry and wet seasons. When comparing other methods for acquiring foodstuffs, during both seasons, villagers were highly dependent on the collection methods irrespective of seasons and kinds of foodstuffs. People appeared to rely on collecting foodstuffs from nature to secure access to food. Collecting from nature was supplemented by production and purchasing foodstuffs at a market. To generalize these results, further research targeting larger areas is required to analyze factors effecting food access by household.

### Introduction

At the World Food Summit of 1996, food security was defined as a situation that exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. This definition points to the four dimensions of food security: availability, accessibility, utilization, and stability (FAO 2006). Since the 1980s, food security has been recognized not only as an issue of supply but also of demand. This new recognition has led researchers to specifically examine the food access of households and individuals (Peng and Berry 2019). This shift in focus has influenced the second goal of the Sustainable Development Goals (SDGs), Zero Hunger, which targets all people, including poor people and infants, in vulnerable situations (UNDP 2015).

Among all Southeast Asian countries, Laos struggles the most with food security issues. The country achieved self-sufficiency in rice production in 1999, and food security has improved from the energy supply perspective (FAO 2011). Nevertheless, about 1.5 million people still remain undernourished (FAO 2014) and the rate of stunted growth for child under five is 44.2% (Moh and LSB 2012). Many undernourished households live in semi-mountainous villages located in some of the poorest areas of Laos. Therefore, undernourishment is assumed to be intimately related to physical issues such as lack of infrastructure and economic issues such as poverty (WFP 2013).

The purpose of this study is to assess food access of Laos from both macro and micro perspectives. Therefore, this report was designed (1) to clarify the situation of food access in Laos in comparison with other Southeast Asian countries utilizing the Food and Agriculture Organization (FAO) data, and (2) to elucidate food access in a semi-mountainous village in central Laos by analyzing survey data.

### **Food access in Laos as regards accessibility of food security**

#### ***Four dimensions of food security***

Food security can be analyzed according to four dimensions of food security suggested by the World Food Summit of 1996: availability, accessibility, utilization, and stability. Each of these four dimensions is further evaluated at the national, household, and individual levels as follows (FAO 2006; Peng and Berry 2019).

***Availability:*** The availability of sufficient quantities and appropriate quality of food, supplied through domestic production or imports, including food aid (national level).

***Accessibility (food access):*** Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic, and social arrangements of the community in which they live, including traditional rights such as access to common resources (household level).

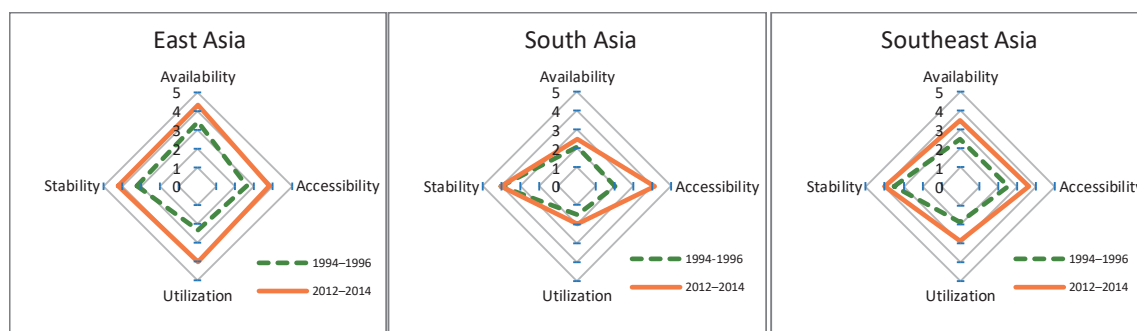
***Utilization:*** Utilization of food through adequate diet, clean water, sanitation, and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security (individual level).

***Stability:*** To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g., an economic or climatic crisis) or cyclical events (e.g., seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security (It may be considered as a time dimension that affects all levels.).

#### ***Food security in different Asia regions***

The FAO analyzed food security in developing regions using the indicators classified along the four dimensions of food security mentioned above (FAO 2014). Fig. 1 shows the state of food security in different Asia regions when analyzed according to these dimensions.

East Asia has experienced rapid progress in all four dimensions over the past two decades. South Asia has displayed slower progress in raising the availability and utilization levels, whereas accessibility has progressed rapidly. Southeast Asia has shown moderate progress but has been unable to equal the progress of East Asia; however, Southeast Asia has shown more growth than South Asia. Nevertheless, the accessibility in Southeast Asia is lower than in South Asia, implying that Southeast Asia has not made sufficient progress in improving food access at the household level.



**Fig. 1.** Evolution of food dimensions in Asia

Source: FAO (2014) with modification

Note: East Asia includes China, Democratic People's Republic of Korea, Mongolia, and Republic of Korea. Southeast Asia includes Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Thailand, Timor-Leste, and Vietnam. South Asia includes Afghanistan, Bangladesh, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka.

### ***Food accessibility of Southeast Asian countries***

Table 1 provides information on food accessibility of Southeast Asian countries with several indicators related to the accessibility of food security. These indicators conform to the set of food security indicators suggested by the FAO. In Laos, the percentage of paved roads over total roads and road density as physical access indicators are 13.7% and 16.7%, respectively. These figures are the lowest and second lowest percentages, respectively, among all the countries considered. Food access is restricted in Laos because of underdeveloped infrastructure. Its domestic food price index as an economic access indicator is the worst among all countries (8.62), despite their gross domestic product (GDP) per capita being moderate (5,079 US\$ based on the purchasing power parity [PPP]), comparatively. This implies that economic food access in Laos is considerably limited or constrained. Although the prevalence of undernourishment in Laos has decreased since 2000 (FAO 2014), it still remains relatively high when compared to other countries. The average dietary energy supply adequacy from 2011 to 2013 in Laos was 104% (FAO 2019); Laos supplied sufficient food on caloric basis at national level. By contrast, as indirect indicators, the depth of food deficit and prevalence of food inadequacy, which emerged as the result of food access, are the second highest after Timor-Leste. This implies that a gap still exists between dietary energy supply and dietary energy demand in Laos. Consequently, Laos faces severe food access issues that cause nutritional insecurity.

**Table 1.** Food accessibility assessment of Southeast Asian countries

Indicator	Cambodia	Indonesia	Laos	Myanmar	Philippines	Timor-Leste	Vietnam	Brunei Darussalam	Thailand	Malaysia
<i>Physical access</i>										
Percentage of paved roads over total roads (%) (2009)	n/a	56.9	<u>13.7</u>	49.7	n/a	n/a	47.6 <sup>d</sup>	79.9	n/a	80.9
Road density (per 100 km <sup>2</sup> of land area) (2009)	21.9	24.9	<u>16.7</u>	4.8	n/a	n/a	48.3 <sup>d</sup>	53.1	35.1 <sup>c</sup>	40.9
Rail-lines density (per 100 km <sup>2</sup> of land area) (2013)	n/a	0.2	n/a	n/a	n/a	n/a	0.7	n/a	1	0.7
<i>Economic access</i>										
Gross domestic product per capita (PPP, \$) (2013)	2,964	9,652	<u>5,079</u>	4,423	6,282	8,887	5,066	79,323	14,771	23,412
Domestic food price index <sup>a</sup> (2013)	7.63	6.38	<u>8.62</u>	8.43	6.75	n/a	n/a	3.06	4.33	2.86
<i>Outcome indicators</i>										
Prevalence of undernourishment (%) (2012–2014)	18.4	9	<u>17.8</u>	12.9	14.2	26.5	11.4	2.7	8.2	3.2
Share of food expenditure of the poor (%) (2008)	84 <sup>c</sup>	22	<u>84<sup>d</sup></u>	n/a	61 <sup>c</sup>	n/a	65	n/a	n/a	n/a
Depth of food deficit <sup>b</sup> (kcal/capita/day) (2012–2014)	122	51	<u>126</u>	102	101	185	89	17	62	20
Prevalence of food inadequacy (%) (2012–2014)	24.9	14.7	<u>30</u>	25.2	21.3	36.7	19.9	6.1	16.9	7.4

Source: FAOSTAT (2019), Land Portal (2012)

Notes:

a: Domestic food price index is calculated by dividing the food purchasing power parity (FPPP) by the general PPP.

b: Depth of food deficit indicates how many calories would be required to improve the state of the undernourished, everything else being constant.

c: Data from 2006.

d: Data from 2007.

e: Data from 2009.

### Food access in a semi-mountainous village in central Laos

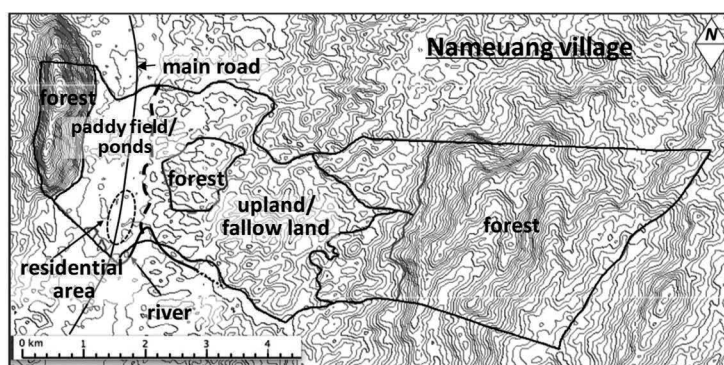
The preceding section demonstrated that Laos still faces food security issues from dimension of accessibility. In this section, food access in a semi-mountainous village in central Laos is assessed using survey data.

#### 1. Research area

Nameuang village in Feuang district, one of the poorer districts in the Vientiane province (Lao PDR 2004), was selected as the research site (Fig. 2). This village is located about 100

kilometers (km) from Vientiane capital. It consists of a residential area, paddy fields, upland fields, fallow land, and forests. At the time of the survey in 2012, the village had 140 households (53 Lao ethnic group households and 87 Khmu ethnic group households) inhabited by a total of 650 people (Kimura et al. 2014). In this village, the wet season lasts from May to October, whereas the dry season from November to April. Most households subsist by planting paddy rice in the flat lands and cultivating upland rice and Job's tears in upland fields.

Methods of foodstuff acquisition (food access) in the village consist of collection, making purchases, production (rearing livestock), exchange, and receiving as gifts. Villagers collect plant and animal foodstuffs in and around residential area, paddy fields, ponds, rivers, upland fields, and forests. Certain kinds of vegetables are planted in gardens while livestock is mainly allowed to feed in and around the paddy fields and residential area. Pot herbs such as green onion and garlic as well as eggs, dry beef meat, and tinned fish are sold at village grocery stores. Additionally, various types of vegetables and fruits, cultured fish (such as tilapia and catfish), some varieties of meats, and other foods are available at a permanent market located 6 km from the village. Villagers rarely exchange items or foodstuffs for other foodstuffs. Foodstuffs are often gifted by relatives.



**Fig. 2.** Location of the research site  
Source: Kimura et al. (2014) with modification

## 2. Methodology

Four households that owned a paddy field and four households that did not own a paddy field were selected among households that planted rice and had an average family size. Existing plant and animal foodstuffs as well as the methods for acquiring foodstuffs for meals throughout the day were recorded, excluding instances of dining out. The survey was administered in September 2014, during a period of rice shortage, and then in early February to early March of 2015, during a period of rice abundance. Table 2 presents attributes of selected households.

**Table 2.** Attributes of selected households

Attribute	Household A	Household B	Household C	Household D	Household E	Household F	Household G	Household H
Ethnicity	Khmu	Lao	Lao	Lao	Khmu	Khmu	Khmu	Khmu
Number of household members	5	4	5	6	6	4	4	3
Income (1,000 KIP/capita/year)	2,600	1,612	2,857	5,287	4,021	1,363	600	3,637
Paddy field area (ha)	0.64	0.64	0.80	1.20	-	-	-	-
Upland rice field area (ha)	2.80	0.96	0.48	-	2.00	3.50	3.00	4.44
Rice yield (kg) (paddy rice + upland rice)	9,620	3,010	4,860	5,364	4,660	8,155	6,990	10,345
Number of livestock (cattle and buffalo/pig/poultry)	0/0/41	0/0/25	0/2/15	0/0/30	2/6/5	0/1/0	0/0/4	0/0/15
Income aside from selling farm products	Tree trimming, agricultural labor	Agricultural labor, weaving, carpentry	Agricultural labor, selling medical tree	Tree trimming, crop transportation	Tree trimming, crop transportation	Agricultural labor	Agricultural labor	Agricultural labor
Main cultivated crops	Paddy rice, upland rice, Job's tears	Paddy rice, upland rice, Job's tears	Paddy rice, upland rice	Paddy rice, Job's tears	Upland rice, Job's tears	Upland rice, Job's tears	Upland rice	Upland rice, Job's tears

Source: Hasada and Yamada (2017) with modification

Notes:

- 1: Income represents the total of on-farm income and off-farm income from January 2014 to early March 2015. The exchange rate was 8,049 kip/US\$ as of 2014. GDP per capita of Lao PDR in 2014 was 1,725 US\$ (MPI 2015).  
 2: Values are based on data from 2014.

### 3. Survey Results

#### *Plant foodstuff acquisition*

Table 3 shows the use frequency and ratios of plant foodstuffs in different acquisition methods during the wet season. Among the eight households, six (households A, B, C, E, F, and G) achieved their highest ratio of acquisition by production during the wet season. This accounted for 45.4% of all acquisitions. The second highest ratio of acquisition was collection, which accounted for 39.3%. All households acquired more than 75% of plant foodstuffs through wild vegetables and homegrown vegetables. This might account for the high degree of food diversity displayed.

**Table 3.** Use frequency and ratios of plant foodstuffs in different acquisition methods during the wet season

Household	Collection	Purchase	Exchange	Received	Production	Collection + Production
A	16 (30.8)	2 (3.8)	0 (0.0)	10 (19.2)	24 (46.2)	40 (76.9)
B	37 (35.9)	0 (0.0)	0 (0.0)	16 (15.5)	50 (48.5)	87 (84.5)
C	25 (35.2)	4 (5.6)	0 (0.0)	13 (18.3)	29 (40.8)	54 (76.1)
D	41 (53.2)	1 (1.3)	0 (0.0)	8 (10.4)	27 (35.1)	68 (88.3)
E	13 (33.3)	4 (10.3)	0 (0.0)	5 (12.8)	17 (43.6)	30 (76.9)
F	32 (43.2)	1 (1.4)	0 (0.0)	0 (0.0)	41 (55.4)	73 (98.6)
G	19 (26.8)	2 (2.8)	0 (0.0)	5 (7.0)	45 (63.4)	64 (90.1)
H	33 (53.2)	4 (6.5)	0 (0.0)	9 (14.5)	16 (25.8)	49 (79.0)
Total	216 (39.3)	18 (3.3)	0 (0.0)	66 (12.0)	249 (45.4)	465 (84.7)

Source: Hasada and Yamada (2017) with modification

Notes:

- 1: Values represent use frequency; those in brackets denote the use ratio (%) for all methods.  
 2: Dark gray denotes the first highest ratio. Light gray denotes the second highest ratio among all methods of plant foodstuff acquisition.

The ratio of plant foodstuffs acquired by collection was the highest, followed by the ratio of foodstuffs purchased during the dry season. The total ratios of collection and purchase to all acquisitions were 33.4% and 29.6%, respectively (Table 4). Households A and D relied heavily on cultivated vegetables because they had gardens near a river or a well as water sources for cultivation. Households A and D acquired about 70 to 80 percent of their plant foodstuffs through collection and production, whereas the other households acquired about 60 to 80 percent through collection and making purchases (Table 4). Collection and production for households A and D and collection and purchase for households C, F, G, and H, respectively, showed mutually complementary relationships.

**Table 4.** Use frequency and ratios of plant foodstuffs in different acquisition methods during the dry season

Household	Collection	Purchase	Exchange	Received	Production	Collection + Production	Collection + Purchase
A	14 (21.5)	12 (18.5)	0 (0.0)	2 (3.1)	37 (56.9)	51 (78.5)	26 (40.0)
B	57 (61.3)	5 (5.4)	0 (0.0)	19 (20.4)	12 (12.9)	69 (74.2)	62 (66.7)
C	20 (27.8)	37 (51.4)	0 (0.0)	10 (13.9)	5 (6.9)	25 (34.7)	57 (79.2)
D	21 (28.4)	9 (12.2)	0 (0.0)	14 (18.9)	30 (40.5)	51 (68.9)	30 (40.5)
E	3 (8.8)	18 (52.9)	0 (0.0)	9 (26.5)	4 (11.8)	7 (20.6)	21 (61.8)
F	21 (36.2)	22 (37.9)	0 (0.0)	4 (6.9)	11 (19.0)	32 (55.2)	43 (74.1)
G	15 (37.5)	8 (20.0)	5 (12.5)	5 (12.5)	7 (17.5)	22 (55.0)	23 (57.5)
H	16 (25.0)	37 (57.8)	0 (0.0)	5 (7.8)	6 (9.4)	22 (34.4)	53 (82.8)
Total	167 (33.4)	148 (29.6)	5 (1.0)	68 (13.6)	112 (22.4)	279 (55.8)	315 (63.0)

Source: Hasada and Yamada (2017) with modification

Notes:

1: Values represent use frequency; those in brackets denote the use ratio (%) for all methods.

2: Dark gray denotes the first highest ratio. Light gray denotes the second highest ratio among all methods of plant foodstuffs acquisition.

### *Animal foodstuff acquisition*

Table 5 shows the use frequency and ratios of animal foodstuffs in different acquisition methods during the wet season. The ratio of acquiring foodstuffs by collection was highest followed by the ratio by purchase during the wet season, which respectively accounted for 53.7% and 28.9% of all acquisitions. Indeed, the ratio of collection is almost twice that of purchase, implying that the collection for animal foodstuffs is more important than that of plant foodstuffs. Among eight households, five (households B, C, D, F, and G) achieved the highest ratio of acquisition through collection, whereas the other households had the highest ratio of acquisition by purchase. Particularly, Lao ethnic group households (households B, C, and D) collected more fish at waterside areas. Khmu ethnic group households (households F, G, and H) collected more small mammals, such as mice and squirrels, in upland areas and forests.

Although some households raised livestock such as poultry, they had little use for their livestock as animal foodstuffs. This implies that livestock is not expected to provide a daily source of food, but is instead used as assets during celebrations such as wedding ceremonies, housewarmings, birthday celebrations, and religious ceremonies.

**Table 5.** Use frequency and ratios of animal foodstuffs in different acquisition methods during the wet season

Household	Collection	Purchase	Exchange	Received	Production
A	1 (3.0)	21 (63.6)	0 (0.0)	7 (21.2)	4 (12.1)
B	75 (83.3)	8 (8.9)	0 (0.0)	3 (3.3)	4 (4.4)
C	45 (70.3)	12 (18.8)	0 (0.0)	3 (4.7)	4 (6.3)
D	26 (48.1)	16 (29.6)	0 (0.0)	10 (18.5)	2 (3.7)
E	2 (4.7)	25 (58.1)	0 (0.0)	11 (25.6)	5 (11.6)
F	22 (62.9)	11 (31.4)	0 (0.0)	2 (5.7)	0 (0.0)
G	15 (71.4)	4 (19.0)	0 (0.0)	2 (9.5)	0 (0.0)
H	5 (31.3)	6 (37.5)	0 (0.0)	3 (18.8)	2 (12.5)
Total	191 (53.7)	103 (28.9)	0 (0.0)	41 (11.5)	21 (5.9)

Source: Hasada and Yamada (2017) with modification

Notes:

1: Values represent use frequency; those in brackets denote the use ratio (%) for all methods.

2: Dark gray denotes the first highest ratio. Light gray denotes the second highest ratio among all methods of animal foodstuff acquisition.

The ratio of animal foodstuff acquisition by collection and purchase was also higher during the dry season. Similar to the wet season data, the ratio of collection was almost twice that of purchase, i.e., 53.6% and 24.1%, respectively. The ratios of acquiring animal foodstuffs by collection were highest in households A, B, C, E, F, and G, whereas the ratio by purchase was highest in households D and H (Table 6). Household members can easily catch small mammals, such as mice, weasels, and squirrels, because many of them appear in rice fields after harvesting in search for fallen rice. As regards livestock, the use frequency and its ratio for all methods displayed little variation between the wet and dry seasons.

**Table 6.** Use frequency and ratios of animal foodstuffs in different acquisition methods during the dry season

Household	Collection	Purchase	Exchange	Received	Production
A	49 (69.0)	6 (8.5)	0 (0.0)	15 (21.1)	1 (1.4)
B	41 (60.3)	2 (2.9)	0 (0.0)	14 (20.6)	11 (16.2)
C	39 (73.6)	11 (20.8)	0 (0.0)	1 (1.9)	2 (3.8)
D	28 (42.4)	31 (47.0)	0 (0.0)	3 (4.5)	4 (6.1)
E	16 (34.8)	13 (28.3)	0 (0.0)	7 (15.2)	10 (21.7)
F	15 (53.6)	11 (39.3)	0 (0.0)	2 (7.1)	0 (0.0)
G	15 (44.1)	5 (14.7)	0 (0.0)	14 (41.2)	0 (0.0)
H	15 (36.6)	19 (46.3)	0 (0.0)	5 (12.2)	2 (4.9)
Total	218 (53.6)	98 (24.1)	0 (0.0)	61 (15.0)	30 (7.4)

Source: Hasada and Yamada (2017) with modification

Notes:

1: Values represent use frequency; those in brackets denote the use ratio (%) for all methods.

2: Dark gray denotes the first highest ratio. Light gray denotes the second highest ratio among all methods of animal foodstuff acquisition.

#### 4. Summary

Among the households we surveyed, the ratios of foodstuff acquisition by collection were highest, excluding plant foodstuff in the wet season, which indicates that collection is an extremely important foodstuff acquisition method affecting food access. Regarding animal foodstuffs, more than 50% of acquisition depended on collection, probably because this village

consists of plain land, upland, fallow land, and forest that supply villagers with various types of natural foods (Hasada and Yamada 2017). The second most important method was purchasing foodstuffs, especially when considering access to animal foodstuffs, irrespective of income limitation and access restriction to the market. This method had a mutually complementary relation with collection. Acquisition methods of collection and purchase are readily influenced by external factors. Unstable climate and land use changes can decrease opportunities for collecting fish and mammals. Purchasing foodstuffs is contingent on market price fluctuations and household income (MAF 2013). Accordingly, households seem to have acquired animal foodstuffs by employing a mixed method of collection and purchase to avoid the vulnerability of depending on a single method of acquisition (Hasada and Yamada 2017).

## Conclusion

In this paper, we attempted to clarify uncertainties concerning the situation of food access in Laos. First, we determined that Laos faces severe food security issues among all the Southeast Asian countries from the viewpoint of accessibility. Second, the findings from analysis of food access (accessibility) data by households in a semi-mountainous village in central Laos indicated that households strongly depended on foodstuff collection for both plant and animal foodstuffs. This is likely related to specific characteristics of the village such as diverse land types. In addition, people seem to be primarily dependent on nature for food security while supplementing collection with foodstuffs that were either purchased or produced.

To generalize the results obtained from this study, we call for research on food access targeting villages with different environments. Moreover, research must be conducted from a perspective not only of food quantity but also of food quality.

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