

Review

Understanding Food Security Behaviors during the COVID-19 Pandemic in Thailand: A Review

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Abstract: The COVID-19 pandemic has impacted worldwide food security including in Thailand. This review aims to understand people's behaviors with regard to promoting food security during the COVID-19 pandemic by covering three main cases at a community level: the food bank, the food exchange, and the food pantry. A systematic review of news content analysis and in-depth interviews were employed for data collection. Based on integrated behavioral models of motivation–opportunity–ability (MOA), the theory of planned behavior (TPB), and value–belief–norm (VBN), key results indicated that altruistic values including beliefs in opinion leaders and the benefits from food security behaviors were influences on people's practices. The attitude toward food as a crucial factor for living, the influence of family members and neighborhoods, and the perception of what constituted enough food led people's behavioral intentions with regard to food security. The intrapersonal communication of opinion leaders was an important initial step linking to people's understanding of others. The most frequent qualities of opinion leaders were: having a determination to help, thinking of the benefits of local people, and believing in community capacity. Self-reliance and procedural knowledge of how to behave were key messages, while personal media, local broadcasting towers, and social media were mainly employed to distribute these messages. Two-way and networking communication should be strengthened to promote sustainable food security during the crisis.

Keywords: food security behavior; food bank; food exchange; COVID-19; Thailand



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1. Introduction: Food Security in Times of Crisis

During the COVID-19 pandemic crisis, which has spread all over the world, a lot of people have found themselves living in difficult conditions including with regard to food security. The World Health Organization has warned about food availability which may affect food export restrictions, leading to food shortages and a higher price of food production [1]. The serious COVID-19 pandemic has caused the reduction of people's income because various businesses could not be run as usual. Some businesses including agricultural and food supplies [2] have needed to be temporarily closed or have had to reduce the numbers of employees.

Due to the lockdown measures of many countries limiting people's movement from one area to another both for domestic and international traveling, the tourism sector, which has been based on in and out bound tourists, has suffered one of the outstanding impacts. The lack of tourists has affected stakeholders, and not only the incomes of the business owners but also the employees who now face temporary or permanent unemployment. This is also linked to other sectors like the agricultural sector where some farmers who grow vegetables, which they sell to hotels for cooking food for the hotel's guests, have also been affected. Moreover, fruits farmers have also suffered direct impacts and have no chance of exporting to other areas, as well as difficulty in linking their products with consumers. At the height of COVID-19 spreading in Thailand, in particular during March to May 2020, shopping malls were ordered to close except for restaurant deliveries and supermarkets, and a six-hour curfew was in force at night. Moreover, the government

attempted to limit social gatherings by requesting people to stay at home and work from home (WFH) [3].

Previous studies on COVID-19 and food security have taken place in 35 developing countries covering African, Latin America, Oceania and Asia [4], Jordan [5], and the United States [6], which clearly reported their transitory food insecurity caused by the pandemic. The main threats from the pandemic to global food security, particularly to the countries facing pervasive poverty, include poor healthcare infrastructure, a lack of robust social safety nets, and malnourishment; the threat of all of these could be high [7]. Moreover, among four aspects of food security, food availability and access are most affected during the pandemic [8]. Socio-economic factors influencing food insecurity during the pandemic were also explored in Iran [9], crucial factors covered personal savings, income, employment status, and the nutritional knowledge of the head of the household. To cope with food insecurity during this pandemic, free food, nutrition consultations, e-marketing, donations, flexible safety nets, and food-based intervention programs should be promoted [9]. Thailand has its own measures and strategies to cope with the COVID-19 pandemic to assist people who are interested in extracting the lessons to be learned so they can build further mechanisms and practical guidelines for related stakeholders to enhance adequate preparation for any future crises.

This review aims to: (1) explore the food security situation and analyze community involvement during the COVID-19 pandemic; (2) discuss food security behaviors from the perspective of behavioral sciences; and (3) propose an effective communication framework to strengthen sustainable food security during the COVID-19 pandemic and during the crisis.

2. Methodology

2.1. Systematic Review and Data Collection

This review employed the methods of news content analysis on the Internet and in-depth interviews. Online news content and clips on YouTube and Facebook (the list of video clips is shown in Supplementary Materials), provided information on the development of three case studies of food security, excluding images, animation, and hyperlinks. The methodology of news content analysis followed the steps of conducting web-based content data analysis [10] as follows.

(1) Purposive sampling was employed to examine the food security news on the Thai PBS online channel from 1 January to 30 June 2020. The keywords search for ‘COVID-19 and food’ was employed to retrieve related news. The Thai PBS online channel was selected as the main source of information due to its effective functioning as a mass medium during the pandemic. The media has reported not only overall situations, government and public health measures, but also the adaptation guidelines for the public without bias toward any stakeholders. The Thai PBS channel has also promoted public participation in the public sphere and links to peaceful solutions such as the television program called ‘COVID-19: fight together’. Other related online information sources in Thailand regarding COVID-19 and food security were also searched, grouped, and analyzed to gain supportive information for data analysis. Food security in this review covered the outstanding three case studies reported on the news: (1) food banks (the growth and consumption of organic vegetables, the paddy rice fund), (2) food exchanges (exchanging rice and fish), and (3) food pantries (food donation).

(2) Categorizing: This review used a set of categories based on the communication elements of senders, messages, channels, levels of communication, and format of communication, as well as a category emerging from the news which was supporters.

(3) Coding: Two coders were appointed to examine food security news from the news sources. The codebook provided clear instructions and guidelines for coders, and indicated categories, key concepts in news items that should be analyzed, and how to code them. Both coders first coded all the news items, and then had face-to-face discussions about the similarities and differences of the coding results. The coding form is shown in Table 1.

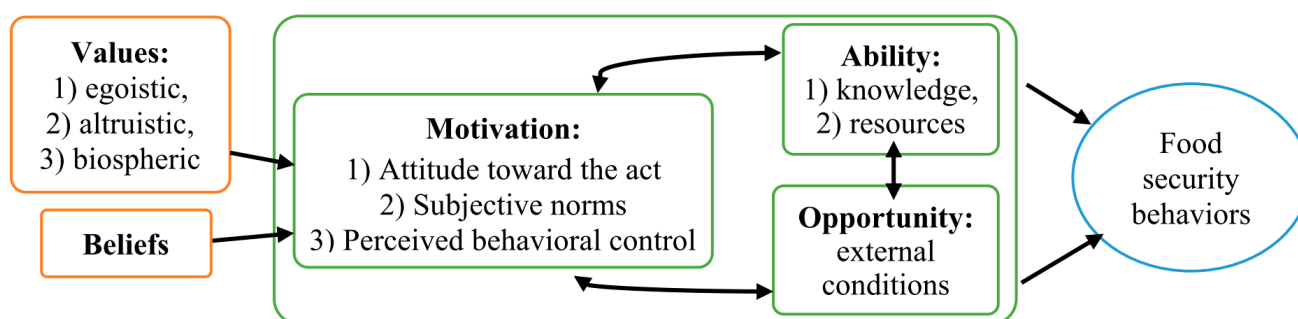
Table 1. Coding form of food security news on the Internet (World Wide Web).

Case	News Headline	News Source	Editor	Opinion Leaders	Supporters	Messages	Channels	Levels of Communication	Participatory Communication
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For the in-depth interviews of ten key informants, purposive sampling with semi-structured interviews were used and actively join in the food security activities were conducted via telephone, online, or face-to-face based on the most convenient approach and available time of the informants. The key informants were found by news content analysis to be leaders in encouraging local people to participate in food security activities during the COVID-19 pandemic and those who were actively involved in the activities. The interview questions were mainly about their motivation to begin and participate in the food security activities, their communication methods, the stakeholders and their roles, problems and solutions, and the success factors that can support and promote food security behavior.

2.2. Food Security Behaviors Analysis

The integrated behavioral models of motivation–opportunity–ability (MOA) [11], the theory of planned behavior (TPB) [12,13], and the value–belief–norm theory (VBN) [14] were employed to analyze people’s behavior with regard to food security. Thøgersen [11] presumes that people will perform environmentally responsible behavior when they have the necessary knowledge, resources, opportunity, and ability to act (Figure 1). With regard to motivation, TPB proposes three constructs influencing people’s behavioral intention: (1) attitude toward a behavior, (2) subjective norms, social pressure influencing their decision on engaging or not engaging in the behavior, and (3) the perceived behavioral control; the perception of the ease or difficulty of acting.

**Figure 1.** Integrated models of food security behaviors (adapted from Thøgersen [11]; Ajzen [12]; Ajzen [13]; Stern [14]).

2.3. Effective Communication Framework Analysis

An effective communication framework was analyzed and proposed based on the theory of communication by Berlo et al. [15] who highlighted, regarding communication, components of the sender, message, channel, and receiver. Implied within sender and receiver, there are factors regarding communication skills, attitudes, knowledge, social system, and culture that need to be involved for the process of communication.

2.4. Data Analysis and Interpretation

There were more than twenty news reported in Thai and more than ten news reported in English regarding cases of food banks, food exchange, and the community food pantry. Additionally, there were 11 clips on YouTube and Facebook providing details with opinions from the key informants in each case study, apart from just the news articles reporting the development of the cases. This review employed a qualitative method to analyze food security behaviors of people at the community level of the case studies. This qualitative

approach allowed the researcher to understand the meaning of people's behavior in their social context, which had a high chance of being unclear in the early stages of this study [16].

3. Food Security in Thailand and Community Involvement during the COVID-19 Pandemic

The vulnerable people of particularly poor and low-income groups were clearly affected by the COVID-19 pandemic due to having less access to food and a lack of money to obtain food for consumption. Therefore, three food security cases were explored and analyzed to understand community food security behaviors at a grassroots level. The following gives an account of the detail of these cases.

3.1. Food Bank

Non-koon village of Non Sa-ard sub-district in Khon Kaen province has survived without relying on food from outside during the serious spread of COVID-19, and instead has relied on community food mechanisms [17]. The starting point for building their own food bank inside the village originated from the village leader who encouraged community members to grow organic vegetables for their household consumption. Although the main occupation of community members was sugar cane planting, they grew their own vegetables for consumption, for which they intensively used chemical fertilizers. In order to ensure organic food and food safety, the leader persuaded his members to grow and consume their own organic vegetables in order to be healthy, with the support of the Thai Health Promotion Foundation which provided funding and vegetable seeds to almost 50 households who could select types of vegetable they wanted to grow. Therefore, every household has its own vegetables for consumption, and three or four households have continued to grow and sell vegetables to other households all year round. Moreover, a paddy rice fund was originated by the local community philosopher in 1985, with the purpose of providing rice for local consumption during times of crisis such as a drought or in difficult times. Paddy rice was collected in the rice barn from local donation, and local members can borrow rice once a year per household. After borrowing the rice for a year, the member needs to give back the paddy rice at the interest rate of one kilogram per 10 kg of borrowed rice. If they have no paddy rice to return, cash can be given instead which would be cheaper than the market price of rice at that time. Then, the paddy rice fund committee buys paddy rice to return to the fund.

3.2. Food Exchange of Rice and Fish

The impact of the COVID-19 crisis included an official lockdown declaration in Rawai sub-district, Mueang district of Phuket province and a traveling prohibition in and out of the area. The ethnic people in the Andaman coast provinces—particularly those in Phuket province—were also affected because their main income was from tourism. Many hotels had to shut down as well as the market and shops which were also closed during this period, leading to a lack of money, causing unemployment and the inability to sell fish to hotels, restaurants, markets, and food shops. Thus, the sea gypsies do not have money to buy rice, while having a lot of unsaleable fish. Only some people (50 households) of the local Lay-Rawai people group can fish in order to take care of others in the community (300 households). Some of the local Lay-Rawai people have no money saved and no literacy; most of them do not have the culture of food storage for consumption, so this situation has caused a bad impact on them.

This was similar to the way that the Pwakanyaw people in Chiang Mai were affected by the outbreak of COVID-19. They practiced their ancient ritual known as Kroh-Yhee as a symbol of restricting their community, reflecting their local wisdom of monitoring the spread of disease. At the same time, they had to extinguish a forest fire, which was very serious during April, leading to there being no time to catch fish and the inability to make a living income to buy food; dried food was necessary while the fire was being extinguished. Meanwhile, they could grow upland rice based on shifting cultivation practice for their household consumption and traditional worship rituals following their ancestral teachings.

Accordingly, there was some brainstorming to solve these difficulties among the leaders of both ethnic groups who have ever coordinated work together before this crisis. They came up with the idea of a local food exchange without spending money on buying food. The main purpose of this project did not focus on the value of exchange, but the assistance among people which would become lasting relationships. The ethnic hilltribes in the northern area of Chiang Mai, Chiang Rai, Mae Hong Son, Lampang, and Tak provinces would like to exchange their rice with the dried fish of the sea gypsies. The goal was to gather more than 1000 kg dried fish, which can be kept for a longer time, while more than 6000 kg of rice was proposed by the Pwakanyaw people in order to exchange together at the simple rate of 1 kg of dried fish for 6 kg of milled rice. The first batch of milled rice (around 3000–4000 kg) was transported to the sea gypsies, and more than 1000 kg of dried fish was sent back to the ethnic hilltribe [18]. Furthermore, the Northeast Farmers Network and Yasothon Association (from Yasothon, Amnat Charoen, and Ubon Ratchathani provinces) exchanged their jasmine rice (9000 kg) for the dried fish (1500 kg) of the sea gypsies without money. Other than rice, chilli from the Northeast and pineapples from the South (Phang-Nga province) were also shared [19]. The main organizations helping with this initiative were the Princess Maha Chakri Sirindhorn Anthropology Center (a public organization), the Northern Development Foundation, Chumchon Thai Foundation, the Community Organizations Development Institute, and the Royal Thai Air Force, and the 360 Truck company whose business is mainly concerned with delivery services.

This local products exchange among the ethnic network community is a tangible effort in the creation of a model of self-reliance, based on local wisdom, the cultural landscape, the economy under 'P2P' (people to people), and the product-to-product system which is helping people to survive during the COVID-19 outbreak. More importantly, this approach generates concern, mutual understanding and cross-cultural learning, and interactivity including the promotion of food safety with the low cost of excluding the middleman.

3.3. Food Pantry

The food pantry was initiated by the private group called "small bricks," which employed the idea of Jessica McClard of The Little Free Pantry in the US. The main concept is sharing food with and for members of the community. The group leader posted his idea on his Facebook page and asked for opinions from his friends as to whether or not this idea would be practicable in Thai society. Most of the comments collected from Facebook showed that this idea would not be so helpful during the spread of COVID-19 because some people might grab a lot of food from the community pantry. Finally, the group located four pilot community pantries in Bangkok province and one in Rayong province. Apart from sharing food, both givers and receivers had a chance to share their feelings with each other by writing in a small notebook. This notebook is a channel to communicate feelings between both partners.

After the community food pantries demonstrated their roles in the pilot areas, the group leader again posted the results on his Facebook page in order to reflect this intervention. This concept could spread quickly to other communities in every province of Thailand, while some places did not provide the notebook for sharing their feelings. The leader's Facebook page has also played its role as the center of updating the numbers and situations of other community food pantries (1400 pantries as recorded on 15 May 2020). This community pantry can sustain for a long time if the members of the community trust in its benefits.

Moving forward to the next step of this project, the group would like to generate community learning by setting the mutual agreement that the giver will also be a receiver, and a receiver will also be a giver at the same time. To explain more clearly: once the giver has put food in the pantry, the giver will be asked to take one thing from the pantry too. Conversely, when the receiver takes some food, they will be asked to put one thing back into the pantry too. The group will also assign their team members to observe and ask the feelings of the receivers who take the things they want and put one thing back in

the pantry. “How about their feeling of being a giver? And then, you know that there is another person who really needs it and finds the thing he or she needs.” By this strategy, Thai people might learn to be both givers and receivers, and then society can be balanced and community problems can be reduced [20].

The three cases represented both rural and urban contexts in Thailand. Although the case study on the food bank was raised in a rural context, it can be also applied to an urban context based on how large the space is of people’s household for homegrown vegetables. Food exchange was practiced based on geographical identity and available resources in the area. As the staple food, rice was gathered from rural and urban communities in five provinces in the northern region and three provinces in the northeastern region of Thailand to exchange with the fish of the Lay-RAWAI people.

4. Understanding Food Security Behaviors from the Perspective of Integrated Behavioral Theories

In this part, three cases of food security at a community level consisting of food bank, food exchange, and food pantry were analyzed based on MOA, TPB, and VBN theories as well as communication elements and formats as summarized in Table 2.

Table 2. Food security behaviors based on motivation–opportunity–ability (MOA), the theory of planned behavior (TPB), and value–belief–norm (VBN) theories and communication elements and formats.

Case Studies	Opinion Leaders	Supporters	Messages	Channels	Levels of Communication	Participatory Communication	Behavioral Theory Toward Food Security		
							Motivation (Value, Belief, Attitude, Subjective norm, PBC)	Opportunity (External Condition)	Ability (Knowledge and Skills)
1. Food bank (grow and consume organic vegetables, paddy rice fund)	local leader, local community philosopher	non-profit organization	-self-reliance by encouraging community members to grow and consume organic vegetables for healthy living -paddy rice fund to have rice for local consumption during the crisis	Inside community: personal media, local broadcasting tower	intra, inter, group, community communication	-Local people: participate in practice/action by attending and following the idea -Supporters: budget and vegetable seeds	Value: egoistic (self-reliance), altruistic (paddy rice fund) Belief: -trust among local community philosopher, local leader, and local people -belief in benefits of food bank Attitude: Food bank was the effective preparedness to promote food security. Subjective norm: The community influence on local people engaging in growing and consuming organic vegetables, and the paddy rice fund. PBC: The place for donating and storing the paddy rice bank.	Local people had been supported with funding and vegetable seeds to create food bank.	Local people have the knowledge and skills to grow vegetables.
2. Food exchange (exchanging of rice and fish)	local academics, coordinator of local non-governmental organizations, leader of farmer group, and local leaders	-local authorities -central authorities -non-profit organization: -private sector -media	The methods and rate of food exchange	-Inside community: personal media, local broadcasting tower -Outside community: mobile phone, social media	intra, inter, group, community and network communication	-Local people: participate in practice/action by attending and following the idea -Supporters: assist in food transportation for exchanging	Value: egoistic (the cultural practices of keeping rice for 3 purposes), altruistic (food exchange, food distribution), biospheric (exchange rate) Belief: -Rice is more important than money (Pwakanyaw people). -belief in benefits of food donation Attitude: The food exchange was helpful to promote food security based on their available knowledge, skills, and resources. Subjective norm: The family members and community influence on local people engaging in the food exchange. PBC: worry about the possibility of making dried fish, and to transporting food for exchange.	The support from other sectors to help food transportation.	Abilities to find and make dried fish for food exchange, to grow and exchange rice.

Table 2. Cont.

Case Studies	Opinion Leaders	Supporters	Messages	Channels	Levels of Communication	Participatory Communication	Behavioral Theory Toward Food Security		
							Motivation (Value, Belief, Attitude, Subjective norm, PBC)	Opportunity (External Condition)	Ability (Knowledge and Skills)
3. Food pantry (food donation)	Opinion leader (the leader of marketing private company)	-The group starting food pantries to help make them and locate them. -Others who extended the idea by placing the food pantry and those who provided food (public and private sectors, individual)	Learning to be both givers and receivers	Social media (Facebook), notebook, pantry	intra, inter, group communication	- Local people: participate in food providing and receiving. - Supporters: public and private sectors to provide the pantry and food inside.	Value: altruistic (food donation) Belief: -Giving is at the root of the culture of the Thai people. -belief in the benefits of food donation. Attitude: The food donation could enhance the chance for those who would like to gain merit, and for those who were facing food shortage to survive. Subjective norm: The family members influence on local people engaging in food donation. PBC: worry of applying the idea in practice.	The support from others who would like to follow this idea.	The food givers had enough food for sharing.

4.1. Motivation

4.1.1. Values

In the case of food bank and food pantry, the egoistic value was the fundamental one in terms of people thinking of themselves first, and then thinking of and giving to their neighbors which reflected altruistic values.

In the case of food exchange of rice and fish, rice is an important element of the Pwakanyaw people's culture. Shifting rice cultivation in the highland areas is part of their way of life, and their ancestors have embedded in their younger generations the practice of dividing their rice into three parts; (1) for household consumption (50%), (2) for their visitors, especially orphans and widows (25%) as cultural social welfare, and (3) for the ceremonies of worship (25%). These reflect all three types of value and their social norms. The Pwakanyaw people understood the importance of the food exchange project with the Lay-Rawai people very well because exchanging and sharing food with everyone giving them to access food security has already been embedded in their culture.

Both Pwakanyaw and Lay-Rawai people share some common features consisting of: (1) they are indigenous people who have lived in a community for a long time; (2) they are both members of the Network of Indigenous Peoples in Thailand (NIPT); (3) they both practice a culture of living product exchange; and (4) they are both facing difficulties during COVID-19; the Lay-Rawai people lacked the money to buy rice while the hilltribe people were fighting a forest fire, during which dried food was very important to them. Based on these common points, especially as members of Council of Indigenous Peoples in Thailand, there is an 'indigenous peoples festival' every year. During this festival, exchanging fish and rice is performed yearly as a traditional practice. Moreover, the leaders from both groups have had the chance to meet each other before. When the Pwakanyaw people heard about the difficulty of the Lay-Rawai people during the COVID-19 pandemic, they felt that their brothers and sisters/relatives were facing difficulty and they need to help the Lay relatives [21]. For those farmers in the northeastern area, there was a local saying, reflecting the local culture [22] which can be translated as, "We eat fish when going to this place, and we eat rice when visiting another place." The farmers could not wait until the Lay-Rawai people lacked rice for consumption while they were rice-growing farmers [22]. These common points of all three groups demonstrate altruistic values which was reflected by the way they think of how others could survive during the COVID-19 pandemic.

Another activity reflecting altruistic values was food distribution, such as the Lay-Rawai people using a community system to distribute rice to each group in their areas by giving the first priority to the most vulnerable people. Moreover, this food exchange was also a way to employ root culture to solve the problem, reflecting the importance of food safety in the hearts of local people. This is an example of ethnic cultural learning based on good thoughts and intentions on both sides of the exchange, where self-reliance has no need to be based on high technology. It is an environmentally friendly method providing social welfare for people and nature, which reflects their altruistic and biospheric values. The exchange rate could also reflect the values of Pwakanyaw people. It was based on a cultural economic concept in which all concerned not only assisted each other, but did not cause much disturbance to shared natural resources. This also presented their biospheric value as they also thought of the quantity to be exchanged without disturbing their surrounding natural resources too much. Their thinking and practices of this kind are intended to support a sustainable ecosystem [21].

4.1.2. Belief

In the case of food bank and for establishing the paddy rice fund, trust is the key belief between the local community philosopher, the local leader, and the local people. Local people respect their local community philosopher and local leader, leading to being trust concerning the idea of a food bank created by the philosopher and continued by the leader. Meanwhile, both the philosopher and leader trust their local people to return the rice or money after borrowing rice for consumption. The Pwakanyaw people believe that rice is

more important than money. Whenever they send rice elsewhere, the spirit of rice (or in Thai “Kwan-Khao”) still had to be with them. Sending rice is also a means of sending the goodness of life so as to satisfy hunger and stay healthy. Consequently, before sending the rice to the Lay people, a ceremony was performed to call the spirit of rice remaining with them. The belief in the leader starting a food pantry reflects the fact that giving is a root culture of the Thai people. Meanwhile, the donors believe that giving is a way of gaining merit by performing good, and they would like to help others who are poorer than them.

4.1.3. Attitude toward a Behavior

Attitudes toward food security behaviors have been developed from an awareness of the importance of food and the consequences of COVID-19, which was then linked to behavioral beliefs concerning food security behavior. In the case of food bank, all stakeholders have realized the benefits of food bank for their households and community as providing an effective preparedness to promote food security. This is also in line with the stakeholders’ attitude to the case of the food exchange which was an appropriate way to promote food security based on the available knowledge, skills, and resources surrounding them. For food donation, this could provide a chance for those who would like to gain merit by giving food to others and help the survival of those who were facing food shortages.

4.1.4. Subjective Norms

This variable is also meaningful to local people and affected their decision to grow, exchange, and donate their food. In all cases, the community influenced local people engaging in food security behaviors. For example, once the Pwakanyaw and Yasothon rice farmers heard about the difficulty of Lay-Rawai people from their local leaders and the idea to exchange rice and fish, the local people talked among themselves and then decided to participate in this activity. This was similar to the Lay-Rawai people; when they heard about the support of rice from the Pwakanyaw and Yasothon rice farmers and the idea of exchanging, they talked with their groups and decided to use their best efforts to prepare dried fish for exchanging. Moreover, family members were also key persons influencing the decision to join in with the food bank and food donation.

4.1.5. Perceived Behavioral Control (PBC)

The opinion leaders, who initiated the food bank, the food exchange, and the food pantry activities, perceived the readiness to act for food security and had confidence in the capabilities of their community members to participate in these activities. Meanwhile, local people realized that there was enough food for sharing and exchanging, and this had led people’s intention to act for food security. This is in line with the findings of Arunrat et al. [23] and Sreenonchai and Arunrat [24], indicating that PBC was the crucial factor influencing Thai farmers’ and fishermen’s adaptation to climate change, respectively. At the same time, all leaders had perceived the difficulties of performing food security behaviors especially at the beginning. The main difficulties were a place to locate the paddy rice bank for community consumption, the delivery of the food exchange, and the worry of turning the idea of the food pantry into practice. The leaders and most of the people participating in the food exchange were worried about how to transport the rice from the northern and Yasothon provinces to southern Thailand and brought the fish from the southern part back to the farmers. This was because of the long distances and heaviness of the rice. Moreover, for the Lay-Rawai people, there was the worry of making dried fish in these quantities, as they had no previous experience of producing such a large amount of dried fish. These worries were solved by their current network and by the newcomer who would like to help make this food exchange possible. Regarding the case of food pantry, there could be people who grabbed a lot of food because they did not think of sharing with others, which could result in the loss of pantry.

4.2. Ability and Opportunity

In all cases, the stakeholders had the abilities and opportunities to perform food security behaviors. The local people in the case of food bank have the knowledge and skills to grow vegetables, which came down from their ancestors and they were also trained by a non-profit organization as their supporter (the Thai Health Promotion Foundation). The Lay-Rawai people have the ability to find fish. They know where to find fish, what kind of fish can be found in that area, how many kilograms of fish they could find from that sea boundary, they have their local wisdom, they knew the sea in front of their household. They should not only receive free rice, although many people expressed their sincere desire to help, but the local Lay-Rawai coordinator thought that at the same time, the Lay people's capabilities should be enhanced as well, or they would face this serious situation for three months at least, or even longer than one year. For the Pwakanyaw people and rice farmers in Yasothon, they have grown rice as a way of life based on the topography of their areas. Additionally, there were opportunities generated by the supporters to help make food exchange possible and effective. In the case of food pantry, the food donors had enough food for sharing (food availability), and an opportunity of support from others who would also like to follow this idea.

5. An Effective Communication Framework to Strengthen Sustainable Food Security

The food security activities in this review during the COVID-19 pandemic can be extracted and proposed as an effective framework to strengthen sustainable food security by bearing in mind the following details.

5.1. Senders/Communicators

The main characteristics of local leaders or coordinators who promote practical food security are: having a determination to help and think of the benefits to their local people or people in society, a belief in the community's capacity to have a food bank, and a will to create a food exchange and online market including a strong intention to donate. In the case of communication beyond one local community, having a network and good cooperation is also important. Some outstanding characteristics of the leaders of the food exchange are now described. The leader of the Pwakanyaw people was born in the hilltribe area and has a good understanding of local ways of life. He also has the determination to encourage hilltribe people to realize their capabilities and to preserve the community forest, as well as promoting a better understanding of people other than the culture of the hilltribe people. The local Lay-Rawai coordinator is also a local member of staff of the Chumchonchai Foundation and has worked with the local people for a long time. He started to solve the urgent problem of helping the local people to have rice for consumption. He spoke to the local leader about taking care of the most vulnerable people such as bed-bound patients, elderly, and disabled people. As the leader of rice farmers in Yasothon, he is the Executive Director of Yasothon People's Association. He has a strong belief in community capacity, cooperation among the network, and guidelines for the work of network groups that would effectively help the local communities to survive during the crisis situation. "If anything, we can help our friends, we must help each other, otherwise our friends would be affected and suffer from COVID-19. We helped them so at least they could survive, even if not with full support, but it was a good starting point for better practice in the future and in the long run." This was his belief, and his initial feeling reflecting the idea of the importance of communicating with the Lay-Rawai coordinator.

5.2. Levels of Communication

Each case shared a similar starting point for communication—from intrapersonal communication demonstrating that the initial idea of food security activities came from the opinion leaders like local leaders (in the case of food bank), local academics (in the case of food exchange), local non-governmental organizations supporting local people (regarding the food exchange), and the private sector (in the case of food pantry). Group

and community communication followed among the local people before they made the decision to act for food security.

5.3. Main Message of Communication

There were two main types of messages covering: (1) the initial and common message and (2) the procedural message. The initial and common messages for communication in every case were those promoting self-reliance at the household level and the sharing of food with others so as to help everyone to survive during the COVID-19 pandemic by, for example, encouraging local people to grow and consume organic vegetables for healthy living and to contribute to the paddy rice fund in the case of food bank. A procedural message was also communicated in which the details were based on each case of how to promote food security such as the methods and rates of food exchange and learning to be both givers and receivers in the case of food pantry.

5.4. Channels of Communication

The most effective channels of communication within the local community were personal media (or face-to-face communication) followed by using local broadcasting tower to distribute information to all the people. The key person linking the idea of food exchange from the initiators with the local people was a local leader, and for some communities, a volunteer inside the village also helped the leader. Due to the lockdown and social distancing measures, communication via social media and mobile phones were the outstanding and effective channels to communicate between the groups and among the network. In the case of food pantry, apart from social media, written notebook and pantry were also used to communicate between food donors and receivers inside a community.

5.5. Two-Way Communication

Communication is an important tool to understand the lives and needs of the community network. The concept of two-way communication should be developed to investigate the most appropriate way of food sharing and ecological concern. Regarding the exchange rate of rice and fish, the leader asked for brainstorming and a small group discussion with the coordinators of rice collection and rice owners based on technological and social media such as Line, Facebook, and telephone calls. They mainly considered factors of happiness, support, and the compassion humans have for one another and for nature. This is support which is not concerned about profit and loss, but which is based on sustainable natural resource management.

5.6. Group and Networking Communication

There were many stakeholders helping to drive the effective food security of every case. Although the local people had their own capabilities of sharing their food, rice, and fish, fresh fish was difficult to share because of the large distance between northern and southern Thailand. The supporters from the local and central authorities, non-profit organizations, the private sector, and the media were able to help make the food exchange possible. In addition, the group starting the food pantry who helped making the pantries and locating them, including those who extended the idea by placing the food pantry and those who provided food in the pantry could be the supporters.

An effective communication framework is proposed as shown in Figure 2 in order to strengthen sustainable food security during the COVID-19 pandemic and in the time of crisis.

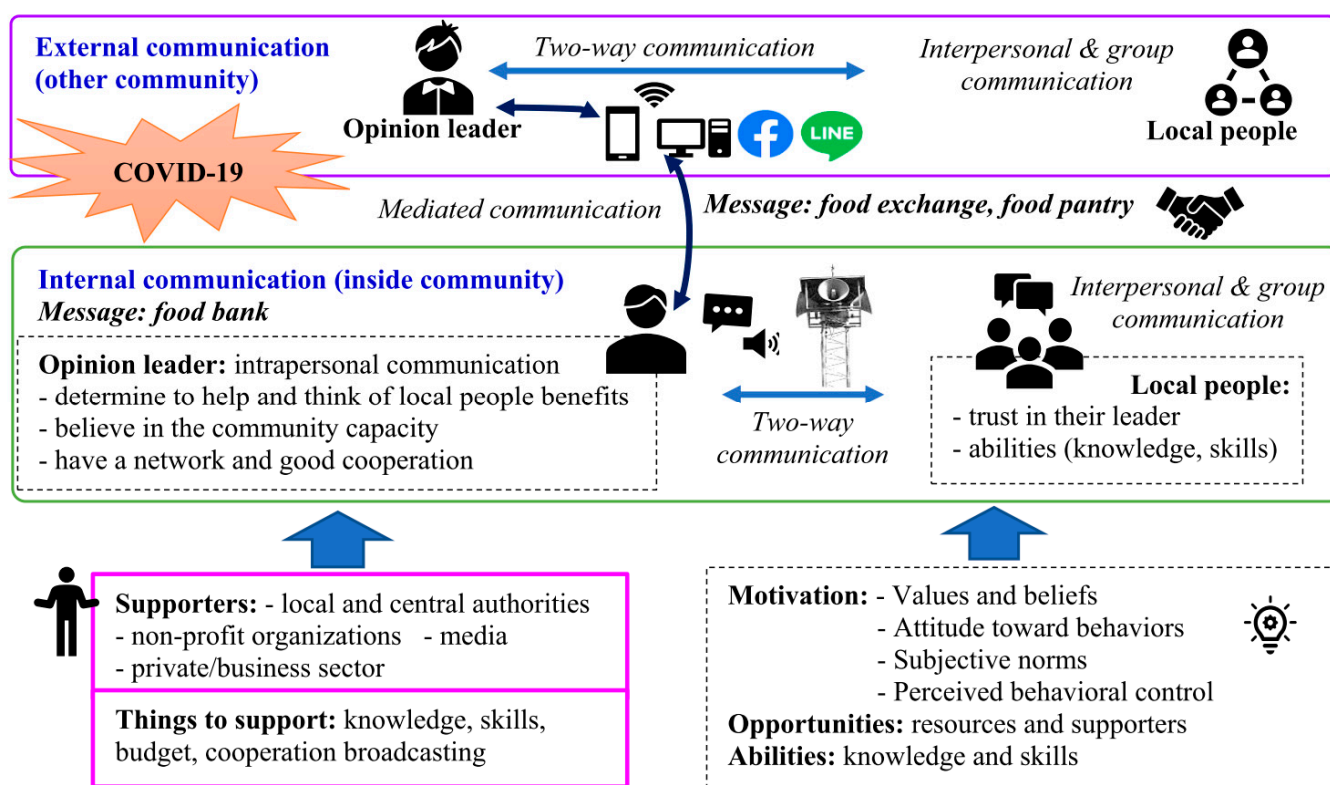


Figure 2. Effective communication framework to strengthen sustainable food security during the COVID-19 pandemic and in the time of crisis.

6. Conclusions and Recommendations

The spread of COVID-19 has impacted people all around the world in many ways including the people of Thailand and their food security. The systematic review and data collection of three obvious cases, namely that of the food bank, the food exchange, and the food pantry were highlighted to promote food security at a community level and to understand people's behaviors. Integrated behavioral theories of MOA, TPB, and VBN were employed to analyze people's behaviors regarding food security. Altruistic, followed by egoistic, and biospheric values, including beliefs in opinion leaders and the benefits of food security behaviors could activate people's motivation to perform food security behaviors. The following motivations led people's intentions to act for food security: the attitude toward food as a crucial element for living particularly for poor or low-income people who had less chances of accessing food without money to buy it during the crisis, the influence of family members and neighborhoods, and perception of having enough food for sharing and exchanging. Moreover, people's abilities due to having knowledge and skills, as well as resources and support could be the opportunity to drive food security behaviors.

In aspects of communication, in each case, opinion leaders shared similar qualifications of having a determination to help and think of the benefits for local people, and a belief in the community's capacity. Moreover, having a network and good cooperation were important in the case of food exchange between two communities. The intrapersonal communication of opinion leaders and local people were a crucial initial stage, leading to their understanding of other difficulties and food security behaviors. The main messages of self-reliance by planting vegetables or storing food and procedural knowledge such as processes of the food bank, the food exchange, and the food pantry were communicated among the leaders and community members. Channels of communication were highlighted such as personal media, local broadcasting tower, social media, and mobile phone. Two-way and networking communication were also meaningful to promote sustainable food security during the crisis.

The analysis of behavioral theory regarding food security leads us to understand what the motivations, opportunities, and abilities were of local people with regard to the food bank, the food exchange, and the food pantry. Once we understand the drivers of people's motivation, (positive value, belief, attitude, subjective norm, and perceived behavioral control (PBC), as well as their opportunities and abilities (knowledge and skills), related partners can plan to support or strengthen these drivers. On the contrary, if we understand any barriers from this behavioral analysis, we should try to decrease them by networking communication and requesting outside support. For example, the negative PBC of worrying about the possibility of making dried fish and transporting it for food exchange, and the concern regarding turning the idea of the food pantry into practice, could be unraveled by support from the community's network and other interested people.

Effective food security management should be decentralized so that local people can design their own styles and ways of problem solving, with support from the local and central authorities and other related organizations. Moreover, procedural knowledge to achieve food security should be promoted via local, social, and mass media to encourage and ensure people's self-efficacy and self-confidence to learn about and act for food security. Other methods of promoting food security behavior—like mobile food shops, food delivery services, and e-markets—should be researched to understand people's behaviors to cope with the crisis situation.

Supplementary Materials: The following are available online at <https://www.mdpi.com/2073-4395/11/3/497/s1>, List of video clips for news content analysis.

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