

Coping during the COVID-19 outbreak: evidence from Xiengkhouang province in the Lao PDR

ABSTRACT

Corona virus (Covid-19) is causing concern in various domains worldwide, especially in the food system. Its impacts on food systems has been one of the factors fueling the debate on how to change food systems to make them more sustainable and resilient to crises. One of the assumptions is that food systems based on agroecology are more resilient than those based on conventional agriculture. This study aims to analyze the resilience of food systems in Laos in the face of Covid-19, with a focus on agroecological food systems. The study was conducted in 2022. Data were collected from 90 relevant stakeholders. The results support the hypothesis that food systems based on agroecology are more resilient, as stakeholders who use agroecological approaches reported no food shortages nor interruption of their activities. And short market chain, producing food at home, support from farmers collectives helped cope with the situation caused by Covid-19.

Keywords: Resilience, Food System, Agroecology, Covid-19

1. Introduction

The Lao PDR is a small landlocked country of Southeast Asia that shares borders with Myanmar, Cambodia, China, Thailand and Vietnam. Most areas of the country are mountainous and thickly forested. In 2020, the population was approximately 7 million, of which about 60% were employed in the agricultural sector (World bank, 2021). Over 2011-20 the agricultural sector contributed 17.5% to the national economy (MPI, 2021). Agricultural productivity is relatively low due to the geography, traditional modes of production and limited technology.

The Laotian food system is largely based on subsistence farming. The country is self-sufficient in rice (Boulom et al., 2022) and produces agricultural commodities (maize, rubber, cassava) and high-value agricultural products (coffee, tea). Food is mainly produced to cover family needs while the surplus is sold on local markets. This type of farming is practiced mostly by small farmers –the average farm size was 2.4 hectares per household (MPI, 2021)– relying on agroecological principles and knowledge, integrating biologically and genetically diverse crops, livestock and trees. Most farmers used little chemical fertilizers (12 kg/hectare on average) (Keoka, 2018). Most of the food produced in Laos is sold fresh or unprocessed, and traditional wet markets remain the most important place for selling farm products, despite a fast development of modern retail outlets (World Bank Group, 2018). Rural populations also consume non-timber forest products, such as forest vegetables, mushroom, bamboo and other shoots, and wild animals. Finally, the consumption of imported products (e.g., sweetened beverages, instant noodles, canned fish) has been increasing mainly in the cities, but remains low compared to the consumption of fresh or lightly processed local products.

An infectious disease that appeared in China in December 2019, COVID-19 was declared a Public Health Emergency of International Concern on 30/01/22 by the World Health Organization. In the Lao PDR, the first case of COVID-19 was confirmed in March 2020, and the number of cases reached twenty the following month. From March 2020 to February 2021, 45 cases were reported, mainly Laotian workers coming back from neighboring countries. In April-May 2020, the Laotian government imposed a six-week lockdown and closed down businesses and service places. Until February 2021, the number of infected people remained under 50. In April 2021, the country experienced its second COVID-19 outbreak: a second lockdown was imposed with restrictions to provincial and district travels, increased surveillance of borders, testing and contact tracing efforts. Over 1,800 people were contaminated between April and June 2021. Most of the cases occurred in Vientiane Capital, with a first confirmed death from COVID-19 in May 2021 (Head et al., 2021). The measures implemented to limit

the transmission of the virus were extended (with some flexibility) until mid-2022. The restrictions imposed during the second lockdown had important impacts on the incomes and access to food of many Laotians. According to a rapid assessment undertaken in the Lao PDR in 2020, the COVID-19 crisis had a negative impact on farmers' ability to sell their produce and on the volumes sold, and diverse effects on prices. Cash crops and vegetables were most affected (WFP, 2020).

This article explores the resilience of food systems in the Lao PDR during the pandemic, and asks whether agroecology played a role in this resilience. This research question is particularly relevant as some authors call for a transition to more socially just and resilient food systems that are better able to withstand crises (Altieri and Nicholls, 2020). Their argument is that agroecology offers high levels of food diversity, good yields and helps maintain ecosystem services. In this article, we focus more on socio-economic resilience and on the mechanisms through which agroecological systems have coped with the COVID-19 crisis.

2. Analytical framework

2.1. Food systems, resilience and agroecology.

The food system consists of “all the elements (environment, people, inputs, processes, infrastructures, institutions) and activities that relate to the production, processing, distribution, preparation consumption [and waste management] of food, and the output of these activities, including socioeconomic and environmental outcomes” (Pimbert & HLPE, 2017). It involves "chains of market and non-market activities and actors (...) that are inter-connected through the circulation of food, each of them can be considered as sub-systems with specific interactions with other activities and actors that are not part of agriculture or food" (Bricas et al., 2019). At a territorial level, several food subsystems coexist. These local food systems are especially important in low and middle incomes countries for rural and urban poor communities (Béné, 2020). Local food systems include a number of smallholders, livestock and fish farmers who produce and sell their products to local and regional markets (formal and informal) via buyers (collectors, wholesalers, brokers), retailers, street vendors and food stores.

Resilience is a positive adjustment after a stressful situation. Food system resilience refers to the capacity of the food system to cope with a specific disturbance, be it internal or external, cyclical or structural, sudden or gradual, natural, political, social, or economic (Tendall et al., 2015). While the concept of resilience has been incorporated into food security studies, it has been increasingly associated with food systems or food value chains since the COVID-19 crisis

(Béné et al., 2021, Paganini et al., 2020; Farell et al., 2020; Fan et al., 2021). According to Béné (2020), food system resilience includes: i/ resilience *per se*, or the true ability to recover from a crisis/shock; and ii/ resilience capacity that designates the different elements that food system operators accumulate, create, develop (income, knowledge, social capital, etc.), and may or may not use in response to a crisis. In other words, resilience is both the element of a process and an intermediate outcome on the way towards a final outcome.

Agroecology can be defined as science, as a practice and as a movement (Wezel et al., 2009). As a practice, it is based on the sustainable use of natural resources, knowledge and priorities of local farmers, smart use of biodiversity to provide ecosystem services and resilience (Gliessmann, 1990). As a science, it emphasizes action research, a holistic approach, participation and multidisciplinary including different knowledge systems. As a movement, it protects smallholder farmers and family farming, peasants and rural communities, food sovereignty, local marketing chains, diversity of native seeds and species, healthy and quality food (Wezel et al., 2018). It applies methods promoting ecosystem regeneration and preservation, aims at minimizing the use of synthetic inputs and using ecological processes and ecosystem services to develop and implement agricultural practices (Wezel et al., 2020). Although agroecology primarily deals with crop production and protection, it also includes many other dimensions such as environment, social, economic, ethical and development.

2.2. Impacts of Covid19 on food systems

The COVID-19 crisis disrupted food systems throughout the world (Béné et al., 2021; Fan et al., 2021; Dury et al, 2021; Dugué et al, 2021; Bitsoumanou et Temple, 2021; Yu et al., 2020) and revealed the fragility of industrial food systems (Altieri and Nicholls, 2020). Border closures undermined trade opportunities, reduced the demand for seasonal labor and increased the price of imported food products. According to Fan et al. (2021), although the impacts of COVID-19 differed in each country, the poor suffered more. In many countries, government-imposed restrictions on travel, trade and lockdowns of entire cities resulted in difficult access to food, especially in large cities that depended on daily food imports.

The pandemic strongly impacted food system stakeholders. According to Fan et al. (2021), port closures and export bans, slower economic growth and lack of purchasing power, impacted food supply chain stakeholders, especially smallholder farmers, youth and women. In West Africa, the lockdowns and traffic restriction measures primarily affected urban market supply. In several cities, quarantines and the closure of open-air urban markets limited the farmers'

selling opportunities for perishable products. Farmers also experienced difficulties accessing inputs (seeds, fertilizers) and labor. In China, lockdown policies caused crop planting delays as farmers could not buy necessary inputs (Zhong et al., 2020). In the Northwest of India, wheat and pulse harvesting stopped due to the absence of migrant workers (Dev & Sengupta, 2020). These concerns tended to be more serious for specialized farmers than for smallholder farmers who depended less on commercial inputs (Dury et al., 2021). Gregorioa & Ancog (2020) show that the limited access to inputs and markets contributed to a lower agricultural production, a loss of profits and food waste. During the lockdown in Burkina-Faso in March 2020, vegetable prices dropped, as travel restrictions prevented farmers from exporting their products (Dugué et al., 2021). Family farms supplying domestic markets seemed to have better coped than export farms. In Ethiopia, the incomes of vegetable farmers dropped due to overstocking, and to input shortages (Tamru et al., 2020). In the United States and Canada, overstocked milk, vegetables, livestock and poultry were discarded or destroyed (Weersink et al., 2020; Bellany and Corkery, 2020).

COVID-19 impacted traders through food losses caused by the closure of restaurants, schools, and other food services (Altieri & Nicholls, 2020). The main impact of COVID-19 on consumers was through unemployment, resulting in loss of incomes and wages, and hence purchasing power (Béné, 2020). Higher food prices and the increase in the unemployment rate have reduced both contributed to reducing the purchasing power of the consumers. COVID-19 also had a strong impact on consumers' purchasing practices, with a greater use of online shopping, particularly by urban consumers. The closure of farmer markets, other retail outlets and catering facilities led to the rise of home delivery.

2.3. Adaptation strategy to Covid19 crisis

Paganini et al. (2020) show that, in response to the COVID-19 crisis, farmers reduced their number of meals, spent less, changed their diets, grew more their own food, and sourced food from families and neighbors. Adaptation strategies developed by the retailers included: negotiating with suppliers to limit the rise in purchasing prices; borrowing money from informal credit associations (indebtedness); lowering prices to keep selling, or stopping sales and diversifying their activities (Mathé et al., 2021). In Northern Laos, Head et al. (2021) show that households met over one third of their food needs thanks to their own production. Over half of the respondents produced their own rice and vegetables, one fourth produced the fish, meat and fruits they consumed. Self-sufficient households were more resilient to shocks than those who purchased their foods. In Southeast Asia, Gregorioa & Ancog (2020) detail the government

interventions that were implemented to support farmers, processors, distributors, retailers and consumers in response to COVID-19. These interventions include: developing digital farming in order to better link farmers to markets (Vietnam); bulk purchases of agricultural produce by retailers from farmers (Malaysia, Thailand, Philippines); price fixing for basic commodities and limiting the purchase of certain staple foods (Philippines). Many countries implemented consumer-targeted interventions: social distancing, shift/scheduled household marketing, e-commerce transaction promotion, urban gardening.

3. Materials and Methods

3.1. Data collection

The characterization of agroecological food systems in Xiengkhouang province involved describing and analyzing: the actors involved and their activities; the main agroecological products; forms of collective action among specific groups of actors involved in the agroecological transition; and forms of interaction between the groups of actors and activities within the food system. Several approaches and tools were used to collect data at various scales, including: farm and market visits; focus groups discussions with farmers and consumers; and individual interviews using semi-structured questionnaires for growers, sellers and consumers. Finally, resilience stories were collected, where interviewees explained the short and long-term effects of the pandemic.

Survey data were collected from organic and GAP vegetable producers in Yone village (Pek district) and conventional vegetable producers in Tham village (Khoun district). Data on traders and consumers were collected from agroecological markets in Xiengkhouang province. Some interviews of retailers and consumers in organic markets in Vientiane Capital were also conducted. A total number of 90 individuals were surveyed.

3.2. The study area: XK province

The research was carried out in Xiengkhouang province, a mountainous province located in the Northeastern part of the Lao PDR. Xiengkhouang province covers about 1.7 million ha and counts less than 250,000 people from five main ethnic groups (Lao Loum, Thai Phuan, Hmong, Khmu and Tai Dam). Relatively well-developed infrastructure connects the province to neighboring provinces and to Vietnam. The province is rich in natural resources and has a climate that is suitable for diversified agriculture. Agriculture is the main economic activity in Xiengkhouang province (Souliyalath et al., 2021). The province depends on lowland and upland

rice, and vegetables for its food security. The priority of the provincial authorities is to increase agricultural production for food security and economic development. The main commercial crops are maize, sesame, jobs tears, groundnut, rice, vegetables, cattle and buffalo. Wild tea is cultivated in a few areas, as well as sub-tropical and temperate fruits. Xiengkhouang is known for large cattle breeds, and for raising native poultry and pigs (UNDP, 2013). Finally, the region hosts over 15 species of natural and forest products (rattan, bamboo, medicinal plants, wild fruits, mushrooms, small animals) that are an important source of food for rural people. Vegetables, rice and fruits are mainly sold in local markets and in the cities, while maize, tea, coffee and cattle are exported to China and Vietnam.

4. Agroecological practices in Xiengkhouang Province

The Government of Laos has been supporting agroecological practices and diversification since the early 2000s. The *Agriculture Development Strategy* (ADS) developed by the Ministry of Agriculture and Forestry aims: “(...) to achieve food security, produce agricultural commodities, develop clean, safe and sustainable agriculture and to gradually shift to a productive agriculture economy linking with rural development and contributing to the national economic basis” (MAF, 2015). In addition, the *Green and Sustainable Agriculture Framework for Laos to 2030* launched in July 2021 (MAF, 2021) provides a detailed elaboration of the Green and sustainable agriculture (GSA) policy, as well as guidance for its implementation.

Xiengkhouang province is suitable for organic food production: the soil is naturally fertile and suitable for crops without using chemical inputs and there is quite a large number of cattle raising farms, allowing farmers to use manure to improve soil fertility. According to the Provincial Agriculture and Forestry Office of Xiengkhouang, agroecological practices (organic agriculture, good agricultural practices, integrated pest management and conservation agriculture) are widespread in the province. In 2022, 1,600 families adopted Organic Agriculture (OA) and Good Agricultural Practices (GAPs) for vegetables, fruits and rice production (106 families were certified organic). At the time of the survey, the vegetable farmers’ cooperative sold 3.5 tons of vegetables per month (20-50 kg per family per week).

Organic farmers in Xiengkhouang used organic matter from neighboring villages –e.g., rice husk from mills, chicken manure from chicken farms– to make the compost used to improve soil fertility. Organic farming practices also included integrated cropping and crop rotation to ensure a diversity of products, and to minimize crop diseases. However, organic practices faced a number of challenges: i/ only the plateau area and valleys had rich enough soils for these

practices; ii/ farmers had limited capital to invest in organic production (e.g., green houses); iii/ organic practices are labor intensive; and iv/ the lack of price incentives has pushed organic farmers to stop or reduce their production (some organic markets closed).

GAP vegetable production has a good potential because the market is larger and farmers received a fair price thanks to support from the *Lao Farmers Network*, the SAEDA project and the local government. The good quality of the soil in the target villages encouraged the implementation of this approach. GAPs are easier to adopt than organic practices, as farmers are allowed to use chemical inputs in a controlled way: farmers can use chemical fertilizers together with compost or animal manure to improve soil quality and chemical pesticides in combination with natural herbs to kill pests. Herbicides are never allowed. As inflation caused the price of imported chemicals to rise, all farmers in the study target areas joined GAP practices. Farmers in the target villages grow cabbage, Chinese cabbage, Thai mustard, long bean and traditional round eggplant in rotation to minimize plant diseases and soil degradation.

The distribution channel for organic vegetables was short, with farmers selling either directly at the farm and in organic market in Pek. GAP vegetables were sold through three main channels: 1/ from the farm to a collector from the village, neighboring villages, or another province to a wholesaler in the destination province, to the retail market. The main destinations for this channel are: Vientiane Capital, Vangvieng, Luang Prabang, Huaphanh and Borikhamxay provinces; 2/ from the farm to the local wet markets; 3/ in some cases, the consumers bought their vegetables directly from the farm. The last two channels represented small quantities of produce as most of the vegetables were sold to other provinces.

5. The impacts of COVID-19 on the food system

Although the Lao PDR has reported much fewer cases of COVID-19 than its neighbors, the impact of the pandemic on the economy has been significant. A study conducted in November 2020 in Northern Laos shows that a large part of the population was affected by an increase in food prices, with dramatic consequences in terms of food insecurity (WFP, 2020). Income losses and increasing food prices prevented households from meeting their food needs (Head et al., 2021). An increase in the unemployment rate was also reported by the Ministry of Labor and Social Welfare from 2% before the pandemic to 25% in May 2020. Finally, food prices further increased by nearly 27% between February 2020 and April 2022 (FAO, 2022).

5.1. Impacts of Covid19 on producers

Organic vegetable growers. The pandemic had little impact on the access of organic farmers to inputs as these farmers did not depend much on external inputs and prepared their inputs (e.g., seeds, rice husk, animal manure) at the beginning of the season. Moreover, agricultural stores and wet markets remained open to provide services to the farmers during the outbreak. Access to labor was not an issue as organic farmers relied exclusively on family labor. The main impacts were in terms of marketing: the farmers sold less vegetables, less frequently and at lower prices, and lost some of their produce. The farmers' income loss ranged from 50-100% for a period of 3 months. In most cases, the farmers were allowed to go to the organic market to sell their vegetables after the lockdown, but they could sell only small quantities as there were fewer consumers. Farmers who sold to restaurants (closed between April 2021 and January 2022) lost most. Vegetable prices during the outbreak were quite stable, declining when supply exceeded demand. There were no significant losses of organic vegetables because the volumes grown were low. When the market closed, farmers could still sell their vegetables at home, shared the vegetables with family and friends, or used them to feed their animals. As the farmers sold through short supply chains, they knew their consumers and were able to supply them through home delivery.

GAP and conventional vegetable farmers. Only a few farmers had trouble buying fertilizers due to travel restrictions. Access to labor was not an issue, because farmers used mostly family labor or exchanged labor within the family or neighborhood. The main impacts related to market access were reduced incomes, lower frequency of sales, price drops and produce losses. GAP and conventional farmers produced large quantities of vegetables that were sold to different markets –e.g., Vientiane capital, Xamneua town, Borlikhamxay Vangvieng, Luang Prabang Xayaboury provinces. During COVID-19 travel restrictions, most collectors were unable to collect the vegetables because they were not allowed to travel to other provinces and some were afraid of getting infected. As a result, some farmers could not sell their vegetables at all, some were able to sell 1-2 times per week, and some were able to sell once every two days instead of every day, but with smaller quantities and lower prices. Farmers experienced vegetable and income losses ranging from 40-100% during three months. In addition, vegetable prices dropped by about 50-80% relatively to ordinary prices. The market was then limited to Vientiane Capital and Bolikhamxay province. Unsold vegetables were fed to the animals or left at the farm.

5.2. Impacts of Covid 19 on traders

In Xiengkhouang province, the second wave was more serious and had a larger impact on the food system. In short supply chains, the impact was limited to the closure period, while longer supply chains were affected during 3-12 months. The traders were subsequently allowed to transport goods under certain conditions (permission letter, vaccination pass). The administrative process to obtain this permission letter took at least three days and these lengthy measures caused product and income losses throughout the supply chain.

Village collectors bought vegetables from their neighborhood and delivered them to the retailers in the market. The average daily volumes purchased and sold by the collectors was about 4-6 tons. The average daily volumes of vegetables bought by the retailers to the collectors 50-100 kg. During the second lockdown, most wet markets were still allowed to open, although the fear of being infected limited the number of shoppers. Because people had less incomes and more time to grow their own food, purchases at the market declined, resulting in food losses. The impact of COVID-19 lasted 3-12 months (April-June). For the collectors, after two weeks of lockdown, the volumes of sales stabilized, but the frequency of sales dropped (many documents to prepare), and prices dropped by about 80%. Traders suffered product losses when they could not obtain the permits on time, by about 50% or more. Retailers sold 40-70% less than usual and lost their vegetables (30-50% each day) but prices were stable. Prices dropped when they could not sell all their products.

5.3. Impacts of Covid19 on consumers

Over a third of the consumers surveyed were government staff or social servants with a permanent job, and less than two-thirds were self-employed –*e.g.*, merchants, traders, businessmen. While government staff were little impacted, other groups of consumers (*e.g.*, vendors, industrial workers, restaurant and hotel owners) lost up to 30-100% of their income. Many businesses closed down because people were afraid of getting infected. During the COVID-19 outbreak, travel restrictions meant lower traveling expenses and time for all categories of stakeholders. Expenses for social events (*e.g.*, ceremonies, weddings, funerals, families or community gatherings, shopping) were also reduced.

Over half of the consumers consumed only conventional vegetables, one third consumed only organic vegetables and 20% consumed both organic and conventional vegetables. Those who consumed organic vegetables praised their long shelf life and healthiness (chemical-free). The consumers started consuming organic products when the organic market opened. Consumers in

Xiengkhouang bought food from four main wet markets: Xiengkhouang Center, Chinese market, Sibounheuang or organic market and Namngam market. Consumers mentioned the increase in the prices of imported food, while the price of local food remained almost the same.

6. Adaptation strategies developed by the different stakeholders of the food system

During the COVID-19 outbreak, the *farmers* kept growing vegetables on the same surface as before. As their main occupation, vegetable farming provided them with good incomes in the absence of alternative jobs. If not sold, the vegetables could be given to neighbors or fed to the animals. The main coping strategy developed by the farmers was to reduce unnecessary expenses (*e.g.*, clothes, home items, eating meat, travel cost). One third of the farmers reduced their cropping areas and diversified their crops and 23% changed their crop varieties. As few farmers knew how to use mobile applications, most organic farmers depended on face-to-face relations, while conventional vegetables growers depended on collectors (little on-line sales).

In response to the COVID19-outbreak, *the traders* reduced their sales volume, opened their stores less frequently, reduced their selling prices, and negotiated lower prices. Vegetable traders kept selling, but reduced the volumes traded. Less than one third reduced the selling price (*esp.* for vegetables). Only 15% of the retailers reduced the frequency of opening shop and negotiated to buy lower price.

70% of the *consumers* reduced unnecessary expenses (70%) during the pandemic. About half of the consumers sourced food from their families or relatives and reduced the quantity of some food items such as meat and fruits. Only one third produced their own food, as most consumers said that the suddenness of the lockdown did not leave them enough time to grow their own food. Rice was available throughout the period. 60% of the consumers mentioned dietary changes, such as switching from more raw foods to processed foods that can be stored for a long time, thereby reducing their shopping activities.

No specific government support or relief activities were provided, apart from support to facilitate the transportation of agricultural goods and to allow food markets to remain open during the pandemic. People relied mainly on their savings.

7. Conclusion & Discussion

Agroecology practices are widespread and take on a variety of meanings in Xiengkhouang province. Most farmers use small quantities of chemical inputs (mainly fertilizers and pesticides). Although they agree with the principles of agroecology, their practices are still in

transition. Many farmers joined GAP projects because they wanted to reduce the use of chemical inputs to maintain their health and the environment. Consumers in Xiengkhouang generally bought vegetables on ordinary or agroecological wet markets in Phonsavan and Khoune districts.

Agroecology in Xiengkhouang is mainly defined by the importance of short supply chains: the agroecological wet market is a central meeting point for agroecological producers and consumers, as well as a place where experiences and information are shared and for developing solidarity.

Some of the practices of agroecological, farmers and traders made them more resilient to the COVID-19 crisis. Agroecological farmers produced over ten kinds of vegetables in their farm. Vegetables that were not sold were shared with families and friends or fed to the animals. In contrast, conventional farmers who grew single crops just left the vegetables at the farm. Both groups faced similar income losses, but agroecological farmers were still able to use their produce for other purposes, while conventional farmers lost all of their crop. Finally, agroecological farmers in short supply chains benefitted from their close connections with consumers, which allowed them to keep selling through home delivery.

Agroecological farmers depended less on external inputs and used family labor only. Farmers and traders were mainly affected by the decline in the volumes of sales of their products, and therefore in their incomes. Income drops however were only transitory and did not affect household food security. Even in the absence of government support, there were no food shortages. Wet markets remained open, and when they were closed, consumers were able to continue sourcing food through family solidarity, direct home deliveries, growing vegetables in their own gardens and changing their food diets when certain food items were not available. Finally, agroecological farmers have joined groups for production and market negotiation, and to share the burden of selling the vegetables. During the pandemic, collective action was disrupted as the farmers were not able to use common transportation, to collect each other's products or to share information.

8. References

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