Food security in Lao PDR, a case study from Nongviengkham village

Bouapao Leesert

Master of Rural Development and Agribusiness

2023

Hungarian University of Agriculture and Life Science

Szent István Campus

Master of Rural Development and Agribusiness

Food security in Lao PDR, a case study from Nongviengkham Village

Primary Supervisor: Dr. habil Krisztian Ritter

Author: Mr. Bouapao Leesert

Q84GM4

Institute for Rural Development and Sustainable Economy

Gödöllő

2023

LIST OF CONTENTS

CHAPTER 1: INTRODUCTION……. 1

1.1 Background of the country…….……. 1

1.2 Food Security in Laos……. 2

1.3 Agricultural production……..……5

1.4 Purpose of the study and research questions…….……..…….6

1.5 Hypothesis of the study……7

1.6 Significant of the study……7

CHAPTER 2: REVIEW OF RELATED LITERATURE……..…….8

2.1 The origin of food security…….……..8

2.2 The meaning of food security…….……..9

2.3 Fundamentals of food security……11

2.4 The importance of food security…….13

2.5 Food security indicators……..14

2.6 Food insecurity definition……17

2.7 Empirical literature review ……..……...19

CHAPTER 3 MATERIAL AND METHODOLOGY…….……...……...23

3.1 Introduction…….…….23

3.2 Study population and sampling……...23

3.3 Recruitment…….24

3.4 Questionnaire……..25

3.5 Statistical analysis…….……..…….25

CHAPTER 4 RESULTS……...…….…….……..……29

4.1 Participants' characteristic…….……..29

4.2 Prevalence of food insecurity and characteristics of the residents……...…...32

4.3 Food coping strategies for food secure and insecure residents…….……..…….33

4.4 Food buying decision……...……37

4.5 Food availability, food access and food security……...……..38

4.6 Food stability……..…….……...…….41

CHAPTER 5 CONCLUSION AND RECOMMENDATION……..44

5.1 Food security status……..……...44

5.2 Food coping strategies and buying decision ……...44

5.3 Food availability, food access and food security…….……45

5.4 Food stability…….……..45

5.5 Results of the proposed hypothesizes……..46

5.6 Recommendations……47

CHAPTER 6 SUMMARY……...……...……...……49

CHAPTER 7 REFERENCES……...…….……50

CHAPTER 8 ANNEXES……..…….62

Annex 1. Questionnaire…….……....56

Annex 2. Acronyms and abbreviations…….…….59

CHAPTER 9 APPENDIX……...…...60

Appendix 1. Abstract…….60

Appendix 2. Acknowledgements……...61

Appendix 3. Declaration of author……..……..62

Appendix 4. Supervisor's declaration……..…….63

LIST OF FIGURES

Figure 1. Map of Laos……..……..1

Figure 2. Consumer price index for food products in Laos during 2022……..…..……4

Figure 3. Food security pillars……..……..9

Figure 4. Key elements of food security definition……..…….12

Figure 5. Food security elements' interrelations……..……...……..19

Figure 6. Map of Nongviengkham village……23

Figure 7. Measuring of severity of household food security and hunger……..……27

Figure 8. Occupation of the sample……..30

Figure 9. Education level of the sample……30

Figure 10. Income level of the sample……..……31

Figure 11. Origin of the residents……..32

Figure 12. Number of household members……...32

LIST OF TABLES

Table 1. Population of Nongviengkham Village by age period……..……...25

Table 2. Coding questionnaire responses for the food security status……..…….28

Table 3. Sex and age groups of the participants ……..…….29

Table 4. Comparing demographic of original residents and residents from other area…..…...33

Table 5. Food security category and scale……..……...34

Table 6. Relation of food security of samples and food copping strategies……..……36

Table 7. Relation of food buying decision and food security……...……38

Table 8. Food source and food security……..……...…39

Table 9. Imported food and food security…….…….……40

Table 10. The change of residents' behavior after the increase of food price……...42

Table 11. Residents' food nutrition knowledge and government inspection quality……43

CHAPTER 1 - INTRODUCTION

1.1 Background of the country

Laos is a land lock country with a total area at 236, 800 km^2 and 7, 38 million of population in 2021, which equal to a low density of 32 people per km^2 (World Bank, 2022). It is a mountainous country in the south of the Asian continent crosses the borders of many countries (Figure 1.). Its neighbored countries are China, Thailand, Vietnam, Cambodia and Myanmar. The north is bordered by China, the northwest side is bordered by Burma, the west side is bordered by Thailand, and the south side is bordered by the country Cambodia and the eastern border with Vietnam, Lao divide the economic zone into three regions. That is, the North, Central and South regions each have differences in terms of area and climate conditions.

Figure 1. Map of Laos

Source: Sisouphanthong, 2000

GDP growth averaged is at 7.7% over the last decade, with income per capita reaching $2,460 in 2018. The government is seeking to maintain macroeconomic stability by reducing the fiscal deficit and strengthening public debt management. As a result, there has been fiscal consolidation, with the fiscal deficit declining to 4.3% of GDP in 2019 from 4.4% in 2018 and 5.5% in 2017. Agricultural production has increased by only 3.4% per annum on average since 2000, despite the fact that the agricultural sector employs 62% of the active population.

Although other sectors have grown more rapidly, the agricultural sector's share of gross domestic product (GDP) declined to around 16.21% in 2020 (World Bank, 2022).

Lao PDR is a lower-middle-income country (LMIC) and is classified in the 'medium' category of the Human Development Index (HDI). Despite significant economic progress over the last two decades, Lao PDR still has one of the highest poverty rates in the ASEAN region, with around a fifth of its 6 million people in poverty. According to the World Risk Index (WRI) Lao PDR is a 'medium risk' country and is highly vulnerable to disasters, with high susceptibility, a lack of coping capacity, and a lack of adaptive capacity. Flooding and storms are the most frequent and destructive natural hazards faced in the country. Lao PDR experiences annual monsoon flooding (July–September) and saw major floods in 2009, 2011, and 2013. The floods in 2009 and 2011 affected over 100,000 people, killed dozens, and damaged houses and infrastructure, with an estimated cost of more than US$100 million. In the 2013 flooding, 12 out 17 provinces were severely flooded, affecting approximately 347,000 people and costing the country US$219 million (WFP Laos, 2019).

Lao PDR is tremendously ethnically diverse. The people of Laos consist of 4 main ethnic groups according to the language category: Lao-Tai (62.4 percent), Mon-Khmer (23.7 percent), Hmong-Lumian (9.7 percent), and Chinese-Tibetan (2.9 percent). These 4 main ethnic groups is contributed from 50 minor ethnic groups. These minor groups of Laos are geographically diverse and have been classified into 3 ethnic groups according to their geographical features: Lower Lao, High Lao and Upper Lao. The ethnic classification also shows the agricultural production system, namely Lower Laos live by farming, while Upper Laos and High Laos do shifting cultivation. This ethnic classification also shows those ethnic resident locations, the majority of Lower Lao residences along the Mekong River at the southwest, while the majority of High Lao lives in the northern and the Upper Lao lives in the southern of Laos. The High Lao and Upper Lao have higher poverty rate than Lower Lao (Lao Statistics Bureau, 2020).

1.2 Food security in Laos

The very first national analyzed report about food security (WFO Lao, 2007) was conduct in mid-2009 by the UN World Food Program in Lao PDR. This study was the first report that significantly 'discovered' widespread malnutrition in Lao PDR. This discovered results become significant base for later studies and uses in policy. Those finding include:

Chronic malnutrition in rural Lao PDR is alarmingly high. Every second child in the rural areas is chronically malnourished, affecting not only their physical development but also their cognitive capacity. The steady economic growth that Lao PDR has experienced over the past 15 years, has not translated into improved nutritional status of the rural Lao population. Chronic malnutrition is as high today as it was ten years ago. The Sino-Tibetan ethnic groups are the most disadvantaged and food insecure followed by the Hmong-Mien and the Austro-Asiatic. Most of these groups live in the Northern Highlands and in the Central and Southern Highlands. Managed access to wild meat and aquatic resources (animal protein) is critical for ensuring food security for vulnerable groups. Consumption of domesticated animals can currently not compensate for a potential loss of access to and availability of wildlife (WFO Lao, 2007). After the publication of the paper, many salient details regarding food security in Lao PDR have come to the researcher's attention. This include availability, access, utilization, and stability have widely understood and accepted by food security stakeholders in Lao policy contexts.

At the national level, Lao PDR has attained food self-sufficiency as measured by kilocalories, the country has been self-sufficient in rice since 2000. Domestic production of major food and cash crops has increased since 1999 (Ministry of Agriculture and Forestry, and Lao Statistics Bureau, 2012). The country's food security situation is complex, with increasing levels of rural outmigration and gradual market integration of food and cash crops. Substantial progress on reducing malnutrition has been made since the early 1990s. The target of halving hunger and malnutrition has been achieved, but chronic malnutrition remains, with a stunting rate of 35.6 percent and underweight at 27 percent. One in three deaths of children under 5 is associated with malnutrition (UNICEF, 2016). Rates of anemia and low birth weight are also high, and the rate of exclusive breastfeeding is low (Scaling up Nutrition, 2016). Wasting rates between 5 percent and 7 percent (indicating acute malnutrition) have remained unchanged for over a decade. Preliminary indications from nutrition surveys conducted in 2015 by the Ministry of Health suggest that a substantial reduction in chronic malnutrition has been achieved since the 2011–2012 Lao Social Indicators Survey.

Laos has weathered the strain imposed by food prices rising sharply to a peak in the October of 2022 (Figure. 2.). Nevertheless many people did suffer from rising prices and the consequences of inflation linger, affecting the value of salaries. In line with the return of stability

to global food prices - for now, food inflation in Laos has been moderate. It also showed that in October 2022 food prices across the country were averagely 32.72 per cent higher compared to 2021. Higher prices have brought pain, suffering and distress, disrupting livelihood calculations drawn from the preceding period of relatively stable prices. Rice, for example, are forecast to cost 48.13 percent more than the previous year 2021, the only consolation is an expectation for relatively stable prices. However the prospect of relative stability should create space for some people to adjust and evolve their ways and means for purchasing what food they cannot grow or catch.

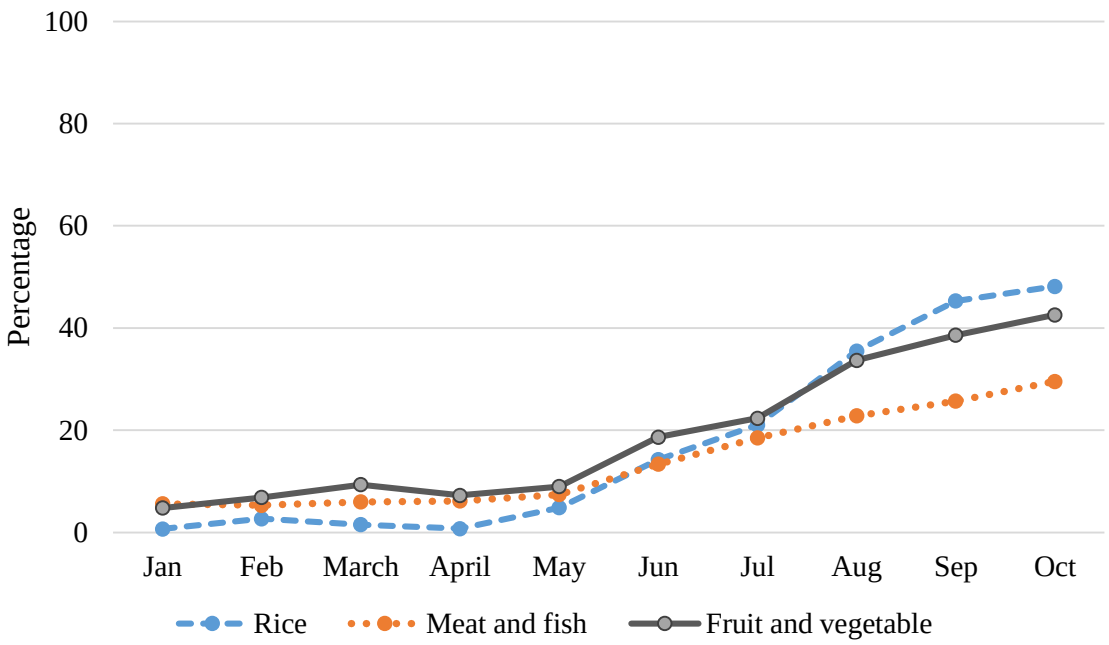

Figure 2. Consumer price index for food products in Laos during 2022 (%)

Source: own edition (2023) based on LAOSIS CPI Report, 2022

Runaway inflation during 2022-2023 in Laos has caused prices of food and other essentials to nearly double over the past year, some even within the last month. Inflation in the country is closely related to the value of the Laotian Kip (LAK) relative to other currencies, due to the country's heavy reliance on imports for most of its consumer needs. The sudden rise in food prices is making life difficult. The price of an egg has now doubled since late last year. Six months ago a pack of instant noodles in Vientiane Capital cost 20,000 LAK, now it costs 40,000 LAK. Pork in the southern province of Laos, now costs 55,000 kip a kilogram, up from 30,000

LAK (Keovilignavong and Diana, 2022). In 2019, almost 20 per cent of the population experienced moderate to severe food insecurity with a stunting rate of 33 per cent among children aged 6-59 months. Over a quarter of surveyed households reported being very concerned about food insecurity in their community. Reducing food consumption became a strategy frequently used by local communities to cope with increasing prices, particularly for low-income vulnerable households (WFP Lao, 2021).

1.3 Agricultural production

Laos has a mountainous topography with only 21% of the total land is suitable for agriculture. 17% of this land area, between 850,000 and 900,000 hectares, is cultivated, just under 4% of the total area of the country. Moreover, agricultural land is dispersed, especially in the northern mountains. About 50% of the arable land supports annual crops, the balance being used for perennial crops, such as coffee, or pastures and grasslands. Only a few areas along the Mekong River and its tributaries have large contiguous cropped land, notably in the Vientiane plain, and in central and southern riverine plains (FAO, 2015).

The farming systems in Laos are divided into five main types: lowland rain fed farming; lowland irrigated farming; upland farming; plateau farming; and highland farming. Lowland rain fed farming produces lowland rain fed rice during the wet season, and the land is used for grazing large animals in the dry season. Lowland irrigated farming is more specialized, uses more inputs, and is less reliant on livestock. Upland farming includes upland rice, cash crops, leguminous, and agroindustry tree plantations. Plateau farming is practiced mainly in the Boloven plateau and is dominated by coffee cultivation, while highland farming is characterized by sloping land and livestock. Agriculture in Laos is transforming from subsistence farming to market-oriented farming, with a developing agro-processing industry (Sacklokham, 2014).

Lao PDR achieved rice self-sufficiency in 2000, a major milestone in the history of the country (Sacklokham, 2014). Today, 72 percent of the total cultivated area is dedicated to rice. Most of the provinces that are deficit in rice are surplus maize producers. Agriculture production is becoming increasingly commercialized. Currently, 33 percent of farmers are producing mainly for sale. Yet, around 80 percent of the rural population is still subsistence farmers, depending on heavily rice base agriculture, raising livestock and relying on collection of food from the wild to supply it with nutrient-rich foodstuffs (World Bank, 2014). Similarly, livestock

production has become increasingly commercialized in recent years, driven by a regional demand that is projected to grow at between 3.5 and 4 percent per annum in the present decade. Use of chemical fertilizers, has traditionally been low, however, with the spread of agricultural concessions, an increased trend in their use has been registered.

The country wants to improve its farming by growing more rice twice a year and selling it in the market. They also plan to farm during the dry season and increase the amount of land used for rice fields (Ministry of Agriculture and Forests, 2015). The Ministry of Agriculture and Fisheries (MAF) also initiated farmers to grow more crops that can be sold for profit, such as maize, coffee, sugarcane, cassava, beans, root vegetables, fruits, and other vegetables (MAF, 2015). Many families in rural areas have been experiencing significant changes in their farming and livelihoods. They have been finding new ways to make a living, such as trying different ways of farming, making the most of their labor, and even considering migration or receiving money from relatives living elsewhere (Alexander and Larson, 2016). Farmers can also learn about alternative crops, such as fruits and vegetables, or ways to improve their farming during the rainy season, or how to raise livestock, through advice from international organizations (see e.g. Clarke et al., 2016; Manivong et al., 2014; Newby et al., 2013; Vote et al., 2015).

1.4 Purpose of the study and research questions

The recent disruptions in international trade resulting from responses to the COVID-19 pandemic and the current inflation of food price have changed the consuming behavior of many people in Laos. This have highlighted the importance of food security. Laos has a primarily agricultural workforces, but a significant portion of its food supply relies on imports which make them even more vulnerable to food security. Consequently, this research aims to find out the current situation in Nongviengkham village, Laos. As a suburban village, it has a variety of origins of residents from every part of the country. Thus, a wide range of levels of food security could be found in this study area, making it an ideal sample for the current food security situation in Laos. This paper seeks solutions by addressing the following four questions:

- What is the current status of the basic personal, economic, and social characteristics of the population residing in in Nongviengkham village, Lao PDR?
- How can we measure the level of knowledge, attitudes, and practices among the residents of in Nongviengkham village, Lao PDR, regarding food security?

- What are the various factors that influence the knowledge, attitudes, and practices related to food security among the residents of in Nongviengkham village, Lao PDR?
- What recommendations can be proposed to enhance the food security situation for the residents of in Nongviengkham village, Lao PDR?

1.5 Hypothesis of the study

- The first hypothesis is that the level of food security of people living in Nongviengkham village is low during the study period which is following the food price increase since 2022.
- The second hypothesis is that the food accessible, the source of food of residents in Nongviengkham village show significant correlation to food security.

1.6 Significant of the study

- Acquiring knowledge to create understanding for people on food nutrition and to create food security and know the factors that affect food security.
- Know the problems, obstacles, and suggestions for people towards food security in Lao PDR. Those results from the research could help promoting food security attention and policy.
- The results of this research will serve as a guideline for other studies in the future. This can be used as basic information for planning activities to promote food security for people living in Lao PDR.

CHAPTER 2 - REVIEW OF RELATED LITERATURE

2.1 The origin of food security

The history of food security begins with the problem of food shortages in various regions of the world, especially in developing countries, where food security has become a concern. Much interest led to the 1974 World Food Summit held in Rome, Italy, where food crises in different regions of the world were discussed. Food price stability as well as preserving the ecosystem which as a result of food production (Office of the National Economic and Social Development Board, 2011).

Maxwell (1998) has classified the history of maintains food into four different periods. Phase one, 1974-1980, focused on global food security caused by the food crisis in Africa and rising food prices. As a result, the World Food Summit by the Food and Agriculture Organization of the United Nations (FAO) created the World Food Security Committee and the World Food Council to monitor global food demand and supply. The second period, 1981-1985, began to implement the structural adjustment policy to solve the problem of poverty that may affect food security. The third period, 1986-1990, when there was a famine in Africa and some parts of the developing world, and the concept of food security was taken seriously. The fourth period, 1990-1996, introduced the concept of poverty reduction to solve food security problems. The fifth period, 1996 onwards, was when world food prices rose, bringing food security back to the spotlight, but focusing on self-sufficiency.

The concept of food security is limited to the framework of the production process, that is, producing enough food to meet the needs of consumers at a stable price is important. Therefore, many countries have adopted the concept. Green Revolution (Green Revolution) or a new way of farming. To adapt to the development of agriculture, resulting in a change of production methods from subsistence farming to industrial farming. In order to have enough food for the world's population (Prasertsak, 2015).

2.2 The meaning of food security

The Food and Agriculture Organization (FAO) of the United Nations (FAO, 2000: p.15.) defines the term Food security means that *"people have sufficient quantity of food for their consumption, there is a variety of the types of food they receive, and that food is of quality,*

meaning it is nutritious and safe. Including people being able to access food resulting from a distribution system" (see Figure 3). Based on ASEAN Reconciliation Declaration (1994) the definition of food security means that "*all people have access to food for their livelihood at all times"* (cited in South Center, 1997: p. 1.). FAO (2006: p.10) has another definition for food security as well: *"Food security occurs when all people, at all times, have access to adequate food. Food is safe and nutritious to meet the needs of a healthy lifestyle and have a good health" (see Figure 3).* In 1996, World Food Summit (AIFS, 2013: p.7) addressed *"food security when people have safe access to food and sufficient for physical and economic needs and have nutritional value for consumption needs. There must acquire his satisfaction in order to be able to live active and healthy at all times".*

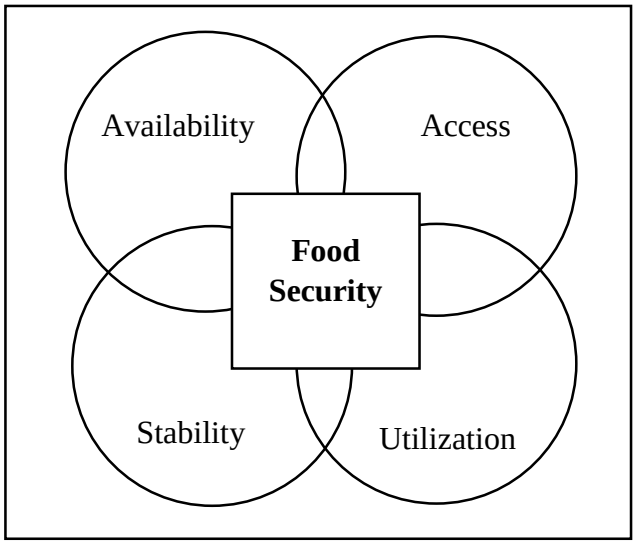

Figure 3. Food security pillars

Source: own edition (2023) based on FAO, 2000; 2006.

Chumchat (2015, p.21) defines food security as "*the availability of food of sufficient quality to meet the domestic consumption needs at the household and community level will entitle, and be able to access the available resources continuously at all times, and can use the knowledge, abilities, skills, wisdom that exist in the community to apply to use with those resources in accordance with the way of life community culture and ecosystems. It is something that will enable families and communities to have enough food to consume according to nutrition principles sustainably".*

Kiouf (2000, p.29) wrote about food security that "*Food security can only be achieved if people are able to find enough safe and nutritious food whenever they need it, whether physically or economically*".

Consortium (2004, p.11) stated that food security from the point of view of human rights. "*Food security is, the effects of respecting, protecting and responding to the right to food. And, food security depends on the right to adequate food and the fundamental right of every human being to freedom from hunger*".

The United Nations Development Program (1994) ensures food security means that everyone at all times has access to basic food both physically and economically. But only if there is enough food to go out. It requires people to have access to food where they have the "right" to food. Growing one by purchasing or taking advantage of the public food distribution system, the availability of food is a necessary condition to maintain safety.

Attaviwattanakul (2014) defined the meaning of food security which refers to a person's abilities both economically and physically, which can access food at all times. The food must be in sufficient quantity, quality, and nutritionally correct. It is safe and socially acceptable in all situations in order to bring about the well-being of individuals.

Soonthornwijit (2016) summarized the meaning of food security as having quality food that is sufficient to meet the consumption needs at the household and community level, with the emphasis on food self-sufficiency. The right to access the community's food resource base and to be able to use the knowledge, skills and wisdom available in the community to manage those resources in line with their way of life. Community culture and ecosystems that will enable families and communities to have food for sustainable consumption. It is also linked to a household economy that responds to the food supply.

Chumchat (2015) gave the meaning of food security as having adequate quality food that meets the consumption needs at the household, community and country levels. They must have the right and be able to access existing resources continuously at all times and can use the knowledge, abilities, skills, wisdom existing in the community to manage those resources in accordance with their way of life. Community culture and ecosystems that will enable families and communities to have food for consumption according to sustainable nutritional principles.

Lao PDR has its own definition of food security. As a framework for setting policies and strategies for the development of the country. This definition is based on the realities of Lao PDR and lessons from many countries on the region and around the world by the Food and Agriculture Organization of the United Nations (FAO), Lao PDR defines food security as ensuring that all people have enough food at all times, physically and economically together with the ever-increasing demand quality health and nutritional balance to improve health and make the body grow normally and can work efficiently (National Institute of Agriculture Planning and Projection, 2000).

In summary, food security means that all people can have food for consumption and access to food sources at all times and throughout life to have enough to lead a healthy lifestyle. There is a wide variety of food types to get. The food have good quality, nutritious and safe.

2.3 Fundamentals of Food Security

Households are food secure when they have year-round access to the amount and variety of safe foods that their member needs to lead active and healthy life. The food available to the household should be shared according to individual needs; the food must be sufficient in variety, quality and safety and each family member must have good health status in order to be benefited from the food consumed (WHO, 2010).

Food security is a broad concept, encompassing issues related to the nature, quality, and security of food supply as well as issues of food access. According to WHO each definition of food security involves the following three key elements (Figure 4). These are:

- Improving availability: availability is a term used to indicate supply of food in terms of quantity and quality to provide adequate energy protein, carbohydrate and micronutrients to the population of a country on a sustainable basis. Availability to household is basically the capacity to acquire the food it needs which primarily could be satisfied by producing it. Any activity of a household that contributes to improve agricultural production or food supply would be considered as part of food availability strategy.
- Increasing access; it is the strategy households apply to get the food. Households and individuals may acquire food through own production, purchase or national safety net

mechanisms. The concept of vulnerability is highly related with the idea of access. Access is also the ability of a household to purchase food i.e. the physical availability of food commodities on the local market and ability of the household to purchase food.

- Appropriate use of available food: food insecure households tend to have larger and high number of dependents. Meeting household food needs is the result of appropriate food use (WHO, 2010).

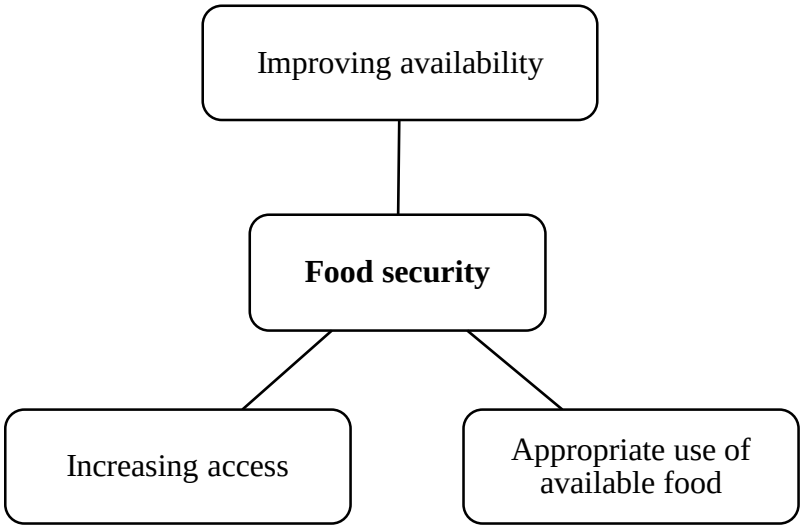

Figure 4. Key elements of food security definition

Source: own edition (2023) based on WHO, 2010

FAO describes the details elements of food security are as follows:

- Food Availability: which means the sufficiency of quality food quantity. This may be from domestic production or import including food assistance.
- Access: which means there is sufficient resources for individuals to obtain proper and nutritious food. Such resources refer to the ability of a person to exercise control over a commodity within the legal, political, economic and social context of the community in which he lives. (Including traditional rights such as access to community resources).
- Food utilization: This is measure through adequate food, clean water and maintaining health and hygiene in order to reach nutritional well-being which all physical needs are met. Food security is therefore related to non-food inputs as well.
- Stability: Food that people, households and individuals must have access to sufficient food at all times without risking food inaccessibility as a result of a sudden crisis such

as an economic crisis or climate or other possible cyclical event such as seasonal food insecurity. In this sense, food security encompasses the dimensions of food sufficiency and accessibility (FAO, 2006).

2.4 The importance of food security

Thongpradap (2010) concluded that food security is very important because food security is a part of national security, namely:

- If any country does not have food security in the country, it will cause people in that country to be starved and hungry. Which may lead to the cause of usurpation Terrorism, robbery, to earn money to buy food for consumption. Famine can also occur, especially in children. This can happen locally to globally.
- There is now a global monopoly based on food as an important tool, with the food consumed and the sovereignty of nations dependent on the monopolizing country. This inevitably affects food security.
- If any country does not have a method that can cause security in food and agriculture in the country, it will affect the well-being of the people in that country and is also a signal that conveys security in other areas such as social, economic, political and environmental security. But at the same time, these security are also linked to food security and agriculture (Thongpradap, 2010).

In addition, food insecurity is a problem in every corner of the world and is a “daily reality” (Webb et al. 2006, p. 140) for millions around the world. On the other hand, hunger and malnutrition are the direct consequences of food insecurity and they have important implications for the well-being of individuals, households and societies. According to the millennium project hunger task force report the labor productivity losses associated with malnutrition and hunger are on average between 6 and 10 percent of GDP and significant losses in children’s cognitive abilities are also directly associated with malnutrition (Sanchez et al. 2005). The report in addition shows that food insecure and hungry people face political and social segregation. Another study shows that at the household level food insecurity leads to “physical impairment” through hunger and illness; “psychological suffering” through stress, fear and departure from norms; and “socio-familial perturbations” through distorted means of food acquisition and modification of eating patterns (Hamelin et al. 2002).

2.5 Food security indicators

Food security indicators are factors or variables that can show or reflect the status that occur in one or more dimensions of food security. Food security indicator in this case, is divided into 2 parts of presentation:

2.5.1 Development of food security indicators

Those indicator were developed to reflect food security, the Food Security Index measures one or more dimensions of food security that reflect the status quo, changes, and other aspects of food security or to measures the outcomes of major development interventions and developments. While there may not yet be a perfect index that can cover all dimensions of food security. Therefore, in practical, teams or organizations may choose to use one index or a combination of multiple indexes depending on the food security concept used, the goals, objectives and resource conditions of each task (Chomkwan, 2015).

Prachasan (2012) divided food security indicators into 3 characteristics:

- From food sufficiency to food access issues: Since at first the concept of food security was seen as a problem of supply scarcity, the index used primarily in terms of the difference between food output and demand. The food of the population of a region or country in the sub-level is the household level and Individuals will use nutritional status as an indicator of food security. By the belief that the lack macro-scale food shortages will result in malnutrition.
- From the objective measurements: Subjective to objective measurement is a measurement from the basis of reality from theory to measurement in individual point of view. This development has been influenced by the study of poverty, which has focused on listening to the experiences of the poor rather than being measured on a traditional monetary value. The subjective food security index is an index based on feeling or perception or the experience of households or individuals. This also includes a focus on values and culture related to food situations.
- From using a representative index to a fundamental index: measures of food security in many jobs often use representative indices such as income levels, calorie content, consumption data or assets, etc. These indices are not the basic index of direct food

security rather it is a representative index of the level of food security. A limitation of the use of representative indexes is that in some contexts they may not accurately indicate food security (Prachasan, 2012).

It can be seen that the food security index will develop in 3 directions, reflecting the food security and changing status in each area which each direction has different principles the researcher has analyzed each index as follows: first characteristic, from sufficiency of food is an index that should be well adapted to research in the community. This can clearly tell if the production is sufficient to meet the demand for consumption, indicating that there is still food security. As for the second characteristic, from objective to subjective measurement. It is an indicator derived from only one group of people, the poor, and therefore cannot provide a comprehensive description of food security. The third characteristic from using a representative index to a fundamental index. It is an index that is used as an indicator for measuring food security by comparing income per consumption and nutrient intake. But this index still has limitations in some contexts do not apply, for example in rural communities, they cannot be compared from per income. The amount of food you need and the amount of nutrients you can get due to having access to food from food sources natural enough to meet the needs of consumption without having to buy making it difficult to measure from income, etc. Therefore, this index cannot be measured in some areas (Chomphon, 2016).

2.5.2 Food security indicator level

Food security indicators were divided into 2 levels: national level and household or community level. This summarize come from FAO (2006) and from the Sustainable Agriculture Foundation (SAF, 2012) as follows:

National food security indicators:

- People's access to food means people must have the ability to access to food at all times It considers national income per capita per year and the ratio of food expenditure to total income.
- Food sufficiency for consumption means food must be sufficient for consumption. Consumption needs of people in households, communities and countries. This can be done by considering Energy requirement of food per person per day.

- Having food stock means having access to food regularly by focusing on the ability Community and country production is the study of the index of diversity of food production on the diversity of food production demand for the consumption of the population.
- Food consumption situation of the people means considering the proportion of the population lack of food compared to the total population in a community or country.
- Nutritional situation means considering the percentage of children under 5 years of age who are underweight.
- Health and public health situation means considering the availability of clean and safe drinking water sources. Including considering the mortality rate of children under 5 years of age (FAO, 2006; SAF, 2012).

Household and community food security indicators:

- Community or household perception, questioning households about food security. It can reveals aspects of cultural acceptance of food consumed by households, including the scarcity and accessibility of food at certain times of the year.
- Food expenditure or budget of the community or household from the measurement of expenses. Household diets can indicate the economic capabilities and vulnerabilities of households in taking care of their own food security. Households with food expenditures as a proportion of expenditures, many of them are at risk or very vulnerable to food insecurity. Food expenditures can also be translated into calorie data.
- The amount of energy from food: measurement of energy from food consumed by an individual Measuring energy at the personal level will measure from the type and amount of total food consumed (including snacks) each day. Measurements may be made both by observation and by interviewing memories. The amount of food consumed is then converted into caloric content according to a calculation formula, was compared with the numerical value standard minimum food requirements. Additionally, measurement of energy from food prepared for household consumption. This method measures energy by quantity. Cooked or processed foods prepared by households for consumption within a certain period of time, were collected by questioning household food supervisors purchase, the amount of food prepared for consumption and the amount of food actually

eaten Most of the data collection will be measured in the form of local units such as cans, pots, bags, etc. (FAO, 2006; SAF, 2012).

2.6 Food insecurity definition

If individuals lack access to sufficient and safe food or cannot obtain it in socially acceptable ways, they encounter a state known as food insecurity, as defined by the USDA. This describes food insecurity as *"the restricted or uncertain availability of nutritionally adequate and safe foods or the inability to obtain acceptable foods in socially acceptable ways"*. (RTI International, 2014, p.3). At the household level, the presence of specific risk factors (Figure 5.) can lead to food insecurity. These risk factors combine to create a situation where individuals lack adequate access to food. Some examples of these risk factors include:

- Low socio-economic status (SES): having a low socio-economic status (SES) means having limited economic resources and lower social status or influence (Troy and Olson, 2011, P.29). Family income can be an indicator of a family's food and nutrition security status, but it's not the only factor to consider. Other factors such as education and health status should also be taken into account (RTI International, 2014). Families with lower SES are more susceptible to food insecurity, and even having a source of income may not necessarily alleviate the problem of food insecurity (McIntyre & Emery, 2012).
- Household composition: The impact of household composition on food and nutrition security can differ based on several factors, such as the presence of children, women as the head of the household, and multiple generations living together. Households that have children are more likely to experience food insecurity (Coleman, 2013). It is suggested that households headed by single women are more vulnerable to experiencing food insecurity and nutrition-related issues compared to households led by males or couples (Nord, 2009). Women generally have lower incomes compared to men, particularly in developing economies (Matheson & McIntyre, 2014).
- Poor health status: The relationship between food security and health status is two-way, meaning that both factors can impact each other. When examining a population's food security status, it is essential to consider their health status with care because it can be both an indicator and a consequence of food insecurity (RTI International, 2014). An individual's health status can impact various aspects of their daily life, including their

ability to perform productive activities. As a result, this can lead to a reduction in economic income.

- Social capital: Families with access to social capital can take advantage of better opportunities, resources, and social assistance (Martin, 2004). Households that possess strong social capital are more adept at dealing with food shortages and can better cope with such situations.

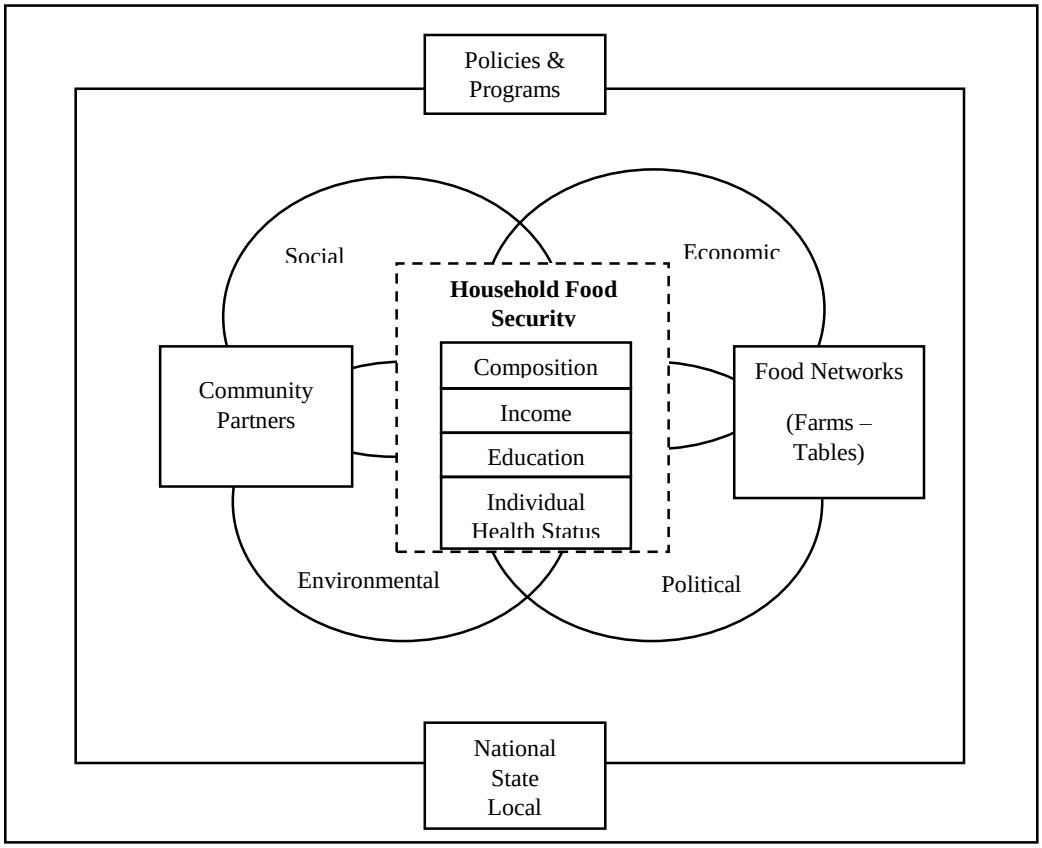

Figure 5. Food security elements' interrelations

Source: RTI International, 2014

2.7 Empirical literature review

Chairit et al. (2012) conducted a study as a correlational research. The objective is to study food security and the relationship of personal factors Family and social factors and food security among the elderly in rural communities in the southern provinces of Thailand (Chumphon; Krabi and Nakhon Si Thammarat Provinces). The sample consisted of 194 elderly people aged 60 years and over, selected by specific type according to the inclusion criteria. Data were collected by questionnaire interview. Assessment of nutritional status by body mass index

and muscle strength. Data were analyzed by descriptive statistics, chi-square and Spearman's correlation. The study found that, there were relatively few elderly people with food insecurity problems, 6.7 percent and amount of food respectively. The results of the relationship analysis revealed that health status, family income, and social support was statistically significantly negatively correlated with food security problems. The results of this study provide recommendations for community practitioners to promote food security in the elderly. Especially, those with health problems low family income and little social support.

Ahungwa (2014) explores the challenges surrounding food security in Nigeria, specifically the paradox of increasing domestic food production alongside increased food imports. The research used data from a variety of sources including the National Bureau of Statistics, the Central Bank of Nigeria, Nigeria's National Dailies, and CIA Fact Book reports. Trend analysis revealed a downward trend in the contribution of agriculture to Nigeria's Gross Domestic Product (GDP) from 1960-1979, with food imports ranging from 2.92% to 9.85% of GDP during that period. The trend continued with an undulating pattern up to 2009, where food imports dramatically rose from N2.6 trillion (3.83%) in 2005-2009 to about N20.6 trillion (25.02%) in 2010-2012. Regression analysis confirmed a positive relationship between agriculture and GDP, with agriculture contributing significantly to the country's GDP. However, the paradox emerges as food imports are also found to be positively related to GDP, increasing as food production marginally increases. The paper suggests that food insecurity in Nigeria could be reduced by minimizing reliance on food imports through increased budget allocation to the agricultural sector and improved post-harvest management practices.

Chumchat (2015) studied food security in terms of food sufficiency and consumption needs of people in the community. The study results are as follows: The community has utilized 188 types of food for the benefit of all 3 sources of food that the community relies on: natural food sources. Self-produced food source and trade sources. When comparing the amount of food availability with the utilization for consumption, it was found that natural food sources contained insufficient food types for 10 food types out of a total of 35 food sources. That are insufficient to meet the consumption demand of 38 species out of a total of 54 species, comparing the amount of existence in the community to the consumption demand it is assumed that the community is still considered to have insufficient food supply to meet their consumption

needs. But when the community is dependent on trading sources. It was found that all kinds of food are sufficient to meet the needs of consumption. As for access to food sources, it was found that people in the community had equal access rights to all food sources. But they vary depending on the context of the food source. And in terms of food management and food sources, it was found that the management to obtain these foods requires the wisdom of making tools, the wisdom of collecting food. Wisdom in cooking as well as managing food sources to obtain food for consumption at all times.

Masawat et al. (2016) have studied factors affecting food security of Thai agricultural households. By comparing the amount of energy received from food consumption of agricultural households with the food security curve. Measure the proportion of households that are food insecure. Food insecurity gap and the severity of food security problems by region, household location, income level and agricultural production activity Including the analysis of factors affecting food security by using logistic regression equations using sample data of 12,446 households. raising the level of education of the head of the household having a female head of household having the amount of rice stored for consumption obtaining agricultural assistance an increase in income in both agricultural and non-farm sectors and integrated farming. The opposite will result in increased food security. An increase in the amount of debt and the number of household members resulting in a decrease in food security. Expanding educational opportunities Promoting off-farm activities along with on-farm activities assistance in agricultural production activities promoting integrated farming and implementing projects to solve farmers' debt problems will reduce the risk of food insecurity.

Praditsathaporn and others (2018) conducted a participatory action research. The objective was to study the process of driving food security through indigenous vegetables. The implementation was divided into 2 phases: 1) assessing food security at local and provincial household levels in the upper northern region and 2) developing a model to drive food security through local vegetables in the model area. Organic farming group. The tools used were food security questionnaires, community leader interviews, observational forms, in-depth interviews and focus groups. The validity of the tool was considered by 3 experts. The reliability of the food security questionnaire was 0.83. Only 44.1% of the provincial local governments in the upper northern region had policies, plans, projects, and activities that reflected community food

security based on community leaders' awareness. The management and participation of the network for analyzing the results of the development of a model to drive food security in the model area revealed that process to drive food security Consists of a district development plan. The development of organic farming groups to create awareness of the body of knowledge within themselves of the group members. Exchange of learning, study visits operate the opening of vegetable shops in the community and act as a learning center resulting in knowledge management.

Based on Arrouna and others (2020) the importance of rice in ensuring food security in West Africa is significant. However, the region is becoming increasingly reliant on imported rice due to a persistent and growing shortfall, and the development of local rice production is hindered by technological, financial, and coordination issues. This makes West Africa susceptible to disruptions in both local and international trade, such as those caused by the ongoing COVID-19 pandemic. By examining the current state of the domestic rice value chain in West Africa, we can anticipate the effects of the pandemic on the resilience of the rice value chain and its ability to maintain food security in the region. To help mitigate the effects of the COVID-19 crisis on food security, various policy options are suggested for West African governments.

Laplante and others (2021) ensuring that everyone has access to adequate and safe food is becoming a bigger issue for society. The world's population is expected to reach 9.6 billion by 2050, but there is less land available for growing crops. The COVID-19 pandemic has shown how important it is for countries to be able to produce their own food. Canada is mostly self-sufficient in meat and dairy but depends on imported fresh vegetables. If there were disruptions to international trade in the future, Canada's food security could be in danger. One solution could be to increase local production of fresh food throughout the year using greenhouses. However, there are challenges to this approach, such as the spread of plant diseases and predicted labor shortages. To overcome these challenges, the greenhouse industry could introduce new crops and innovative technologies. This article examines the state of the Canadian greenhouse industry, identifies potential problems, and suggests opportunities to improve food security across the country.

Food security is a crucial issue in Laos, as the country is still predominantly rural and heavily dependent on agriculture. Natural biological resources, including lowland paddy, shifting cultivations, and fishery, play a crucial role in household food security in Northwest Laos by providing a significant source of cash income, particularly for poor people (Kenichiro, 2004; Lorenzen, 2013). Livestock banking programs have been implemented in Laos to increase food security, particularly among poor households. However, these programs may not have a significant impact on rice production for households that were classified as poor before their participation in the program (Santos, 2010). Meanwhile, Bouttasing's (2013) study highlights the prevalence of chronic malnutrition among ethnic minority groups in Laos and limited knowledge about specific nutrition practices among these groups. Therefore, promoting the use of natural biological resources, particularly fishery and lowland paddy, could help improve food security in Northwest Laos, particularly for poor households.

In Northern Laos, increasing market accessibility has led to a shift from subsistence to commercial agricultural systems (Tanichanon, 2018). Farmers in areas with higher market accessibility primarily grow cash crops, while those in areas with lower market accessibility rely more on subsistence agriculture and have lower levels of basic wellbeing. This is closely linked to land tenure security (Keovilinavong, 2020), who noted that land tenure insecurity can push farmers to explore alternative strategies to ensure food supply, such as through farm and non-farm employment. Phouvong's study highlights several factors that affect food security in the areas of the Nam Theun2 Hydropower Project in Khammuan, Laos. The status of food security was adversely affected by household size, food prices, drought, and sudden shocks. Monthly income, number of household laborers, gender of the household head, and the size of farmland were found to have a positive correlation with the household's food security status (Phouvong, 2020). Meanwhile, the WFP's rapid assessment (2020) found that the biggest obstacle to obtaining food in Laos was financial, with lower-income households and those relying on daily wage labor facing the most severe access challenges. Rural households depend on their own farming and gathering food from nature, such as fish, herbs, fruits, and insects. However, almost one-third of the participants in the WFP assessment noticed a decrease in the nutritional value of their food.

CHAPTER 3 – MATERIAL AND METHODOLOGY

3.1 Introduction

In this section, the study method and design are briefly explained. The objective of the research was to examine the degree of food security among residents who currently live in Nongviengkham Village, Xaythany District, Vientiane Capital, Laos (Figure 6.) as well as to investigate the factors related to food insecurity. The study also aimed to explore factors associated with residents' food insecurity. To maintain anonymity and sensitivity, an anonymous questionnaire was chosen to collect data. The use of validated survey instruments allowed for potential comparisons with other studies. The study aimed to include a large number of participants from various resident groups. However, qualitative methods such as semi-structured in-depth interviews would have provided more comprehensive information on the nature of food insecurity, but these methods were not feasible in this study.

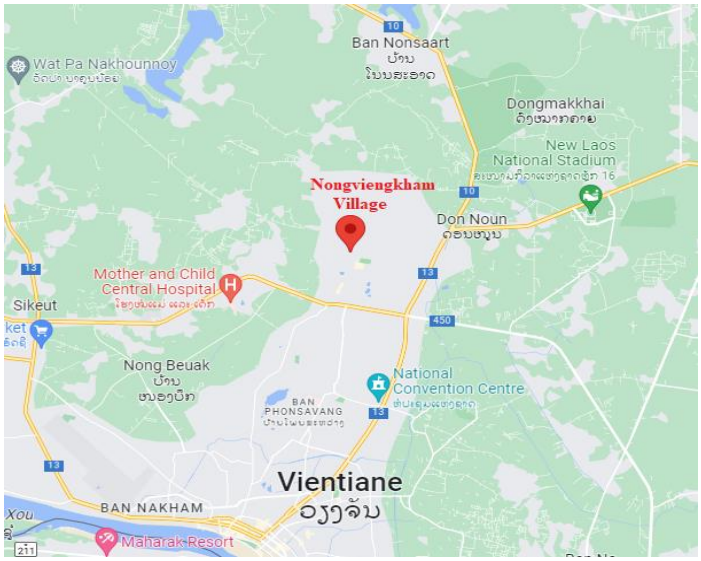

Figure 6. Map of Nongviengkham Village

Source: own edition (2023) based on Google Maps, 2023.

3.2 Study population and sampling

This research study was conducted in Nongviengkham Village, Xaythany District, Vientiane Capital, Laos. The study involved one village, with a total of 825 households. The population consisted of 2488 original villagers and 544 temporary residents, making a total of

3032 people. Out of this population, 1532 were men and 1500 were women. These data were provided by Nongviengkham Village's Office. As the survey was conducted on google form and held online through social media (Facebook). There is high probability that older people in the village, do not know how to fill the form and many elders do not use Facebook, thus to avoid statistical biased, the aging population above 50 years old (n 423) was excluded (Table 1). Also, as the survey targeted adult and followed previous adult food security survey papers (Ariel, 2017), the younger population below 19 years old (n 1033) was also excluded (Table 1). By using this heterogeneous purposive sampling method, the total study population was 1571 people.

Table 1. Population of Nongviengkham Village by age period

Age period	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
population	590	443	700	540	331	220	126	54	23

Source: Nongviengkham Village's office, 2023

The number of sample which was used for this study is calculated by the below formula, (Equation 1.), based on Grimma (2021). By this calculate the number of sampling in this study was designed to recruit around 129 residents from a total pool of 1571 residents. This approach was conservative and was based on sample size calculations that considered a 95% confidence interval and a range of food insecurity prevalence rates from 8% to 21% as a determined from the previous study (Rychetnik, 2003; Chapparro, 2009). This analysis indicated that a sample size greater than 106 would be necessary as the above end of the food insecurity prevalence range was used.

Equation 1: $n = [z^2 \times p \times (1 - p) / e^2] / [1 + (z^2 \times p \times (1 - p) / (e^2 \times N))]$ ……. (1)

Where: n = sample size

q = 1-p (expected non-prevalence)

P = expected prevalence (as fraction of 1)

d = relative required precision

N = population size

Z = linked to 95% confidence interval

3.3 Recruitment

Initially, a survey was generated using Google Forms. Subsequently, Facebook was used to reach out to potential participants who reside in Nongviengkham village. The survey was

initially distributed to a group of 30 residents, whose Facebook usernames were provided by an anonymous individual with strong connections to the community and a residency of over a decade. Following this, each of these 30 users were requested to share the questionnaire link with an additional five individuals who also live in the village. This was expected to result in approximately 210 responses. The period of the survey started from March 20 until March 25, 2023 and was concluded on March 31, 2023.

3.4 Questionnaire

A cross-sectional online questionnaire (see Appendix 1.) was developed on google form for collecting data from sampling residents by sending to their Facebook. This questionnaire was created based on food and food security. The questions were derived from a range of sources. Primarily the questions reflected those in the study by Ariel (2017). It has total of five parts with 22 questions. The first part is about general information of respondents with 6 questions. The second part was about the level of individual food starving with three questions. These three questions were regarding prevalence of food insecurity over the past 12 months which was derived from the USDA Adult Food Security Survey Module (AFSSM, 2012). The third part was about strategies that some people use to get food when their own food was low or when they have run out of food with five questions. The residents were asked to indicate the frequency, i.e., “often”, “sometimes”, or “never” with which they had used each strategy during the previous 12 months. The fourth part is about food available and accessible. This part aimed to achieve information about available source of food such as market, forest, natural resource. The fifth part was about food stability with three questions. Respondents were asked about their level of understand about food security and level of trust to the safety of food available at the market.

3.5 Statistical analysis

In this research, the data collected from questionnaires were analyzed using computer software for social science research, namely the Statistical Package for Social Science (SPSS) for Windows. Descriptive statistics were used to explain the statistical data used in interpreting the results, which included frequency, percentage, arithmetic means, minimum and maximum values, standard deviation (SD), and regression statistics. These data were analyzed to be used in analyzing the questionnaire using the following steps.

Step 1: Basic personal factors, income, occupation, and supplementary factors of the sample population, using descriptive statistics to explain the statistical data used for data analysis, including frequency and percentage distribution, and presenting in sequential order.

Step 2: To determine the residents' food security status, the USDA AFSSM scoring system was used, where a score of zero indicated high food security, scores of 1-2 indicated marginal food security, scores of 3-4 indicated low food security, and scores of 5-10 indicated very low food security. Based on USDA guidelines (Figure 7.), residents who scored in the low food secure or very low food secure categories were categorized as food insecure, while those who scored in the high food secure or marginally food secure categories were categorized as food secure for data analysis purposes (USDA, 2000; Ariel, 2017).

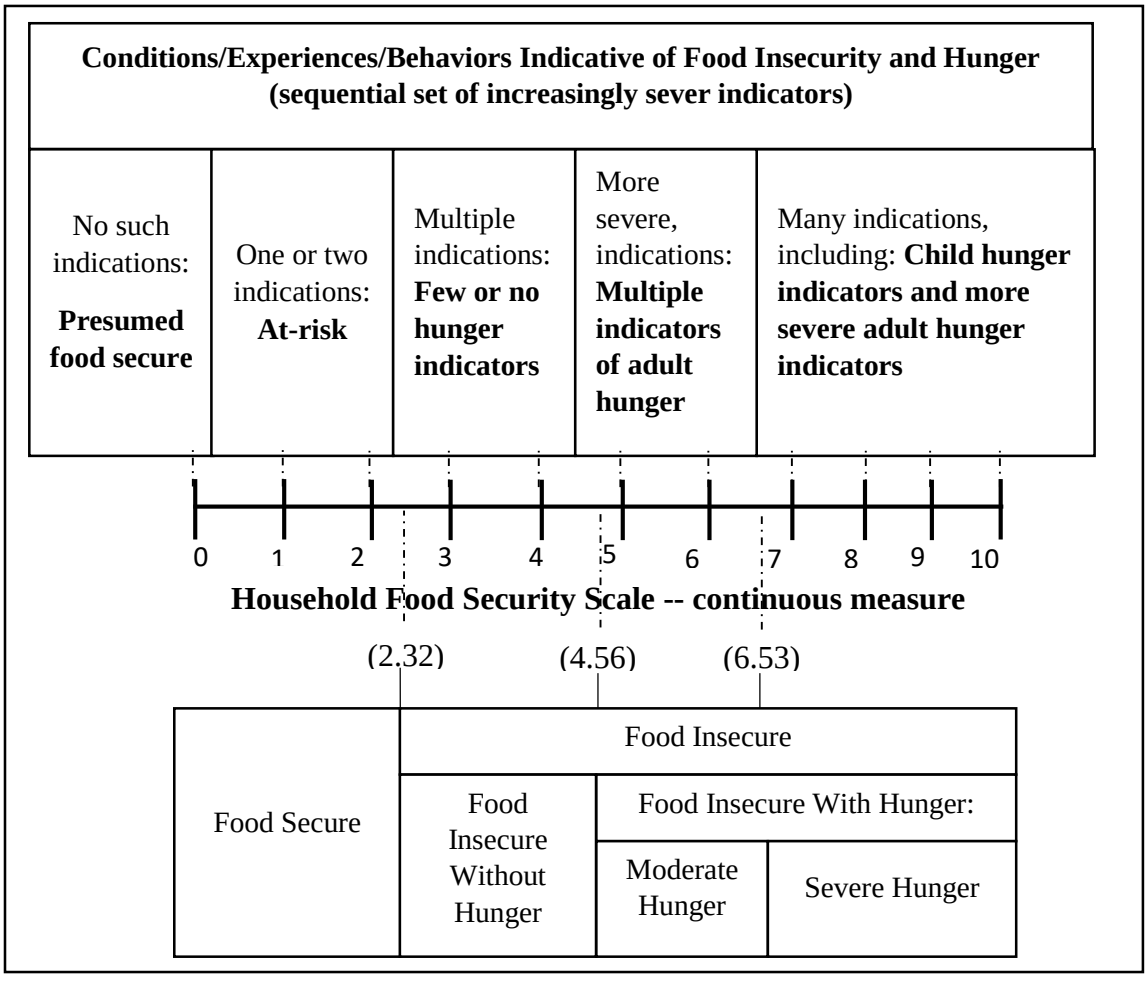

Figure 7. Measuring of severity of household food security and hunger

Source: USDA, 2000

To calculate the scoring system, three questions from the questionnaire were used (Table 2.). These questions were designed to assess the frequency of food insecurity among participants. Two of these questions required participants to rate their experience on a scale ranging from "never" to "usually", which were then assigned numerical values of 0, 1, 2, 3, and 4, respectively. The third question asked participants to rate the adequacy of their food supply, with responses ranging from "enough" to "often not enough". For this question, a coding system was used, with values of 0 to 3 assigned to each response, respectively. The use of these scoring systems provides a quantitative measure of food insecurity experienced by participants, allowing for a more detailed analysis of the data collected.

Table 2. Coding questionnaire responses for the food security status

Question	Scale of the answer				
	Never	Few times	Sometimes	Often	Usually
In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?	0	1	2	3	4
In the last 12 months, did you lose weight because there wasn't enough money for food?	0	1	2	3	4
Question	Answer choices				
	Enough of the kinds of food I want to eat	Enough, but not always the kinds of food I want to eat	Sometimes not enough to eat	Often not enough to eat	
Which statement best describes the food available to you in the past 12 months?	0	1	2	3	

Source: own edition, 2023

Step 3: Analysis of strategies, agreement, knowledge and trust using descriptive statistics. The study uses a rating scale, specifically the Likert Scale, to measure the level of the above tasks. The Likert Scale consists of 5 levels: strongly agree, agree, neutral, disagree, and strongly disagree. The study then calculates the mean score and divides it into 5 levels to describe the

data using descriptive statistics. The respondents are asked to select one of the options that best describes their level of situation, from the highest level to the lowest level, based on the interview questions that are formulated as a rating scale.

The highest level	is equal to 5
High level	is equal to 4
Moderate level	is equal to 3
Low level	is equal to 2
The lowest level	is equal to 1

Then calculate the actual scores to find the average and interpret it as follows:

1.00 - 1.80 indicates very low level

1.81 - 2.60 indicates low level

2.61 - 3.40 indicates moderate level

3.41 - 4.20 indicates high level

4.21 - 5.00 indicates very high level

Step 4: The descriptive statistics including frequency and percentage distribution, and presenting in sequential order was used to analyses the decision reasons, food available and food stability.

Step 5: the relationships between various factors and knowledge, personal factors, and levels of food security using correlation analysis.

CHAPTER 4 – RESULTS

4.1 Participants characteristic

The demographic characteristics of the study population were included in a total of 129 residents living in Nongviengkham village who completed this study's online survey. In this group, males accounted for more than half of the participants at 61.2%, while females accounted for 38.8%. The majority of the respondents' age was between 18 and 28 years old at 55.8%, followed by the age group from 29 to 39 years old at 37.2%. The other age groups had low inclusion, where ages below 18, 40-50, 51-61, and more than 62 years old were recorded at 0.8%, 3.1%, 1.6%, and 0.8%, respectively (see Table 3). The demographic characteristics of this study were divided by occupation, level of education, income, origin, and household members.

Table 3. Sex and age groups of the participants

Factors		Total	
		n (129)	%
Sex	Female	50	38.8
	Male	79	61.2
Age Groups	Below 18	1	0.8
	18 – 28 years	72	55.8
	29 – 39 years	48	37.2
	40 – 50 years	4	3.1
	51 – 61 years	2	1.6
	More than 62	1	0.8

Source: own research and edition, 2023

This study has found that the residents who participated in this survey were mainly company officers, accounting for 35.7% of respondents, followed by students at 27.9% of the total respondents. The next largest group of residents were government officers at 20.9% of the respondents, while 7% were self-employed. Other occupational groups had lower representation, with farmers, unemployed, and others accounting for 3.9%, 2.3%, and 0.8% of respondents, respectively (see Figure 8). These findings offer insight into the employment landscape of the surveyed population, highlighting the dominant industries and professions in the area.

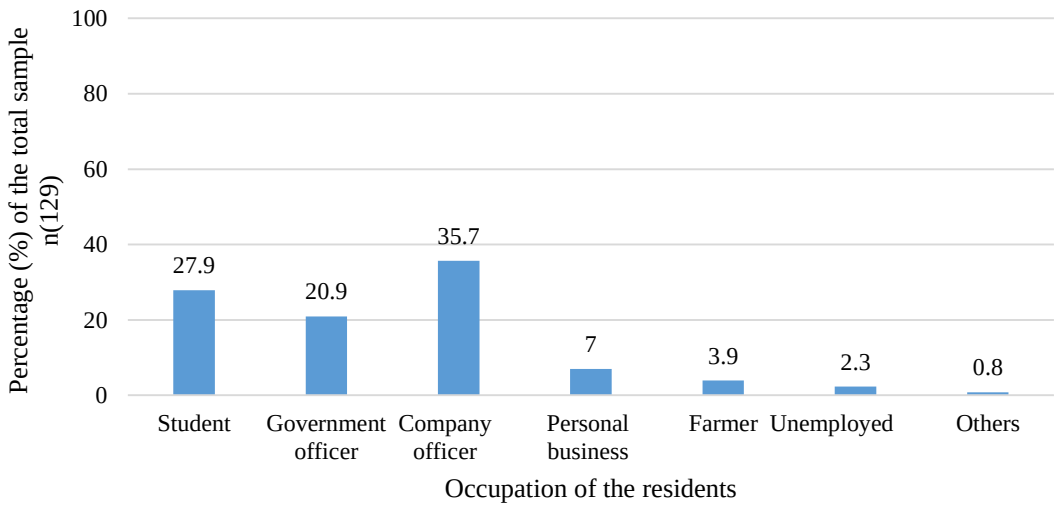

Figure 8. Occupation of the sample

Source: own research and edition, 2023

Based on Figure 9, the majority of the respondents in this study had attained tertiary education, accounting for 92.2% of the sample. Only 7.8% of the total sample reported having completed secondary school. Notably, none of the surveyed residents reported having no formal education, likely due to the suburban location of the village. Similarly, the percentage of respondents who had completed only primary school was also zero. These results suggest that the surveyed population had a relatively high level of education, with a significant proportion having pursued higher education.

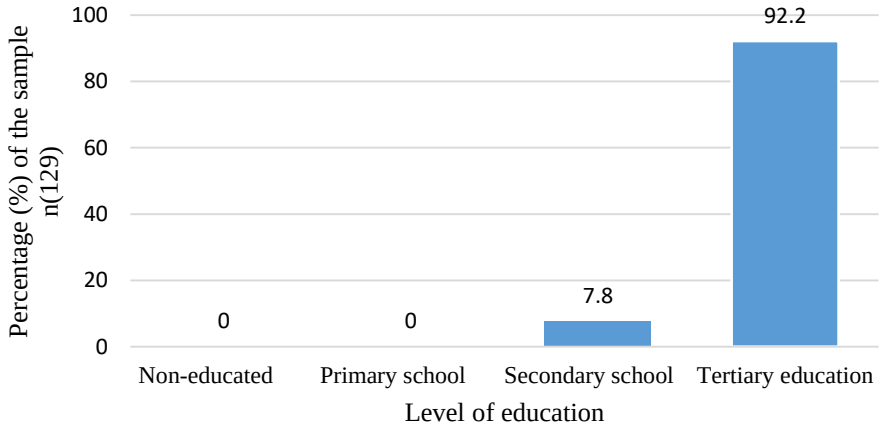

Figure 9. Education level of the sample

Source: own research and edition, 2023

From Figure 10, it can be observed that the majority of residents who participated in this survey earned between 2,000,000 – 5,000,000 LAK, accounting for 37.2% of the total sample. Another significant group of residents had incomes below 2,000,000 LAK, comprising 24.5% of the total sample. This may be due to the high number of students who participated in the survey. The next largest group were residents with incomes over 8,000,000 LAK, accounting for 22.5% of the total respondents. Finally, residents who earned between 5,000,000 – 8,000,000 LAK constituted around 14.7% of the total sample.

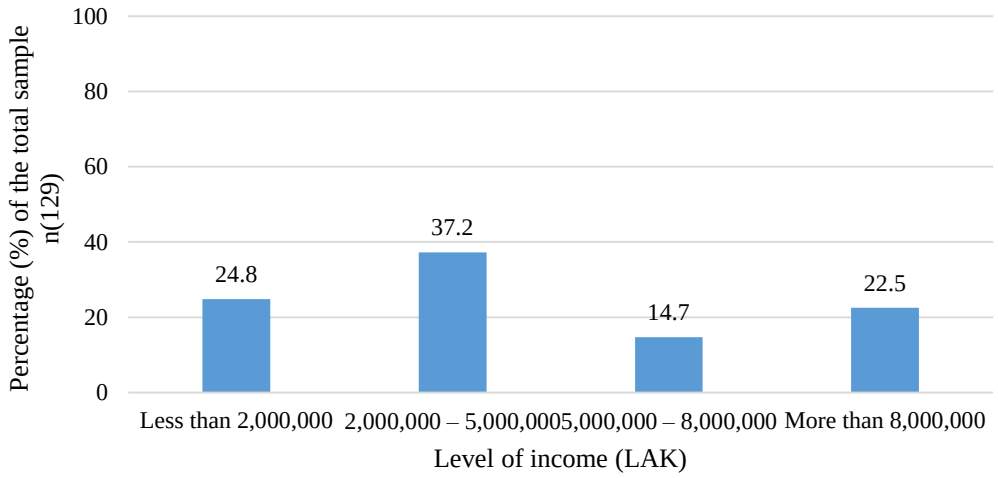

Figure 10. Income level of the sample

Source: own research and edition, 2023

The origins of the respondents or sampling, as depicted in Figure 11, were found to be predominantly residents who originally live in Vientiane Capital, accounting for 40% of the total sample of the survey. The next largest group came from the Northern provinces, which accounted for approximately 29% of the total respondents who participated in the survey. Around 26% of the respondents came from the Middle provinces of the country. Only a small proportion, approximately 6% of the sample, came from the Southern provinces (Figure 11). Nongviengkham village, being a suburban village close to the city center of Vientiane Capital, has a wide range of residents coming from different parts of the country. Furthermore, as it is located near the National University of Laos, it serves as a living area for students and workers who come from other parts of the country.

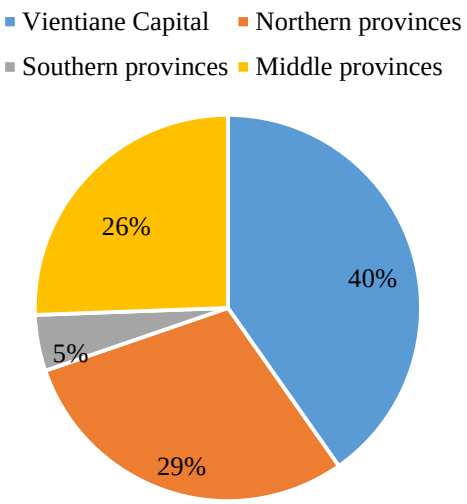

Figure 11. Origin of the residents

Source: own research and edition, 2023

Based on the following figure (Figure 12), regarding household size, only 22.5% of respondents living with three or fewer people, while around 40.3% lived with four or five people. Furthermore, 19.7% of respondents lived with six or seven people, while 17.8% reported living with more than seven people. These findings provide insight into the socio-economic and demographic characteristics of the study population and highlight the importance of considering these factors when developing interventions to address food insecurity in the community.

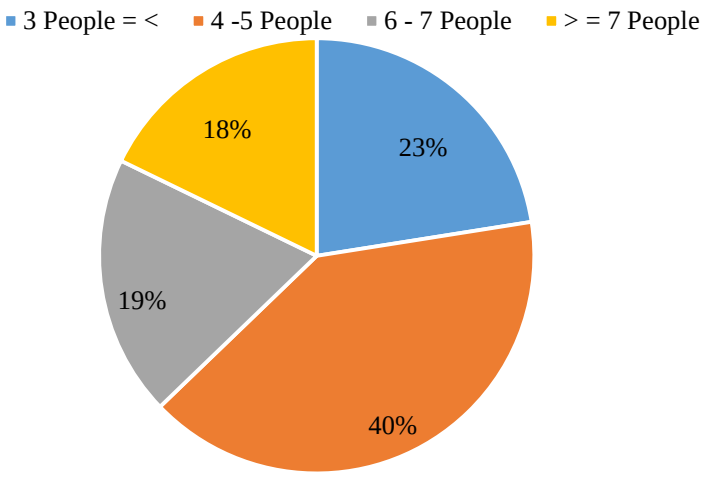

Figure 12. Number of household members

Source: own research and edition, 2023

According to Table 4, there were differences in demographic variables between original residents and residents from other areas. Original residents had a higher income compared to residents from other areas, with 26.9% of them earning more than 8,000,000 LAK, while only 19.5% of the residents from other areas earned this amount. On the other hand, 28.6% of residents from other areas earned less than 2,000,000 LAK, whereas this was true for only 19.2% of original residents. However, there was not much difference in the income range of 2,000,000 – 8,000,000 LAK, where the proportions were 53.9% and 50.7% for original residents and residents from other areas, respectively. In addition, original residents had a preference for living together in groups of 4-5 people, with 48.1% choosing this option, followed by 25% preferring to live with 6-7 people, then 15.4% living with fewer than 3 people, and finally 11.5% living with more than 7 people. In contrast, residents from other areas had a different preference, with the majority (35.1%) preferring to live with 4-5 people, followed by 27.3% living with 3 or fewer people, then 22.1% living with more than 7 people, and finally 15.6% living with 6-7 people. Nevertheless, residents preferred to live by 4 – 5 people.

Table 4. Comparing demographic of original and residents from other area

Factors	Come from other parts of the country		Originally live in Vientiane Capital	
	n (77)	%	n (52)	%
Income (LAK)				
Less than 2,000,000	22	28.6	10	19.2
2,000,000 – 5,000,000	28	36.4	20	38.5
5,000,000 – 8,000,000	11	14.3	8	15.4
More than 8,000,000	15	19.5	14	26.9
Household members				
Below or 3 People	21	27.3	8	15.4
4 - 5 People	27	35.1	25	48.1
6 – 7 People	12	15.6	13	25.0
More than 7 People	17	22.1	6	11.5

Source: own research and edition, 2023

4.2 Prevalence of food insecurity and characteristics of the food insecure

The prevalence of food security was assessed using the USDA AFSSM, as illustrated in Figure 6 (P: 26). The findings revealed that a considerable proportion of the residents, about 22.5%, were food secure (Table 5.). In contrast, a higher percentage, around 55%, experienced

food insecurity without hunger. Among the remaining participants, 17.1% reported moderate hunger due to food insecurity, while 5.4% had severe hunger due to food insecurity. These results suggest that a significant number 22, 5% of individuals in the community are struggling with food insecurity, ranging from mild to severe levels. It underscores the importance of addressing this critical issue to promote the well-being of the community.

Table 5. Food security category and scale

Food security category	Food security scale	Frequency	Percent (%)	Cumulative Percent (%)
Food secure	0	29	22.5	22.5
Food insecure without hunger	1	27	20.9	43.4
	2	29	22.5	65.9
	3	15	11.6	77.5
Food insecure with moderate hunger	4	14	10.9	88.4
	5	8	6.2	94.6
Food insecure with severe hunger	6	5	3.9	98.4
	7	2	1.6	100
Total		129	100	

Source: own research and edition, 2023

4.3 Food coping strategies for food secure and insecure residents

Measures of food coping strategies were related to the level of food security, since this study aimed to measure the current situation of food insecurity, those coping strategies were taken into measurement to see how each group response to the problems. A significant difference was found for residents who were in food insecure with moderate and severe groups compared with residents who were in food secure and food insecure without hunger groups.

From Table 6, Residents around 69% had experienced eating less healthy meal so they could eat more. However, the P-value for this strategy is 0.101 which is not significant which

mean that the use of this strategy does not increase as the severe of food insecurity increase. Whereas, 35% of the sample used to eat only rice because they don't have enough money to buy food. The P-value for this strategy is significant at the 0.01 level which means that more and more residents will eat only rice or humongous meals as their food insecurity become more and more severe.

According to the findings, the majority of residents, which constitutes 77%, have not resorted to selling their personal possessions in order to purchase food. This observation is significant because it implies that most residents have not yet reached the point where they have exhausted all other options and have to resort to such extreme measures. However, it is noteworthy that this strategy showed a significant correlation with food security at the 0.01 level, which means that residents are likely to consider selling their personal possessions as they encounter more severe food insecurity. This underscores the severity of the food security situation and highlights the need for further interventions to address the issue. It is important to note that while the strategy of selling personal possessions may offer temporary relief, it is not a sustainable solution to the underlying problem of food insecurity, and more comprehensive measures are needed to tackle this issue.

From Table 6, the different strategies used by residents to cope with food insecurity was revealed. The results showed that around 62% of residents reported trying to save money on utilities, such as electricity, gas, and water, which is a popular strategy for reducing expenses. This strategy was found to have a significant correlation with food security scale at the 0.01 level, indicating that it may be an effective way to improve food insecurity among households.

Borrowing money to purchase food were not commonly used by residents, with 71% of respondents, reporting that they had never used this methods (Table 6). However, this strategy was found to have a significant association with food security scale at the 0.01 level significant, meaning that individuals may turn to this tactics as a last resort when facing with food insecurity challenges. This results provide valuable insights into the coping mechanisms used by households in response to food insecurity. While reducing expenses on utilities may be a feasible strategy for some households.

Table 6. Relation of food security of samples and food copping strategies

Question	Response	Residents' food security				Coef. correlation
		Food secure (n)	Food insecure without hunger (n)	Food insecure with moderate hunger (n)	Food insecure with severe hunger (n)	
Have you ever ate less healthy meals so you could eat more food?	Never	13	24	3	0	0.255 (0.101)
	Few times	1	25	9	2	
	Sometimes	5	18	7	3	
	Often	9	3	3	1	
	Usually	1	1	0	1	
Have you ever used less utilities (e.g. electricity, water) to save money for food?	Never	18	28	3	0	0.425** (0.000)
	Few times	3	15	4	1	
	Sometimes	5	21	12	0	
	Often	2	5	2	5	
	Usually	0	2	1	1	
Have you ever sold personal possessions to buy food?	Never	26	54	17	3	0.254** (0.004)
	Few times	2	10	0	1	
	Sometimes	1	5	5	2	
	Often	0	2	0	1	
	Usually	0	0	0	0	
Have you ever borrowed money from friends to buy food, because you don’t have money?	Never	23	37	9	2	0.372** (0.000)
	Few times	2	20	3	0	
	Sometimes	4	13	6	3	
	Often	0	1	3	2	
	Usually	0	0	1	0	
Have you ever eat only rice because you don’t have money to buy food?	Never	29	49	5	1	0.554** (0.000)
	Few times	0	11	9	1	
	Sometimes	0	11	6	4	
	Often	0	0	2	1	
	Usually	0	0	0	0	
** Correlation is significant at the 0.01 level (2-tailed).						

Source: own research and edition, 2023

4.4 Food buying decision

The study aimed to address the issue of food security and examined how food purchasing decisions are related to the food security scale (as shown in Table 7). The most commonly cited reason for choosing food was to purchase items that the respondents liked at a normal or affordable price, with 84.4% of the sample indicating this preference. However, this decision was found to have a negative coefficient and a significant level of 0.01, indicating that it was used less frequently as food insecurity increased. Convenience and proximity to home were the next two primary factors, with 43.4% and 41.1% of respondents choosing these options, respectively. However, these two factors did not pass the significance level, suggesting that they were not affected by food security levels.

Organic food was another important factor, with 31% of respondents citing this preference (Table 7). This decision passed the significant level of 0.05, with a negative coefficient indicating that residents preferred less organic food as their food insecurity increased. Considering diet food was the next consideration, with 14% of the sample selecting this option, although it did not pass the significant level, suggesting that the decision to buy diet food was not influenced by food security.

The last decision was to purchase cheaper food, even if the quality was lower, with only 12.4% of the sample choosing this option. However, it passed the significant level of 0.05, indicating that residents at high levels of food insecurity were more likely to make this decision. Overall, these results offer valuable insights into how food purchasing decisions are influenced by food security levels and highlight the need for more comprehensive and sustainable solutions to tackle this critical issue.

Overall, the most common reason for choosing food was affordability, but this decreased as food insecurity increased. Convenience and proximity to home were also important factors. Organic food was preferred by 31% of respondents, but this decreased as food insecurity increased. The decision to buy diet food was not influenced by food security, while purchasing cheaper food was more likely at high levels of food insecurity. These findings underscore the need for sustainable interventions to address food insecurity.

Table 7. The relation of food buying decision and food security

Decision	Sample size: n(129)		Correlation to Food security	
	n	%	Coef. Efficient	P-value
Cheaper food even that the quality may lower	16	12.4	0.151*	0.044
Convenience or fast food that is easy to prepare	56	43.4	-0.133	0.067
Closest to where I live	53	41.1	-0.17	0.424
Diet food	18	14.0	-0.033	0.354
The food I like to eat at general price	105	81.4	-0.22**	0.006
Organic food even the price may higher	40	31.0	-0.147*	0.048
Others: specify	5	3.9	-0.078	0.191
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).				

Source: own research and edition, 2023

4.5 Food availability, food access and food security

Food access and availability factors were associated with food insecurity (Table 8). Food source was associated with food insecurity, with a difference between residents who were in different food security category. Residents who were labeled as both food secure and food insecure without hunger obtained their food from several sources. The main sources, in descending order, were market malls, small shops, household gardens, self-grown rice, and nearby nature. Market malls were the most common source, with 93% of this group using them. 55% used small shops, while 42% used household gardens. The proportion of residents who relied on self-grown rice was 17%, and nearby nature was used by only 10%. It is noteworthy that there was no significant correlation between food source and food security among this group of residents. Residents classified in the food insecure group with moderate and severe hunger primarily relied on markets for their food, with 75% of the residents in this group using this source. Household gardens were the next most significant source, with 46% of residents in this

group relying on them. Interestingly, there was a significant correlation between the household garden as a food source and food security in this group, with a significance level of 0.01. This suggests that residents who had better access to household gardens were likely to have better food security. Small shops and self-grown rice were also important food sources for this group, with 32% and 27% of residents, respectively, using them. However, there was no significant correlation between these two sources and food security, which could indicate that residents had free access to these sources. Finally, nearby nature was the last significant source of food for this group, with 25% of residents relying on it. Like the household garden, the availability of nearby nature was also significantly correlated with food security in this group, meaning that residents who had better access to this source for food were more likely to have better food security.

Table 8. Food source and food security

Food source	Category of residents' food security					
	Food secure and food insecure without hunger (sample is 100 residents)		Coef. Efficient	Food insecure with moderate and severe hunger (sample is 29 residents)		Coef. Efficient
	n	%		n	%	
Market mall	93	93	-0.109 (0.140)	21	75	-0.87 (0.331)
Household garden	42	42	-0.012 (0.454)	13	46	-0.537** (0.002)
Nearby nature	10	10	0.000 (0.500)	5	17	-0.322* (0.048)
Self-growing rice	17	17	-0.003 (0.490)	7	25	-0.173 (0.189)
Small shop	55	55	-0.125 (0.107)	9	32	-0.57 (0.386)
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).						

Source: own research and edition, 2023

The availability of food and imported food were found to be factors associated with food insecurity, as shown in Table 9. Specifically, imported food was linked to food insecurity, with

differences observed between residents in different food security categories. Among residents who were both food secure and food insecure without hunger, there was a significant correlation at the 0.05 level between food insecurity and their consumption of imported sea food, as well as grain and cereals. This suggests that residents with lower food security tend to consume less of these imported food items. Instant food, chips and candy, soft drinks, fruit, meat and fish and poultry, spices, and vegetables were the most commonly consumed imported food items, in descending order. However, there was no significant correlation between the consumption of these food items and food security, indicating that residents in this group had unrestricted access to these imported products.

Table 9. Imported food and food security

Imported	Category of residents' food security					
	Food secure and food insecure without hunger (sample is 100 residents)		Coef. Efficient	Food insecure with moderate and severe hunger (sample is 29 residents)		Coef. Efficient
	n	%		n	%	
Chips and candy	55	55	-0.067 (0.253)	12	42	-0.325* (0.046)
Soft drinks	38	38	0.111 (0.137)	9	32	-0.218 (0.133)
Instant food	67	67	-0.002 (0.492)	18	64	-0.346* (0.035)
Spice	22	22	0.102 (0.157)	5	17	-0.244 (0.126)
Vegetable	18	18	-0.085 (0.201)	6	21	0.170 (0.194)
Meat, fish, poultry	31	31	-0.130 (0.098)	6	21	-0.013 (0.474)
Fruit	36	36	-0.116 (0.126)	9	32	-0.298 (0.062)
Sea food	43	43	-0.211* (0.018)	8	28	-0.071 (0.360)
Grains and cereals	11	11	-0.193* (0.027)	3	10	0.069 (0.363)
Others	1	-	-	1	-	-

Source: own research and edition, 2023

From Table 9, residents who were classified in the food insecurity group with moderate and severe hunger primarily consumed instant food, followed by chips and candy, with significant correlation to food security at the 0.05 level. This suggests that residents in this category consumed less and less of these products as their socio-economic status become worst and worst. The next most commonly consumed products, in descending order, were fruit, soft drinks, sea food, vegetables, meat and fish and poultry, spices, and grains and cereals. However, the p-value for the correlation between these food groups and food security did not reach a significant level, could indicating that residents in this group had free access to these products to meet their demand.

4.6 Food stability

Examining changes in consumption behavior is an important factor in determining the strength of residents' food security status and their response to shocks. According to Table 10, the most commonly used strategy after the increase of food price in 2020, was to buy less unnecessary food and cook more at home, which was reported by 71% and 53% of the sampled residents, respectively. However, the correlation between the first strategy, buying less unnecessary food, did not pass the significance test, while the strategy of cooking more at home did, indicating that residents with lower food security status cook more at home since price shock. The next strategy was to start growing vegetables or raising animals for food, which was reported by 26% of the residents. This strategy showed a weak but significant correlation at the 0.1 level, suggesting that residents with lower food security status engage in this activity more. The next two strategies were to buy cheaper substitute foods and to eat less, which were reported by 23% and 9% of the residents, respectively. Both of these strategies showed significant correlations with food security, indicating that residents with lower food security levels have to eat less and buy cheaper substitute foods. Finally, 25% of the residents did not change their consumption behavior, and this also passed the 0.05 significant level, suggesting that residents with lower food security status need to change their consumption behavior.

Table 10. The change of residents' behavior after the increase of food price

Behavior		Category of residents' food security								Total		Coef.
		Food secure		Food insecure without hunger		Food insecure with moderate hunger		Food insecure with severe hunger				
		n	%	n	%	n	%	n	%	n	%	
Buy less unnecessary food	No	8	28	19	27	8	36	2	29	37	29	
	Yes	21	72	52	73	14	64	5	71	92	71	-0.44
Total		29		71		22		7		129	100	(0.311)
Cook more at home	No	17	59	34	48	6	29	3	38	60	47	
	Yes	12	41	37	52	15	71	5	63	69	53	0.145*
Total		29		71		21		8		129	100	(0.050)
Same as before	No	15	52	59	83	17	77	6	86	97	75	
	Yes	14	48	12	17	5	23	1	14	32	25	-0.201*
Total		29		71		22		7		129	100	(0.011)
Growing vegetable or raise animal	No	22	76	50	70	16	73	7	100	95	74	
	Yes	7	24	21	30	6	27	0	0	34	26	-0.064
Total		29		71		22		7		129	100	(0.235)
Buy cheaper substitute food	No	24	83	55	77	16	73	4	57	99	77	
	Yes	5	17	16	23	6	27	3	43	30	23	0.126*
Total		29		71		22		7		129	100	(0.077)
Eat less	No	29	85	66	93	22	100	5	71	122	95	
	Yes	5	15	5	7	0	0	2	29	12	9	0.159*
Total		34		71		22		7		134	100	(0.036)

Source: own research and edition, 2023

The knowledge of residents regarding food nutrition and the quality of food inspection by the government was measured using a scale of agreement. Table 11, shows that the range of knowledge about food nutrition varied from the lowest level, where residents had no knowledge

about food nutrition, to the highest level, where residents were well-informed about food nutrition. The mean value of 2.47 indicates that the majority of residents rated their knowledge of food nutrition as being low. Additionally, the range of perceptions regarding the quality of food inspection by the government varied from the lowest level, where there was no checking, to the highest level, where there was very good checking. The study found that the quality was at a medium level at 2.87, indicating that residents rated the government's food inspection as good.

Table 11. Residents' food nutrition knowledge and government inspection quality

	N	Minimum	Maximum	Mean	Std. Deviation
Knowledge about food nutrition	129	1	4	2.47	0.729
Government inspection	129	1	4	2.87	0.666

Source: own research and edition, 2023

CHAPTER 5 – CONCLUSIONS AND RECOMMENDATIONS

The objective of the research was to examine the degree of food security among residents who currently live in Nongviengkham Village, Xaythany District, Vientiane Capital, Laos. The purposes of the study are: 1) Study the basic personal factors such as income, occupation, and supplementary factors were collected using descriptive statistics, including frequency and percentage distribution. 2) Involve using the USDA AFSSM scoring system to determine the food security status of residents. 3) Analyze the correlation between individual factors and food insecurity status. 4) Analyze the correlation between food available and food insecurity. The sampling size for this research is 129 residents who live in Nongviengkham village. The calculation for sampling size is based on previous study (Rychetnik, 2003; Chapparro, 2009).

5.1 Food security status

The study included 129 residents of Nongviengkham village who completed an online survey, with the majority aged between 18 to 39 years and 61.2% male. The majority of respondents were employed (63.6%) and had tertiary education (92.2%). Most respondents (37.2%) reported an income of 2,000,000 LAK – 5,000,000 LAK. Nearly 60% of respondents were from other provinces. Original residents had a higher income with 26.9% earning more than 8,000,000 LAK, while 19.5% of residents from other areas earned this amount. Residents in Nongviengkham village preferred to live by 4-5 people.

The prevalence of food insecurity was reveal at 77.5% among the sample of residents living in Nongviengkham Village during the year 2023. Whereas, food security were classicy into three categories where around 55% of the residents experienced food insecurity without hunger. Among the remaining participants, 17.1% recorded moderate hunger due to food insecurity, while 5.4% had severe hunger due to food insecurity. This results also suggest that there were about 22.5% of the resident in Nongviengkham village, were classified as food secure. The findings highlight the need to address the issue of food insecurity to improve the well-being of the community.

5.2 Food coping and buying decision strategies

This study analyzed the relationship between food coping strategies and food security levels in Nongviengkham Village. Results showed that residents experiencing moderate and

severe food insecurity used different coping strategies compared to those who were food secure or only experiencing food insecurity without hunger. Around 69% of the residents have experienced eating less healthy meals to eat more, but the p-value for this strategy is not significant, meaning that it does not increase as the severity of food insecurity increases. However, 35% of the sample used to eat only rice due to lack of money, and the p-value for this strategy is significant at the 0.01 level, indicating that more residents will eat only rice as their food insecurity becomes more severe. Saving expenses from utilities is a common coping strategy for residents, with 62% of them having experienced it, and it is significantly correlated with the food security scale at a 0.01 level. Additionally, 77% of residents had never sold their personal possessions to buy food, while 71% had never borrowed money for this purpose. However, both of these strategies were found to have significant correlations with food security at a 0.01 level, suggesting that residents may resort to selling their possessions or borrowing money as they experience more severe food insecurity.

Measures of how food buying decisions relate to the scale of food security were examined, with 84.4% of residents choosing food they like at normal or affordable prices. Constant food or fast food, and proximity to home were also important factors, chosen by 43.4% and 41.1% of residents respectively, but these factors were not significantly related to food insecurity. 31% of residents chose organic food, but this decreased as food insecurity increased. Only 14% considered diet food, and this was not significantly related to food insecurity. 12.4% of residents chose cheaper food despite lower quality, and this decision was significant at the 0.05 level for those with higher food insecurity.

5.3 Food availability, food access and food security

Food access and availability were found to be associated with food insecurity among residents. Market malls were the most common source of food for both food secure and food insecure without hunger residents, with 93% of them using them. For food insecure residents with moderate and severe hunger, markets were the primary source of food for 75% of them. Household gardens were found to be significantly correlated with food security for this group, with 46% of residents relying on them. Small shops and self-grown rice were also important food sources for this group, but there was no significant correlation between these sources and

food security. Additionally, nearby nature was significantly correlated with food security for this group, with 25% of residents relying on it.

Imported food was linked to food insecurity, with differences observed between residents in different food security categories. Among residents who were both food secure and food insecure without hunger, there was a significant correlation between food insecurity and their consumption of imported sea food, as well as grain and cereals. Instant food, chips and candy, soft drinks, fruit, meat and fish and poultry, spices, and vegetables were the most commonly consumed imported food items, but there was no significant correlation between the consumption of these food items and food security. Residents in the food insecurity group with moderate and severe hunger primarily consumed instant food and chips/candy, with a significant correlation to food security at the 0.05 level. The next most commonly consumed products, in descending order, were fruit, soft drinks, seafood, vegetables, meat and fish/poultry, spices, and grains/cereals. However, the p-value for the correlation between these food groups and food security did not reach a significant level.

5.4 Food stability

The study analyzed changes in consumption behavior after a food price increase in 2020. The most common strategies were buying less unnecessary food and cooking more at home. The latter strategy had a significant correlation with food security. Other strategies included growing vegetables or raising animals for food, buying cheaper substitute foods, and eating less, which all had significant correlations with lower food security. 25% of residents did not change their consumption behavior, which was also significant, suggesting that residents with lower food security status need to change their consumption behavior as the price increased.

Residents' knowledge of food nutrition was found to be generally low, with a mean value of 2.47 on a scale measuring agreement. On the other hand, residents' perception of the quality of government food inspection was rated as good with a mean value of 2.87 on a similar scale

5.5 Results of the proposed hypothesizes

This study has confirmed the first hypothesis of the study, which states that the level of food security of people living in Nongviengkham village is low following the food price increase since 2022. It was confirmed that the prevalence of food insecurity was revealed to be

high, at 77.5%, among the sample of residents living in Nongviengkham Village during the year 2023. Meanwhile, food insecurity was classified into three categories, with around 55% of the residents experiencing food insecurity without hunger. Among the remaining participants, 17.1% recorded moderate hunger due to food insecurity, while 5.4% had severe hunger due to food insecurity. These results also suggest that about 22.5% of the residents in Nongviengkham village were classified as food secure.

The second hypothesis, which states that the food accessibility and sources of food of residents in Nongviengkham village show significant correlation to food security, was confirmed to some extent. This study revealed that household gardens and nearby nature showed significant correlation with residents who were classified as food insecure with hunger. However, no correlation was found between food security status and other food sources studied, such as market malls, self-growing rice, and small shops. The study also further revealed that certain food items, such as imported instant food, chips, and candy, showed significant correlation to food security among residents who were classified as food insecure with hunger. Meanwhile, imported sea foods, grains, and cereals showed significant correlation to food security among residents who were classified as food secured and food insecure without hunger group. However, other imported foods such as soft drinks, spices, vegetables, meat, fish, poultry, and fruit did not show significant correlation to food security.

5.6 Recommendations

Based on the findings of this study, the researcher suggests some recommendations that could be useful for the local government, private agencies, projects, and communities in the Nongviengkham viellage, as well as in Lao People's Democratic Republic. These recommendations could be used to plan and implement programs that promote and develop food security at the household level for farmers.

1. Since household garden were found to be significant for residents who classified as food insecurity with moderate to severe hunger. The government should providing resources and training on how to establish and maintain a household garden, as well as offering incentives or subsidies for households to start their own gardens.

2. As nature is an important food source for residents who facing food insecurity with moderate to severe hunger. Everyone should support sustainable agriculture practices, protecting natural resources, promoting biodiversity, and reducing pollution and waste.

3. From the study we can see that the level of knowledge regarding food nutrition is low. Thus, organizing workshops, and providing educational materials about food nutrition should be conducted for residents. These initiatives can help the residents to understand the importance of consuming a diverse and balanced diet and the benefits of consuming nutritious foods. This can help residents to make more informed choices about what foods to buy and consume, which can lead to better food security.

4. The study found that certain food products, such as chips/candy, soft drink and instant food, are primarily imported and have a significant correlation with food insecurity, particularly among residents with moderate to severe hunger. This highlights the vulnerability of households in the study area to external factors such as fluctuations in international markets and trade policies. In light of this, it is important for the government to promote and support the production of domestic food products that can provide a stable and reliable source of food for the local population.

5. The study has shed light on two significant issues related to food security in the area. The first issue is related to the increase in food prices that happened in 2022. The study showed that more than 75% of the residents had to change their consumption behavior as a result of the price increase. This change in behavior included measures such as buying less unnecessary food, cooking more at home, and buying cheaper substitute foods. Unfortunately, 7% of the residents reported that they had to eat less food as a result of the price increase, which highlights the severity of the problem.

6. Another significant issue highlighted by the study is that 77% of the residents were classified as food insecure. This high percentage is an alarming sign that the government needs to pay more attention to the food security issue in the area. It indicates that a large portion of the population is not able to access the necessary amount of food for their daily needs, which can have serious consequences on their health and well-being. Therefore, the government should prioritize initiatives that can address this issue, such as providing food aid or supporting local agriculture to improve food availability and accessibility.

CHAPTER 6 – SUMMARY

The research aimed to investigate the level of food security among residents of Nongviengkham Village in Laos. The study collected personal information and used the USDA AFSSM scoring system to determine food security status. The research also analyzed the correlation between individual factors and food insecurity status, and between food availability and food insecurity. The study had 129 participants, with the majority aged between 18 to 39 years, male, employed, and having tertiary education. The prevalence of food insecurity was found to be high, with 77.5% of participants experiencing food insecurity, and 55% experiencing food insecurity without hunger. The study emphasizes the need to address the issue of food insecurity to improve the well-being of the community.

From this study, coping strategies were found to be varied among residents, with saving expenses from utilities being a common strategy. Food buying decisions were influenced by factors such as preferable, affordability, and proximity to home. Food availability and access were found to be associated with food insecurity, with market malls being the primary source of food for both food secure and food insecure without hunger residents. Household gardens and nearby nature were significantly correlated with food security for food insecure residents with moderate and severe hunger. The study also analyzed changes in consumption behavior after a food price increase in 2020, with buying less unnecessary food and cooking more at home being common strategies. Overall, the study confirms that food insecurity is a significant issue in Nongviengkham Village and that there are various factors influencing residents' food coping strategies, buying decisions, and food availability and access.

The study recommends several actions to promote and develop food security at the household level for farmers in Nongviengkham village and Lao People's Democratic Republic, including providing resources and training for establishing household gardens, supporting sustainable agriculture practices, organizing workshops and providing educational materials on food nutrition, promoting the production of domestic food products, and addressing issues related to food price increases and high food insecurity rates through initiatives such as food aid and support for local agriculture.

CHAPTER 7 - REFERENCES

Ahungwa. R. T. - Haruna. U, - Muktar. B. G. (2014): Food security challenges in Nigeria: a paradox of rising domestic food production and food import. *International Letters of Natural Sciences*. 13(1) pp. 38-46.

AIFS. (2013). Integrated Food Security Framework and Strategic Plan of Action on Food Security in the ASEAN Region. Cha-am: Centre of international law.

Ariel. D. (2017). Food insecurity and related correlate among students attending Appalachain state university. Appalachian State University.

Arouna. A. - Guillaume. S. - Patricio. M. (2020). Policy options for mitigating impacts of COVID-19 on domestic rice value chains and food security in West Africa. *Global Food Security.* 26(1) pp. 196–203.

Atchara. T. (2010). An Analysis of the Effects on Household Food Security from Changing Rice Fields to Other Cash Crops in Karaket Subdistrict Chien Yai District. Nakhon Si Thammarat University.

Bouttasing. N. - Osrin. D. Identifying priorities to improve maternal and child nutrition among the Khmu ethnic group, Laos: a formative study. *Maternal Child Nutrition*. 9(4) pp. 452–466.

Burmese Border Consortium. (2004). Claiming rights to news, food security and displacement in Eastern Burma. Chiang Mai: Wanida Press.

Chairit. S. (2012). Food security among elderly people in Chumphon, Krabi and Nakhon Si Thammarat Province. Thaksin University.

Chapparro. P. - Zaghloul S. – Holck. P. – Dobbs. J. (2009). Food insecurity prevalence among college students at the University of Hawai'i at Manoa. *Public Health Nutrition*. 12(11) pp. 2097–2103.

Chanita. P. - Laor. M. - Wilaiporn. W. and Prakaidao. S. (2018). The process of driving food security through provincial local vegetables in the upper northern region. *Area Based Development Research Journal*. 10 (3) pp. 214-228.

Chumchat. C. (2015). Food security of Khok Phayom Community, Langu Sub-district, Langu District, Satun Province. Prince of Songkla University.

Chomphon. V. (2016). Food security of Chonboury, Longprang district, Khonkaen Province. Khonkaen University.

Clarke. L. – Jackson. T. Keoka. K. - PhimphachanvongsoD. V. (2016). Farmer experiences and approaches with mechanised dry direct seeding in savannakhet province. Vientiane: National Economic Research Institute (NERI) Government of Laos.

Coleman. J. A. (2013). Household food security in the United States in 2012, ERR-155. Washington. D.C: United States Department of Agriculture, Economic Research Service.

FAO. (2006). Food Security Policy Brief. fao.org. Retrieved from: https://www.fao.org/fileadmin/templates/faoitaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf

FAO. (2015). Crop production in Laos. fao.org. Retrieved from: https://www.fao.org/3/at609e/at609e.pdf

Google. (2023). Nongviengkham Village. Google Maps. Retrieved from: https://www.google.com/maps/place/18%C2%B003'02.0%22N+102%C2%B038'09.8%22E/@18.0491504,102.6319388,15.83z/data=!4m4!3m3!8m2!3d18.050558!4d102.636053

Grimma. T. G. Sample Size Determination in Food Security Survey Studies. *Journal of Food, Nutrition and Population Health*. 20(1) pp. 1-9.

Hamelin. A .M. - Beaudry, M., & Habicht, J. P. (2002). Characterization of household food insecurity in Quebec. *Food and Feelings Social Science & Medicine*. 54(1) pp. 119–132.

Kiouf. J. (2000). Working together to eliminate hunger at the hunger farm in Thombury District of Thailand. Chiang Mai University.

Kenichiro. Y. - Masayuki. Y. (2004). Use of Natural Biological Resources and Their Roles in Household Food Security in Northwest Laos. *Southeast Asian Studies*. 41(4) pp. 235–259.

Keovilinavong. O. - Diana, S. (2022). Linking land tenure security with food security: Unpacking farm households' perceptions and strategies in the rural uplands of Laos. *Land Use Policy*, 90(2) pp. 97–103.

Lao Statistics Bureau. (2020). Lao Population and Housing Census 2020: Ethnicity. Vientiane: National Economic Research Institute (NERI) Government of Laos.

Laos Statistic Information Service and Ministry of Investment and Planning. (2020). Lao agricultural year book 2019/2020. Vientiane: National Statistical Centre of Lao PDR.

Laos Statistic Information Service. (2022). Consumer Price Index Report. Vientiane: National Statistical Centre of Lao PDR.

Laplante. G. - Andrekovic. S. - Robert. G. (2021). Canadian Greenhouse Operations and Their Potential to Enhance Domestic Food Security. *Agronomy*. 11(6) pp. 229-239.

Lorenzen. K. - Bunnefeld. N. (2013). Fishing Farmers: Fishing, Livelihood Diversification and Poverty in Rural Laos. *Human Ecology*. 41(5) pp. 737-747.

Manivong. V. - Cramb. R. - Newby. J. (2014). Rice and remittances: Crop intensification versus labour migration in southern Laos. *Human ecology*. 42(3) pp. 367-379.

Martin. K. - Rogers, B. - Cook. J. & Joseph. H. (2004). Social capital is associated with decreased risk of hunger. *Social Science Medicine*, 58(12) pp. 2645–2654.

Matheson. J. & McIntyre. L. (2014). Women respondents report higher household food insecurity than do men in similar Canadian households. *Public Health Nutrition*. 17(1) pp. 40-48.

Maxwell .D. (1998). Urban Challenges to Food and Nutrition Security: A Review of Food Security, Health, and Caregiving in the cities. Washington, D.C: International Food Policy Research Institute.

McIntyre. L. - Bartoo, A. & Emery. H. (2012). When working is not enough: food insecurity in the Canadian labor force. *Public Health Nutrition*. 17(1) pp. 49-57.

Ministry of Agriculture and Forestry Department of Agriculture. 2015. Development Strategy of the Crop Sector 2025 Crop Production by Focusing on Modernization, Clean, Safety,

Quality, Stability, Sustainability and Commercialization and Vision 2030. Vientiane Capital: Ministry of Agriculture.

Ministry of Agriculture and LSB. (2012). Lao Census of Agriculture 2010/11 Highlights. Vientiane: MAF/LSB.

National Institute of Agriculture Planning and Projection. (2000). Lao PDR Food Security Strategy in the Period 2001-2010. Vientiane: MAF/LSB.

Newby. J.C. - Manivong. V. - Cramb. R.A. (2013). Intensification of lowland rice-based farming systems in Laos in the context of diversified rural livelihoods. Brisbane, Australia: University of Queensland.

Nord. M. (2009). Food Insecurity in Households with Children: prevalence, severity, and household characteristics. Washington. D.C: United States Department of Agriculture: Economic Information Bulletin.

Office of the National Economic and Social Development Board. (2011). National Economic and Social Development Plan No 11. Vientiane: National Economic Research Institute (NERI) Government of Laos.

Punnada. M. - Prapinwadee. S. - Isariya. N. and Boonyasiri. P. (2016). Factors Affecting Food Security of Thai Agricultural Households. Bangkok: Kasetsard University.

Sunthornwijit. P. (2016). Food security of Klong Dan community: a case study of Klong Dan Sub-district, Ranot District, Songkhla Province. Songkhla Nakarin University.

Patcharawadee. A. (2014). Thesis, Food Security of the Elderly in Rural Communities, Phatthalung Province, Community Health Vocational Program. Graduate school Songkhla Rajabhat University.

Phouvong. P. - Jianhua. (2020). H. Exploring the Determinants of Food Security in the Areas of the Nam Theun2 Hydropower Project in Khammuan, Laos. *Sustainability*. 12(2) pp. 520-529.

Research Triangle Institute. (2014). Current and prospective scope of hunger and food security in America: A review of current research. Cornwallis: RTI International.

Rychetnik. L. - Webb. K. - Story. L. - Katz. T. (2003) Food Security Options Paper: A Planning Framewor and Menu of Options for Policy and Practice Interventions. Sydney: NSW Centre for Public Health Nutrition, University of Sydney.

Sacklokham. S. (2014). Rice-based farming systems in Lao PDR – opportunities and challenges for food security. *Agricultural Systems*. 160(1) pp. 17–25.

Sanchez. P. – Swaminathan. M.S. – Philip. D. & Nalan. Y. (2005). Halving Hunger, it can be done. A report of the UN Millennium Project, Task Force on Hunger (Hunger Task Force) UN Development Program, New York.

Santos. P. (2010). Livestock Banks and Food Security in Laos. *Research in Agricultural & Applied Economics.* 49(4) pp. 497–509.

Sustainable Agriculture Foundation. (2012). The Right of Agriculture and Food Security. Bangkok: Office of Agricultural Economics.

Sisouphanthong. B. (2000). Atlas of Laos: The Spatial Structures of Economic and Social Development of the Lao People's Democratic Republic. Vientiane: National Statistical Centre, State Planning Committee of Lao PDR.

Thanichanom. P. (2018). Balancing cash and food: The impacts of agrarian change on rural land use and wellbeing in Northern Laos. Vientiane: National Library of Medicine.

Troy. L. M. & Steve. O. (2011). Hunger and obesity: Understanding a food insecurity paradigm: Workshop summary. Washington. D.C: The National Academy Press.

UNICEF. (2016). UNICEF for every child Lao People's Democratic Republic. Unicef.org.

United Nations Development Programme. (1994). Human Development Report 1994. *The Journal of Asian Studies*. 54(2) pp. 523-525.

USDA. (2000). Guide to Measuring Household Food Security Revised 2000. Washington. D.C: United States Department of Agriculture.

USDA. U. (2012). Adult food security survey module: three stages design, with screeners. Washington, DC, USA: Economic Research Service, USDA.

Vote. C. - Newby. J. - Phouyyavong. K. - Inthavong. T. - Eberbach. P. (2015). Trends and perceptions of rural household groundwater use and the implications for smallholder agriculture in rain-fed Southern Laos. *International Journal of Water Resources Development*. 31(4) pp. 558-574.

Wantanee. C. - Nopwan. P. - Sujinda. J. (2012). Factors related to food security among the elderly in rural communities in the south. *Ramathibodi Nursing Journal.* 18(3) pp. 311-326.

Webb. P. - Jennifer. C. - Edward. A. - Beatrice. L. - Anne. S. - Paula. B. (2006). Measuring Household Food Insecurity: why it's so important and yet so difficult to do. *Journal of Nutrition.* 136(5) pp. 404-412.

Wiranphat. P. (2015). Food Security: From Agricultural Development to Sufficiency Economy. Maha Sarakham Province: Mahasarakham University.

World Bank. (2014). Lao PDR Development Report 2014: Expanding Productive Employment for Broad-Based Growth. Retrieved from: https://www.worldbank.org/en/country/lao/publication/lao-pdr-development-report-2014

World Bank. (2022). Lao PDR. World development indicator. Retrieved from: https://data.worldbank.org/country/LA

World Food Programme. (2007). Comprehensive Food Security and Vulnerability Analysis. Vientiane: WFP.

World Food Programme. (2019). Strengthening the capacity of ASEAN Member States to design and implement risk-informed and shock responsive social protection systems for resilience Lao PDR Case Study. Vientiane: WFP.

World Food Programme. (2020). Rapid Assessment of Food Security and Agriculture in Lao PDR. Vientiane: WFP.

World Food Programme. (2021). Annual Country Report Overview. Vientiane: WFP.

CHAPTER 8 –ANNEXES

ANNEX 1. QUESTIONNAIRE

Questionnaire: Food security, a case study from Nongvienkham Village, Vientiane Capital, Laos.

Greetings!

My name is Mr. Leesert Bouapao. This questionnaire is conducted for the research purpose of my master thesis. You are invited to take part in a research study about your usual food consumption. If you agree to participate, you could answer some questions for about 10 minutes. Your participation in this study is strictly voluntary.

Your participation would be very valuable to us since the answers you provide will help us to design activities about how to enhance food security.

Thank you for considering this invitation. If you have any questions about this study, please contact me at bleesert@gmail.com

First part: general information

First part: general information of respondents.

1. How old are you?

☐ Below 18 ☐ 18 – 28 years ☐ 29 – 39 years ☐ 40 – 50 years ☐ 51 – 61 years ☐ More than 62

2. Sex

☐ Male ☐ Female

3. What is your occupation?

☐ Student ☐ Government officer ☐Company officer ☐Personal business

☐Farmer ☐ Unemployed ☐Others, please specify:……

4. What is your level of education?

☐ Non-educated ☐ Primary school ☐Secondary school ☐ Tertiary education

5. How much is your income per month?

☐ Less than 2,000,000 LAK ☐2,000,000 – 5,000,000 LAK ☐5,000,000 – 8,000,000 LAK

☐ More than 8,000,000 LAK

6. Where do you come from?

☐Originally live in Vientiane Capital. ☐Come from Northern provinces.

☐Come from Southern provinces. ☐Come from Middle provinces (Except Vientiane Capital).

7. How many people do you live together in your household?

☐ 3 or below 3 people ☐ 4 – 5 people ☐ 6 – 7 people ☐ More than 7 people

Second part: question regarding the level of individual food starving.

8. Which statement best describes the food available to you in the past 12 months?
☐ Enough of the kinds of food I want to eat
☐ Enough, but not always the kinds of food I want to eat
☐ Sometimes not enough to eat
☐ Often not enough to eat
9. In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?

☐ Never ☐ few times ☐ sometimes ☐often ☐ usually
10. In the last 12 months, did you lose weight because there wasn't enough money for food?
☐ Never ☐ few times ☐ sometimes ☐often ☐ usually

Third part: Below is a list of strategies that some people use to get food when their own food is low or when they have run out of food.

11. Have you ever ate less healthy meals so you could eat more food?
☐ Never ☐ few times ☐ sometimes ☐often ☐ usually
12. Have you ever used less utilities (e.g. electricity, water) to save money for food?
☐ Never ☐ few times ☐ sometimes ☐often ☐ usually
13. Have you ever borrowed money from friends to buy food, because you don't have money?
☐ Never ☐ few times ☐ sometimes ☐often ☐ usually
14. Have you ever eat only rice because you don't have money to buy food?
☐ Never ☐ few times ☐ sometimes ☐often ☐ usually
15. Have you ever sold personal possessions to buy food?
☐ Never ☐ few times ☐ sometimes ☐often ☐ usually

Fourth part: questions regarding food available and accessible.

16. What are the main decisions before buying food for you? (3 most important reasons)

☐ Diet food ☐ Organic food even the price may higher

☐ Cheaper food even that the quality may lower ☐ The food I like to eat at general price

☐ Convenience or fast food that is easy to prepare ☐ Closest to where I live

☐ Others: specify

17. What are the main sources of food for you? (3 most important sources)

☐ Buying at market mall ☐ Self-produce (vegetable from garden)

☐ Nearby forest or nature ☐ Rice from family (family grow rice)

☐ Super market ☐ Small shop

☐ Others: specify

18. What kind of imported food products do you buy? (more than one choices)

☐ Fruit and Vegetable ☐ Meat/fish/poultry ☐ Grains/cereals

☐ Chips, Candy. ☐ soft drinks ☐ Instant food (Noodle, can food)

☐ Spice ☐ Others: specify

19. How much do you agree that raising animal or growing vegetable for food by yourself, help you to secure your food security?

☐ Very agree ☐ Agree ☐ Maybe ☐ Disagree ☐ I don't know

20. How much does it take for you to reach the place you usually buy food?

☐ 5 or below 5 min ☐ 6 – 15 min ☐ 16 – 30 min ☐ more than 30 min

Fifth part: questions regarding food stability.

21. Since the food price have been increased from last year, how much do you change your consuming behavior?

☐ Same as before ☐ I buy less unnecessary food

☐ I cook food at home more ☐ I choose to buy cheaper substitute food

☐ I eat less ☐ I start to grow vegetable or raise animal for food

☐ Others: specify

22. How well do you know about food nutrition in general?

☐Very well ☐Good ☐Little ☐Don't know

23. Do you think that the related government sector gives clear check about food safety before selling on the market?

☐Very good check ☐Good check ☐Little check ☐Don't check

ANNEX 2. ACRONYMS AND ABBREVIATIONS

AFSMM	Adult Food Security Survey
ASEAN	Association of Southeast Asian
DS	Dry season
FAO	Food and Agriculture Organization
GDP	Gross Domestic Products
HDI	Human Development Index
LAK	Laos Kip
LMIC	Lower Middle Income Country
SES	Socio-economic Status
WFP Laos	World Food Programs Laos
WRI	World Risk Index
WS	Wet season

CHAPTER 9 – APPENDIX

APPENDIX 1. ABSTRACT OF THE THESIS

Food security in Lao PDR, a case study from Nongviengkham village

Bouapao Leesert

Master of Rural Development and Agribusiness

Institute for Rural Development and Sustainable

The objective of this research was to explore the degree of food security among individuals residing in Nongviengkham village, Laos. By utilizing the USDA Adult Food Security Survey Module (AFSSM), the study assessed the food security status of inhabitants and examined their coping mechanisms and consumption patterns following the 2022 food price increase. Furthermore, the investigation examined the relationship between food stability, accessibility, and food security among the residents. The prevalence of food insecurity was reveal at 77.5% among the sample. Whereas, around 55% of the residents experienced food insecurity without hunger. Among the remaining participants, 17.1% recorded moderate hunger due to food insecurity, while 5.4% had severe hunger due to food insecurity. When facing severe food insecurity, rice was regarded as the final option for obtaining food. The consumption of organic food has been confirmed as a recent trend, yet it is not commonly consumed by individuals who are experiencing moderate to severe hunger. Residents in food secure and insecure groups faced different challenges when it came to accessing food, despite both groups primarily relying on market malls as their main source of food. Additionally, households gardens and nearby natural areas were found to be crucial sources of food for individuals experiencing moderate to severe hunger and food insecurity. Finally, the residents' level of knowledge regarding food stability was found to be low, while the quality of government food inspections was rated as moderate. Additionally, only 25% of the participants reported that they did not modify their food consumption habits following the 2022 price increase.

APPENDIX 2. ACKNOWLEDGEMENTS

Above all, I would like to express my gratitude to my supervisor, Prof. Krisztian Ritter and the Head of the MSc specialization - Prof. Farkas Tibor, as well as all the professors, and all the faculty and staff of the university who provided advice, guidance in planning, checking and correcting, and coordination throughout the research process until the completion of this dissertation. Special thanks to the staff of Nongviengkham village who provide information and data for the study. I also would like to expresses gratitude to my siblings, relatives, friends, seniors, juniors, and all those who have supported and encouraged the research to be successful beyond all else. Finally, I'm forever indebted to my parents who understand the importance of this work, suffered my years away and being apart for a long time and were very supportive for my study abroad.

Thanks again to everyone who helped me and made this thesis possible.

Sincerely,

Bouapao Leesert

APPENDIX 3. DECLARATION OF AUTHOR

DECLARATION

on authenticity and public assess of final essay/thesis/master's thesis/portfolio[1]

Student's name:	Bouapao Leesert
Student's Neptun ID:	Q84GM4
Title of the document:	Food security in Lao PDR, a case study from Nongviengkham village
Year of publication:	2023
Department:	Institute for Rural Development and Sustainable Economy

I declare that the submitted final essay/thesis/master's thesis/portfolio[2] is my own, original individual creation. Any parts taken from an another author's work are clearly marked, and listed in the table of contents.

If the statements above are not true, I acknowledge that the Final examination board excludes me from participation in the final exam, and I am only allowed to take final exam if I submit another final essay/thesis/master's thesis/portfolio.

Viewing and printing my submitted work in a PDF format is permitted. However, the modification of my submitted work shall not be permitted.

I acknowledge that the rules on Intellectual Property Management of Hungarian University of Agriculture and Life Sciences shall apply to my work as an intellectulal property.

I acknowledge that the electric version of my work is uploaded to the repository sytem of the Hungarian University of Agriculture and Life Sciences.

Place and date: ____2023_____ year _____5_____month ___5____day

Bouapao Leesert

[1]Please select the one that applies, and delete the other types.
[2]Please select the one that applies, and delete the other types.

APPENDIX 4. SUPERVISOR'S DECLARATION

STATEMENT ON CONSULTATION PRACTICES

As a supervisor of Bouapao Leesert (Q84GM4), I here declare that the master's thesis has been reviewed by me, the student was informed about the requirements of literary sources management and its legal and ethical rules.

I recommend/don't recommend[3] the master's thesis to be defended in a final exam.

The document contains state secrets or professional secrets: yes no*[4]

Place and date: 25.04.2023.

Internal supervisor

[3] Please underline applicable.
[4] Please underline applicable.