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# FOOD SECURITY POLICY RESPONSES TO COVID-19 IN WUHAN AND NANJING, CHINA

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## Abstract

After decades of famine and thousands of deaths caused by food shortages and starvation, China was able to achieve food security for the majority of its population through ensuring food availability. Despite this, during COVID-19, the government needed to heighten their responses to ensure food security and faced several challenges in doing so. This paper analyzes Chinese policies around food security during COVID-19 in two cities: Wuhan and Nanjing. The United Nations Food and Agriculture Organization's definition of food security and the four pillars it identifies (availability, access, utilization, and stability) are used to provide a framework for this analysis. The study employs a policy analysis based on an inventory of over 400 documents varying from government policies to local blog posts. Aspects of food security in this analysis include agricultural production, transportation of food, stabilization of food prices, and the use of contactless methods in purchasing foods. Overall, the policies consistently emphasized the importance of collaboration across different levels of government. However, a major gap identified was the lack of focus policy responses on food access at a household level and food utilization. Key recommendations for future policy responses around food security include: ensuring consistency throughout all levels of government, strengthening existing set-ups such as national food reserves to leverage emergency responses, addressing the root causes of food insecurity by focusing on access at the household level, and promoting the importance of food utilization.

## Keywords

food policy, urban food security, food access, online food ordering, COVID-19

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This is the 45th discussion paper in a series published by the Hungry Cities Partnership (HCP), an international research project examining food security and inclusive growth in cities in the Global South. The five-year collaborative project aims to understand how cities in the Global South will manage the food security challenges arising from rapid urbanization and the transformation of urban food systems. The Partnership is funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) and the International Development Research Centre (IDRC) through the International Partnerships for Sustainable Societies (IPaSS) Program. The research for this paper was undertaken by the HCP COVID-19 and Food Security Project with funding from the Canadian NFRF Coronavirus Rapid Research Fund and SSHRC.



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## Introduction

During COVID-19, food security has become an area of concern due to the importance of daily food access. While there has been much research highlighting the drivers of food insecurity globally, there is little research to date focusing specifically on the impact of the pandemic on food security generally and even less on China. Similarly, while there is some research on urban food policies in China (Zhong et al 2019), there is an urgent need for more research on how the pandemic interacted with this pre-existing policy environment and how urban food policies responded to the challenge of COVID-19 and the decision to impose strict controls on human mobility to, from and within many Chinese cities (Zhong et al 2020). While research on the pandemic in China is beginning to emerge, this is the first to analyze food security policies in China during COVID-19 using the FAO's four pillars of food security as a framework (availability, access, utilization, and stability).

As one of the world's most populated countries, China has always strived to ensure food security through ensuring grain supply and food availability (Zhong et al 2019). After decades of famine and thousands of deaths caused by food shortages and starvation, China was able to achieve food security for the majority of its population through raising production and ensuring food availability for rapidly-urbanizing population (Zhou 2015). During COVID-19, however, the government needed to heighten its responses to the prospect of widespread food insecurity and faced several challenges in doing so. This paper focuses on food security in China during the early months of COVID-19 in the cities of Wuhan and Nanjing. Wuhan, of course, was the original epicentre of this pandemic while Nanjing, which lies 400km to the east, was affected. The purpose of the paper is to analyze the effectiveness of both national and local policies around food security as a response to COVID-19 after the city of Wuhan issued a lockdown on January 23rd.

The key policy areas discussed here include agricultural production, transportation, stabilization

of food prices, and the use of contactless methods in purchasing foods. These all emerged as key modalities during the pandemic. Most policies also involved the coordination of multiple government departments including the Department of Agriculture and Rural Affairs, the Department of Commerce, and the Department of Transportation. The paper also discusses the strengths and limitations of these policies in order to inform future responses to ensure food security during such emergency situations. It is organized into five main sections. The next section discusses the importance of agricultural production in improving food availability. In section two, we analyze the role of transportation in ensuring food availability. Section three discusses the use of online purchasing methods for contactless delivery. Section four focuses on market monitoring to ensure affordability and access. The last section concludes with an analysis of the strengths and weaknesses of the overall response and identifies opportunities for further research.

## Food Security and COVID-19

The FAO has proposed four pillars of food security as a framework for defining and analyzing food security (FAO 2008). The first pillar, availability, refers to the available supply of food often determined by food production. Availability focuses on food supply chains and whether or not they make sufficient food physically available to the household. Accessibility concerns the ability of the individual to actually access food where physical and economic barriers (such as high food prices, low wages and lack of transportation) cause food insecurity despite a sufficient supply. Utilization emphasizes the importance of having the skills, ability, and resources to properly prepare nutritious foods and the overall utilization of food on a personal level. Lastly, the pillar of stability highlights that food security is only ensured if an individual has access to food on a regular basis and does not become food insecure due to external shocks such as adverse weather or unemployment.

In the absence of a unified global response, policies to control COVID-19 and mitigate food insecurity have varied from country to country (Capano et al 2020, Hale et al 2020). Global food supply chains were quickly designated “essential” and efforts were made to ensure that they did not break. At the same time, the FAO and IFPRI estimate that the world could lose more 451 million jobs or 35% of formal employment in the food sector (Torero 2020). While some countries provided direct financial subsidies, such as Canada’s Emergency Response Benefit, other governments focused on ensuring food availability and price stability by monitoring markets (Holland 2020). Additionally, some governments have implemented specific food security programmes while others have relied mainly on non-governmental organizations to develop initiatives supporting food security for those in need (Crush and Si 2020, Dafuleya 2020, Fruman and Zhang 2020). In addition, countries like South Africa quickly reversed their initial response by re-opening the informal food sector almost immediately (Battersby 2020, Wegerif 2020). The many and varied policy responses to improving food security during the pandemic across the globe means that there is lack of formal analysis on the actual effectiveness of policies.

In a review of the resilience of food systems during COVID-19 in low and middle income countries, Béné (2020) noted that most of the information available at the time of writing (May-June 2020) derives from grey literature. In this literature, food security has been discussed mostly in government or organizational reports. The International Panel of Experts on Sustainable Food Systems (IPES FOOD 2020) released a report in April analyzing how COVID-19 has disrupted different parts of the food system and negatively impacted those who are most vulnerable. The report also provided recommendations such as protecting the most vulnerable, building resilient food systems, and rebalancing economic power for the public good. In addition, the FAO has published reports focusing on the different aspects of food security affected by COVID-19, such as its effect on fisheries and aquaculture, its contribution to food waste, and its impacts in specific countries (FAO 2020a, FAO

2020b, FAO 2020d). In June this year, the United Nations (2020) published a policy brief providing a general overview of how the pandemic has affected food security globally. Recommendations such as supporting vulnerable populations and investing in a sustainable and resilient food system, were also made to ensure food security remains a global priority post-pandemic.

Food insecurity is widely associated with a lack of income and poverty, often having a disproportionate impact on vulnerable populations (Béné 2020). Several studies prior to COVID-19 underscored the importance of considering vulnerable populations during discussions around food security. One study on urban food security in Nanjing, China, for example, highlighted the significance of poverty reduction efforts in improving access to food (Zhong et al 2019). Yu et al (2015) also point out that extreme poverty in India and some parts of China is the main reason these countries struggle with achieving complete food security. During emergencies, when many people struggle to maintain a stable income, the proportion of the population that is food insecure rises. According to a report by the Committee on World Food Security, the World Food Programme estimates that an additional 130 million people will experience acute hunger as a result of the COVID-19 pandemic (Committee on World Food Security 2020). These impacts are not confined to the Global South. In a national survey of low-income adults in the US during the pandemic, for example, Wolfson and Leung (2020) found that 44% of respondents were food insecure with less than one in five able to meet the public health recommendation of purchasing two weeks worth of food at a time. Béné (2020) concludes that the pandemic has mainly impacted individual mobility due to lockdowns, resulting in loss of income and increased food insecurity, especially for the poor.

The pre-existing evidence that the effects of food insecurity are heightened by poverty means that this relationship should be a major focus of COVID-19 research on the effectiveness of policies and initiatives that support vulnerable populations. Another research area that needs addressing in the

context of COVID-19 is food access. Although food availability is an important aspect of ensuring food security during emergency situations, a sufficient supply is often ineffective in improving access in isolation (Zhong et al 2019). In China, Zhou (2010) concluded that despite food availability at a national level, not everyone is able to access sufficient food. However, much of the existing research on food security focuses on initiatives to raise food production at the national level. This tendency is likely to be reproduced in COVID-19 pandemic analysis. Analyzing Canada's food security response to COVID-19 Holland (2020), for example, mainly makes recommendations around supporting farmers, agricultural production, and trade. Another study discusses how governments can ensure food availability through national reserves, but leaves out the importance of stabilizing food prices and ensuring access (Galanakis 2020). While food supply at the national level is crucial, food security can only be established if accessibility and affordability is ensured at the household and individual level (Si et al 2018). This paper emphasizes the importance of a multi-scalar approach to food security that incorporates policy responses at both the national and local levels.

This paper also addresses the importance of food utilization during COVID-19. While the lack of discussion around food utilization may be due to the urgency of COVID-19 and the focus on making food available, the utilization of food should not be excluded from discussions around food security. Food utilization includes important aspects of food security such as equipping individuals with the proper knowledge to ensure adequate amounts of nutrient intake when fresh foods may become limited and ensuring food quality is prioritized throughout food systems. Food utilization also includes improving food skills, raising awareness of food safety in the population, and ensuring the quality of food throughout its production. Galanakis (2020) does discuss the importance of handling meat to avoid cross-contamination and the further spread of COVID-19, but there are few studies of utilization to date. Some government websites and news sources have released guidelines around food

safety although they are mainly directed at the food services sector rather than individuals and personal hygiene. For example, the FDA (2020) released best practices for restaurants and food delivery services during the pandemic, but did not provide any information on how the general public should be handling their food. News articles on how to stay safe when handling groceries were initially prominent, especially in the US, although some public health officials later deemed these practices unnecessary (CNN 2020).

## Methodology

This paper is based on an inventory of policy documents collected in March and April 2020. A thorough search of Chinese websites, news reports, and blog posts was conducted and a total of 441 documents were located, all in Chinese. Documents were selected if they captured important policies implemented during the peak of the pandemic (in mid to late February). The inventory was organized into two main sections: one for policies in Wuhan city, Hubei province, and the other for Nanjing city, Jiangsu province. The city of Wuhan was selected due to its being the epicentre of the outbreak and where unique and extreme policy measures in ensuring food security were implemented. Since the Hungry Cities Partnership (HCP) has ongoing work in the city of Nanjing, it was selected to provide a contrast with Wuhan. The folders of each city in the inventory also included a subfolder for national level policies released by the central government. To analyze the data, an Excel spreadsheet was created to highlight the main points of each document. The findings were generated and organized based on the frequency of discussion of certain themes in the documents analyzed, including agricultural production, transportation of foods, online purchasing methods, and price stabilization. The inventory may not be exhaustive or representative of all policies that may have been in place during this time period.



## Food Security in China Before and During COVID-19

In the early 1980s, with decollectivization and the Household Responsibility System, household-based farming was permitted and collectives were disbanded in China (Huang 2016). Farmers were granted more autonomy, and previous controls – such as the grain procurement quotas – were lifted. This freedom was an incentive to many farmers and resulted in an overall increase in grain output. The government continued to make modifications to policies in the 1990s, and previous ineffective policies around grain sales were abolished. By 1998, grain was widely available in the markets of most urban areas and prices were stabilized (Zhou 2015).

China has always strived to be self-sufficient in providing food for its population by setting goals such as aiming to be 95% self-sufficient in grain production by 2030 (Mukhopadhyay et al 2018). China's national food supply has become abundant with improved food availability and increased consumption. According to Zhou (2015), national surveys conducted by the Ministry of Health in the 2000s found adequate nutritional intake across the country and abundant grain reserves and supply. However, areas of concern remain. They include food utilization such as the safe handling of food, and food access for vulnerable populations. Despite the sufficient food supply nationally, food access on a household level continues to be a challenge, especially for vulnerable populations (Zhou 2015). The quality of food has also become a major area of concern among Chinese consumers due to the common overuse of pesticides in farming and the addition of harmful chemicals during food processing (Si et al 2018). In 2012–2013, an online survey found that 96% of Chinese consumers were concerned about the quality and safety of foods (Zhou 2015).

Vulnerable populations in China mainly refer to those living in low-income households and individuals with disabilities or other health concerns. In Wuhan and Nanjing, older adults or any individuals with mobility issues were also considered a part

of the vulnerable population due to their inability to access basic needs. Efforts to support vulnerable populations such as the social welfare program, Dibao (minimum livelihood guarantee), were put in place to improve the quality of life and provide financial support (Zhang 2011). Dibao was established in 1999 and provided cash subsidies to the poor living in urban areas. In addition, the Social Assistance Regulation was put in place to provide further cash subsidies to low-income populations, individuals with specific health concerns, and those with particular education or housing needs (Gao et al 2018). Policies supporting vulnerable populations have led to reduced rates of absolute poverty, but inequalities persist and there continues to be a growing gap between the rich and poor (Zhou 2015).

Throughout the period from January to April 2020, food security policies in response to COVID-19 varied between Wuhan and Nanjing, mostly due to the difference in severity of the pandemic and response in each city. Wuhan adopted more extreme measures while Nanjing implemented similar, yet less strict, policies. Figure 1 compares the responses of each city and displays the policies in a linear visual. Wuhan was the epicentre of the outbreak and considered a high-risk area, and a lockdown of the city was enforced on January 23rd. On the other hand, the province of Jiangsu, where Nanjing is located, issued a notice encouraging individuals to stay at home on February 2nd. Additionally, in Wuhan wet markets were closed starting on January 30th while the majority of wet markets in Nanjing stayed open throughout the four months. In both Wuhan and Nanjing, the closed management of residential neighbourhoods was enforced, on February 14th and February 4th respectively. The closed management of neighbourhoods included leaving only one point of access open to the residential complex. One member from each household was given permission to leave their complex every three days to obtain groceries and other necessities. Food and delivery services were also not permitted to enter the complex. The staff of residential complexes were called to monitor the entry point that was accessible to ensure no one was entering or leaving for non-essential purposes.

Beginning on March 1st, non-essential businesses in Nanjing were given permission to slowly re-open following safety protocols and Wuhan followed shortly on March 10th.

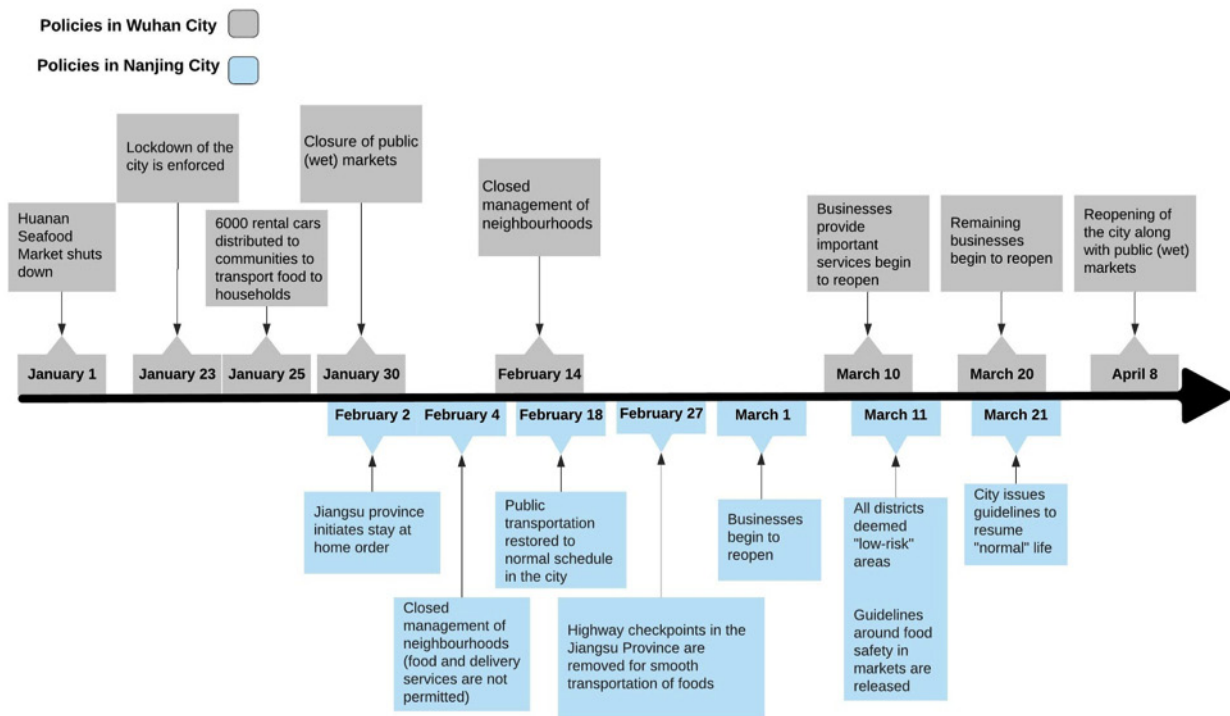
## Policies to Address Food Production Challenges

Consistent with the first food security pillar, many of the policies analyzed for this paper focused on agricultural production and the importance of ensuring a sufficient supply of food. Typically, near the end of February and beginning of March, most farmers in China begin preparations for growing crops for the spring growing season. However, due to the pandemic there was a delay in several aspects of agricultural production. A large number of companies were not resuming regular production, it was difficult to access resources such as pesticides and fertilizers, and transportation to farms was often blocked (Daily Economic News 2020).

Despite this, the central government of China urged farmers to boost food output while ensuring they were being cautious about preventing the spread of disease. The government called on farmers to continue to take advantage of the spring farming season and grow more than previous years in order to have a surplus to boost the stocks of food. Additionally, the government pushed for farmers to reclaim abandoned farmland and use innovative technology to increase the spring harvest (Xiao et al 2019).

In 2019, the culling of animals during the African Swine Fever outbreak, closure of small livestock farms in an attempt to reduce environmental pollution, and government efforts to standardize livestock farms, meant that the number of hogs slaughtered for food decreased by 20% and pork prices rose at least 40% compared to previous years (Bloomberg News 2020, Global Meat News 2016, Sohu News 2019). To increase the pork supply during the pandemic, the central government outlined measures on March 10th such as providing more land to private hog-breeding enterprises and subsidies for these businesses to invest in modern technology.

**FIGURE 1: Timeline of Key Food Security Policies in Wuhan and Nanjing During COVID-19**



Source: Authors' compilation, drawing from Wuhan Municipal Government website, Nanjing Municipal Government website, and Zhong et al (2020).

In Wuhan, the Agricultural and Rural Affairs Bureau released guidelines for farmers to continue to produce crops while preventing the spread of COVID-19. These measures included wearing masks and gloves while handling crops and keeping a safe distance from other workers. Despite the city being the epicentre of the COVID-19 outbreak, and the province being a high risk area, the government encouraged farmers to continue spring farming to prevent a shortage of food and released a guide on the “Current Spring Farming Production Work” (Chinese Government Network 2020d). The guide included recommendations for arranging crops and plots of land for maximum efficiency and preparedness for natural disasters and pest infestations. In addition, livestock farms with large economic losses were granted relaxed loan guarantees and extended loan repayment deadlines. Hog producing farms qualified for subsidized interest rates on their household loans. The Ministry of Agriculture and Rural Affairs also created an online service to ask for assistance for those experiencing technical difficulties with farming machinery.

In Nanjing, the municipal government carried out the central government’s orders by forming an initiative called “Online and Offline Services” for farmers (FAO 2020c). The online services included guidance around maintenance and repairs for agricultural machinery and pest control. In the Jiangning district in Nanjing on February 19th, farmers were encouraged to stay connected with agricultural experts and machinery technicians through WeChat groups using their mobile phones. These experts were available on a daily basis to provide assistance online. In addition, the Nanjing Agriculture and Rural Affairs Bureau developed the Nanjing Smart Agriculture Supervision App on February 24. This was another innovative method to provide farmers with advice and ensure they could seek assistance in multiple areas using one platform. These areas included guidance around pest control and how to prepare for significant weather changes. Offline services included in-person training in which technical experts would visit farmers and address their needs.

Despite these support measures to increase crop cultivation and reduce food insecurity, farmers faced many challenges that resulted in declining profits. For example, certain crops were difficult to sell due to the lack of demand from restaurants. As well, there was a shortage of workers to harvest crops, and transportation barriers. Products with a short shelf life such as strawberries and leafy vegetables started going to waste and needed to be sold at lower prices while individuals living in cities simultaneously had to pay higher prices to purchase foods with limited options and availability (NetEase News 2020). One farmer in Nanjing explained that these new prices were not bringing enough income to cover the cost of maintaining their land, feeding and taking care of livestock, and hiring workers (NetEase News 2020). The media heard about the unsellable products in the Pukou District of Nanjing and notified the district’s agricultural department. In response, the district called on e-commerce companies to partner with local farmers to increase sales. WeChat groups were used to promote local produce and reach more community members. Farmers were also connected with larger supermarkets and government-run canteens.

Another method to encourage farmers to cultivate more land and grow more crops than in previous years was through financial subsidies and incentives. Banks were given instructions to provide newly formed agricultural businesses with working capital loans, and financial guarantees of under 10 million yuan (1.4 million USD)<sup>1</sup> per farming household (FAO 2020c). Financial guarantees involved a guarantor who took responsibility for the borrower in case of default. Guarantors are usually a family member or someone trustworthy.

## Challenges in Transportation of Food

In order to distribute food around the country, China relies on long distance transportation and the use of highways. Most highways are maintained by private companies and require tolls (Jia and Tian



2002). which often require tolls. Additionally, due to the large climatic range in the country, certain areas are major producers of specific produce. For example, the province of Shandong produces a large proportion of the country's fruit and vegetables. During the outbreak, the transportation of foods became even more important and highway tolls were a major barrier to the efficient transportation of food. To overcome this challenge, the Ministry of Transportation waived highway fees nationwide and gave priority to vehicles transporting supplies for epidemic prevention and control from February 17th until May 6th . The central government also asked provinces to set up 'green channels' for eight essential products (cooking oil, eggs, flour, vegetables, meat, milk, rice, and convenience foods). Green channels ensured a smooth process of transportation, from farm to shelf, by allowing vehicles to by-pass toll stations or COVID-19 checkpoints by showing a provincially issued pass. With this pass, vehicles could avoid fees and unnecessary delays caused by inspections or stops. These passes allowed vehicles to enter areas under lockdown without further question.

Wuhan, located next to the Yangtze River, is known as a transport hub, acting as a passageway to other major cities such as Beijing, Shanghai, and Guangzhou for centuries. However, the lockdown of the city meant that most roads were blocked and alternative modes of transportation were shut down. On February 22nd , the province of Hubei announced the implementation of five new green channels leading into the city of Wuhan to facilitate the efficient transport of essential supplies such as food. However, unlike in the city of Nanjing, the province of Hubei did not implement green channels for agricultural production materials early on which led to a lack of pesticides, fertilizers, and seeds greatly affecting the spring harvest in the province (Hubei Province 2020).

In Nanjing, on February 17th , the municipal government released new measures to ensure the production and supply of vegetable basket products (which refers to the non-grain supply of the vegetable basket and rice bag programs) (Zhong et al

2020). One measure was to establish a green channel for vehicles to transport agricultural products and agricultural production materials including pesticides, seedlings, and agricultural machinery. These vehicles were also eligible to apply for a pass which allowed them to travel locally free of tolls (including their return trip with the empty vehicle).

In accordance with the central government's national notices, several provinces were ready to send fresh produce to Wuhan city to increase availability and green channels were necessary for the smooth delivery of donations. Shouguang city in Shandong province, for example, arranged to donate 350 tons of vegetables, while 2,000 tons of frozen pork in the government's central reserve were released to Wuhan. An additional 10,000 tons of fruits and vegetables in Jiangsu, Zhejiang and Shanghai were prepared as a backup in the event of low supply.

While the utilization of green channels allowed for smooth transportation between provinces and cities, issues began to arise around the transportation and distribution of foods within cities. One of these issues was the "last mile problem" where vehicles transported produce to a designated drop off area within Wuhan, yet food still needed to be transported to community storage facilities or supermarkets. Due to the lack of trucks within the city, food would often sit in an area for days before it was brought into the neighbourhood. To solve this issue, Hubei province invested in 800 buses and other large vehicles to transport produce to neighbourhoods around the city. Once the produce reached the neighbourhoods, it was once again left in a storage unit and not distributed to each household. This was the "last 100 metres problem" as the produce was only a short distance away yet there was a lack of community workers to organize and distribute it. Each community was encouraged to unite their efforts and form a team of community workers, volunteers, and neighbourhood committee employees to receive and distribute produce to households. Despite this, local efforts had mixed success in allowing the produce to cover the last 100 metres.

## Improving Access and Affordability

Early on in the outbreak, the central government of China announced the importance of regulating the price of necessities to ensure affordability and promote food security. On January 31st, the central government outlined regulations to enforce stricter and more severe penalties for illegal increases in prices (NDRC 2020). A hotline was set up for the general public which they were encouraged to use to report any price spikes. The strict monitoring of prices aligns with the “access” dimension of food security as it recognized that households faced barriers when accessing food despite its availability. The central government also encouraged provinces to monitor the supply of foods in order to prevent a sudden shortage of products. Supermarkets nationwide were urged to be aware of products that were low in stock and to monitor the situation and respond accordingly, avoiding any delays. During a press conference on February 25th, the central government explained that despite efforts to stabilize them, prices did indeed rise (Chinese Government Network 2020c). However, in response, they quickly carried out a “Three Guarantees” policy by monitoring the price of 11 specific products in 40 cities, reminding businesses of the penalties that come with illegal price increases, and contacting corporations through video conference to ensure compliance with regulations. Of the corporations reached out to, 150 agreed that they would comply with the regulation and stabilize their prices (Chinese Government Network 2020c).

In Hubei on January 22nd, the provincial market supervision bureau issued a regulation reminding businesses of the requirement to follow the central government’s direction of implementing fair and stable prices (State Council Information Office 2020). On the morning of January 23rd, the bureau dispatched 13 inspection teams to several districts in Wuhan to conduct price checks on markets and supermarkets. The inspections ensured regulations were followed and concluded that prices were stable all across the city. After the lockdown of Wuhan,

the state council held a press conference urging Wuhan to guarantee the supply of necessities such as vegetables, meat, grains, and oil in three aspects: real time monitoring, unloading and distributing foods, coordinating transportation (Chinese Government Network 2020b). Real-time monitoring called for a daily monitoring and reporting system to stabilize prices and to discover lack of supply early on to act on it in time.

In Nanjing, the Municipal Department of Commerce launched a daily reporting system on January 29th that required supermarkets to keep up with market conditions and restock any products that were in high demand. The data collected from daily reports was sent to each district’s department of commerce and used to monitor unusual price fluctuations. To ensure availability, the Nanjing Agricultural and Logistics Co. Ltd signed a contract with a vegetable supply base 250 kilometres away and arranged for 10,000 tons of produce on-site as back-up supply which included over 20 types of vegetables and 3,200 tons of items requiring cool storage areas such as potatoes, yams, onions, cabbage, and radishes. In the district of Yuhuatai in Nanjing, three markets re-opened during the spring festival to allow local residents to purchase vegetables for their celebrations (People’s Government 2020). These markets created teams to monitor sections of the market. On January 20th, the teams reported that they found no abnormal fluctuations in prices, and supply was plentiful. However, in practice, the experiences at the household level may have differed.

Additional policies to increase access to food were mainly targeted at vulnerable groups who needed extra support. One of the major policies implemented involved subsidized produce that came in the form of packages which were known as *ai xin cai* (directly translated as love vegetables), vegetables sold at low prices such as 10 jin (around 500 grams) for 10 yuan (1.41 USD) (Hubei TV 2020). These packages were ordered by employees of neighbourhood committees after ensuring the households were eligible. Suppliers then packed and delivered them within the same day to ensure the freshness of foods. In Wuhan, the suppliers of *ai xin cai* were

receiving an average of 50 to 300 orders from each neighbourhood daily and the number went as high as 3,000 orders per day at times. On March 3rd, Wuhan announced that it would increase the total amount of available *ai xin cai* allowing for up to 200,000 orders per day focusing on the needs of low- and middle-income groups (Hubei TV 2020). The increase in volume was possible because the number of supermarkets involved grew from the original five to 12.

The recruitment of community volunteers was also a key factor. These volunteers were mainly youth or young adults although those between the ages 18 and 40 were qualified to apply (Hubei TV 2020). They had to be in good health with no respiratory illnesses in the previous month, living in Wuhan (in close proximity to a participating supermarket), and flexible with their time to make it to their assigned shifts. Once these requirements were met, volunteers who were selected were notified through WeChat and provided with the necessary protective equipment and training. In total, over 1,000 volunteers were recruited and provided with a certificate recognizing their community service (Hubei TV 2020). Furthermore, in the Caidian District in Wuhan, the department of finance allocated funds to certain neighbourhoods in order to meet the basic monthly living needs of residents in extreme need and provided reimbursements for the provision of grain, oil, and vegetables in some cases (Caidian District People's Government of Wuhan 2020).

Despite the efforts to increase food access and support vulnerable groups, many of these policies had limitations when implemented. In terms of price stabilization, several reports found prices were inconsistent even after the implementation of controls. While some government documents report that prices were constantly monitored through inspections and found to be stable, some news sources and other government reports state that prices spiked especially during the peak of the pandemic (mid to late February, coinciding with the period where it was most difficult to purchase food). During a press conference on February 8th, government officials mentioned that the prices of

vegetables had increased up to seven times what they had been in previous years (Chinese Government Network 2020a).

These inconsistencies make it difficult to know the extent to which price stabilization policies were effective. Regardless, some companies were still illegally raising their prices which caused panic buying and unnecessary fear in the population potentially leading to an overall shortage of food (Hubei News, 2020). Additionally, the policies to support vulnerable groups often only benefited a proportion of the population while those living in extreme poverty were excluded due to their rural location or disconnect to the community. Furthermore, the large quantity of donated produce and *ai xin cai* called for many helping hands to package, label, and distribute. A shortage of volunteers and employees of neighbourhood committees was yet another barrier since most community volunteers during this time were selected by the government and received wages. Aside from the *ai xin cai* program that the 1,000 volunteers in Wuhan were recruited for, regular community members were not encouraged to take part in the distribution of produce.

## Online Food Ordering and Group Buying

To reduce the spread of COVID-19 and increase access to foods, the central government issued notices reminding citizens to utilize technology for contactless methods to obtain groceries and foods. Since Chinese citizens had begun to integrate digital technology into many aspects of their lives prior to the pandemic, the system and required technology were already in place and ready to be used (Deloitte 2018). While these platforms were not government owned, the government encouraged e-commerce companies to promote their services to attract consumers' attention (Jiangsu Provincial People's Government 2020). In Jiangsu, one online platform shared that they had over 4,000 kinds of goods available with fair prices that were comparable to

prices before the Spring Festival. The platform also launched a series of daily “special prices” to ensure affordability (e.g. 500g of broccoli for 6.50 yuan, equivalent to 0.92 USD) (People’s Daily 2020). They also prided themselves on making timely deliveries as they began delivering daily from 4 am until 5 pm with each delivery driver completing 900 orders a day on average (People’s Daily 2020). These drivers were able to make a large number of deliveries each day due to the concentration of households within a complex. Additionally, storage units were built in some neighbourhoods to ensure the delivery process was smooth and contactless. After an order was placed, the consumer would receive a unique QR code which would be used to retrieve their items from the neighbourhood storage unit (People’s Daily 2020). These storage units also had refrigerated areas which allowed for foods to be kept fresh for longer periods of time.

Many individuals chose to order ready-made foods as dining out at a restaurant was not longer an option during the pandemic. Although there was a well-developed system in place, the timeliness of food delivery was impacted by COVID-19. There was a longer wait time for consumers to receive their orders due to a shortage of delivery drivers since many were migrant workers who had returned to their hometowns before the Spring Festival holiday. With new travel restrictions imposed, these workers could no longer return to the city for work leaving most delivery companies with a shortage of drivers. To compensate, delivery companies arranged for drivers to make multiple deliveries in one trip and try and ensure consumers could still experience quick and reliable service without unnecessary delays. Platforms delivering ready-to-eat foods also used promotions and coupons to promote their services while charging little to no delivery fee or surcharges. This made the cost of ordering food for delivery often lower than dining out in a restaurant prior to the pandemic.

Delivery companies invited consumers to sign up for their membership clubs for a small fee to receive even better deals; those with an existing membership were incentivized to choose this option during the pandemic. During the time of isolation and

quarantine, food delivery companies received an influx of orders compared to previous periods. One of the most popular food delivery platforms, “Ele.me,” owned by online delivery giant Alibaba, stated that during the lockdown period (after January 23rd) they delivered 600% more frozen food and 181% more fresh food compared to previous years (The Star 2020).

With the increased uptake in purchasing food online during the pandemic, including the use of e-commerce platforms, group buying, and ready-made food delivery, food access was greatly improved. JD.com, a large e-commerce company, said that it sold about 220 million items between January 20th and February 28th. Of these, the majority were grain and dairy products although orders for chicken and beef tripled and quadrupled respectively compared to the previous year (The Star 2020). An e-commerce platform, Meituan Dianping, reported a 400% growth in sales in February compared to 2019; the most popular items included face masks, tangerines, potatoes, and pre-cut fruits (The Star 2020). Because the pandemic led to increased uptake in online purchasing, more consumers were forced to rely on and put their trust in e-commerce platforms. In addition, those from new demographics who had not previously been exposed to online buying became familiar with the process. The platforms proved to be successful as they gained in popularity and also built new and stronger connections with farmers and suppliers.

The prices of foods sold on e-commerce platforms were also monitored by the Wuhan Municipal Market Supervision Administration of Hubei Province to ensure fair prices and follow the instructions of the central government. One e-commerce company in Wuhan took advantage of the pandemic to increase profits in Wuhan by selling vegetables for over double the average price of items in stores (Table 1) (Hubei News 2020). This caused consumers to panic and question whether there was a shortage of supply. After the company refused to make changes to their prices, they were fined three million yuan (about USD423,525) (Hubei News 2020).



**TABLE 1: Price Comparison of Market and E-Commerce Company Prices in Wuhan**

Item	Market price	Wuhan e-commerce company
Tomatoes	7.5 yuan (1.06 USD)/kg	22 yuan (3.11 USD)/kg
String beans	16 yuan (2.26 USD)/kg	36 yuan (5.08 USD)/kg
Carrots	4 yuan (0.56 USD)/kg	25 yuan (3.53 USD)/kg
Note: The market prices used for comparison were provided by Wuhan Baishazhou Agricultural Products Co. Ltd for the same time period (February 4th to February 29th 2020) (Hubei News, 2020)		

In addition to e-commerce platforms, there were also food purchase platforms organized by the state and the civil society, particularly buying groups. Buying groups organized by different actors demonstrated different strengths and limitations (Dai and Qi 2020). The community-level government mobilized their staff and volunteers to facilitate online food ordering and delivery during the lockdown of residential complexes. However, they were facing various challenges such as delayed delivery, lack of flexibility in terms of order size and freshness (Dai and Qi 2020). Other buying groups were self-organized by residents within a community and was an informal method more often used in Wuhan due to the strict lockdown regulations. This method was preferred due to its convenience and reliability; individuals could reach out to group buying organizers and volunteers in their neighbourhood (mainly through WeChat) to place their orders. Organizers and volunteers then forwarded orders for the group by contacting farmers, supermarkets, or small merchants.

## Evaluation of Policies

Throughout the rapid formulation of policies in response to COVID-19, many tactics proved to be successful. One of the main strengths was the pre-existing system of food distribution. The vegetable basket program implemented in 1988 and the rice bag program implemented in 1994 were created to ensure there was sufficient food supply, stable prices, and improved food quality (Zhong et al 2020). These programs designated responsibility for grain supply to provincial governors and non-grain supply to city mayors (Zhong et al 2020). One of the ways the vegetable basket program ensured a sufficient food supply was through its emphasis

on encouraging local food production (Zhong et al 2020). Producing food locally made it easier for city mayors to ensure accessibility and affordability of food since they were better able to balance local production with the demand (Zhong et al 2020). With these programs in place, it was easier during COVID-19 to delegate tasks and ensure coordination between different levels of government. When issues around specific products arose, it was clear who was responsible for resolving it and who could be held accountable.

Another pre-existing factor which supported food security was the common usage of technology in the daily lives of local residents. Their routine use of technology in many aspects of their daily lives made it easier to transition to the lockdown, a period in which people often needed to rely on technology for ordering food and for receiving guidelines from the government. Since the push for the innovative use of technology such as New Retail which merges online and offline commerce to improve the retail experience by Jack Ma, co-founder of Alibaba in 2017, China has implemented advanced ways of utilising technology to make commonly-used services available remotely and virtually (Forbes 2018). Rather than having to introduce new technology or online platforms, most individuals were familiar with the contactless methods of obtaining food and could ease into relying more on technology.

China's existing grain reserves and national backup food supply were also useful structures in place especially for areas under strict lockdown, such as Wuhan. The backup food supply was possible due to the central government's Ministry of Commerce coordinating nine provinces (Hubei, Anhui, Jiangxi, Shandong, Henan, Hunan, Guangxi, Yunnan, and Chongqing) to combine their efforts and supplies to reduce food insecurity in Wuhan



(Ministry of Commerce 2020). Furthermore, the central government coordinated food reserves across provinces and provided overarching support to meet the needs of Wuhan and other high-risk areas (Xinhua News Agency 2020).

Despite these pre-existing conditions and the comprehensive nature of the policies, several gaps can be identified in the policy responses. Firstly, there was a disconnect between the formulation and implementation of policies. While provinces and cities carried out the central government's notices and there were no contradictions between the different levels of government, the actual implementation of policies was problematic. During implementation, some local government representatives reported that they found it difficult to evaluate effectiveness and whether or not the population was being reached. Local residents also expressed their frustration through blog posts explaining that despite changes being made, they continued to face challenges in accessing food. On the other hand, most government reports claimed that policies were proving effective and there were very few challenges around accessing food. While the general policies may have seemed appropriate, the local, lived experience was often different, resulting in a disconnect.

In addition to the gaps in policy implementation, there was a disconnect between the employees of neighbourhood committees and local residents mainly caused by a lack of communication. While the employees who worked long hours each day had a variety of tasks ranging from delivering necessities to seniors, to sorting and distributing donated foods, local residents felt that they were unable to contact neighbourhood committee employees on most days (Observer Network 2020b). This was a major limitation as many of their needs remained unmet despite these representatives being their main point of contact. One blog post written by a local resident in Wuhan explained that they never saw their neighbourhood committee representative and felt they did not receive sufficient support (Observer Network 2020b).

Another major limitation of the policy response was the lack of focus on vulnerable groups. While ai

xin cai was a major initiative to support vulnerable groups, there was minimal direct financial support provided. During this time, most individuals did not receive any income since their paychecks were delayed or they were no longer working. Increased food prices on top of a lack of income meant these households struggled to afford necessities. For vulnerable groups, these factors only further exacerbated the challenges they faced when accessing food.

The lack of policy-related discussion around food waste was another feature. Many of the policy challenges, such as the “last 100 metre problem” and barriers to food transportation, led to a large amount of food waste even while households were experiencing a lack of food. In some cases, grocery delivery took so long that by the time it arrived at people's residences, most of the fresh meat had gone bad. Long distance trucks dropping off large amounts of produce reported that up to 40% of the products were damaged (Observer Network 2020a). In addition, the lack of volunteers sorting and distributing donations from other provinces meant large amounts of food quickly went bad, especially in neighbourhoods without refrigerated storage units. If consumers did not pick up their orders in timely fashion, the produce spoiled easily and contributed to overall food waste. Another source of food waste was the challenge farmers faced when they were unable to sell their crops that had a short shelf life. Despite the implementation of ‘green channels’ and smoother transportation, the issue of food waste persisted and very little action was taken to resolve this issue.

The lack of policy focus on the “utilization” dimension of food security was another major limitation. While most policies emphasized food availability and access, discussion around food utilization was limited. Food safety was neglected aside from guidance around sanitation protocols in markets, leaving people unaware of how to properly sanitize their foods once they were brought into the home. During the peak of the pandemic, when the disease was spreading much more quickly, this lack of direction could have led to consumers mishandling groceries and foods, thus causing further outbreaks

(Pressman et al 2020). In addition to food safety, the quality of foods also did not appear to be a priority. As noted above, food quality had been a pressing issue in China even prior to the pandemic. Throughout this analysis of policies, food quality was not explicitly discussed despite its importance for the consumers' grocery shopping experience. Since most people normally purchase foods at local public markets where they are able to carefully select produce, using online methods to purchase foods may have resulted in poorer quality foods being consumed due to the handling and delivery process. As mentioned above, one blog post by a local resident in Wuhan explained that the pork they ordered had gone bad by the time they received it. When they reached out to the online platform they were told that this was inevitable during peak times since drivers make hundreds of deliveries in a day (Observer Network 2020a). These types of situations may lead to food safety issues if individuals try to salvage the food that has gone bad or decrease their protein consumption while contributing to the problem of food waste.

## Lessons Learned

The policies analyzed in this report were generally effective in ensuring overall food security, at least in terms of food availability and economic and physical access. The supply of food was sufficient due to the well-developed existing system of food reserves and the central government's ability to mobilize supply interprovincially. Most policies in China emphasised agricultural production and called for farmers to maximize efforts to take advantage of the spring growing season rather than focusing efforts on aquaculture. The policies specifically mentioned grains and vegetables while also emphasizing hog production due to the low pork supply resulting from African Swine Fever in 2019. Since most traditional dishes in Chinese cuisine involve pork and meat, there was less of an emphasis on fish production in the policies analyzed for this study. To diversify the foods consumed and to ease the burden on the pork industry, future policies could consider methods to encourage the consumption of

less commonly consumed foods such as fish. This could be done through creating incentives for consumers to purchase the less popular items such as marking them at lower sale prices or educating the population on different ways to utilize less commonly used foods. These initiatives would help to reduce the reliance on one specific industry and avoid putting a strain on certain areas of agricultural production. Furthermore, if commonly consumed products are low in supply, these initiatives will ensure individuals are open to other food options as alternatives.

At the household level, food access was addressed through the monitoring of food prices and the promotion of online methods to purchase food. Stabilizing food prices across different platforms reduced panic buying and improved overall access during the time of quarantine. However, a major limitation was that these policies had little emphasis on food utilization and stability. Very little guidance on the utilization of food was provided to the population, at least in the documents analyzed. Discussion around food safety and healthy eating habits was limited. Additionally, the aspect of stability and constant access to food was only mentioned during discussions around price monitoring.

To better ensure food access and support vulnerable populations, policies that focus on directly providing financial benefits to households would further reduce food insecurity and tackle one of the major barriers to food security (Si and Zhong 2018). Government funding to cover the cost of living for those in extreme poverty, such as a more comprehensive Dibao, would better meet their basic needs and allow for flexibility when purchasing foods. Although *ai xin cai* improved access to fresh food, this initiative disproportionately benefited households living in neighbourhoods whose neighbourhood office or property management company had the will and transportation capacity to pick up and deliver the donated food. Providing specific *ai xin cai* options also neglected other needs individuals may have had during the pandemic. An emergency fund requiring an application process for vulnerable populations would ensure those who apply meet the qualifications and would also be more effective

in reducing poverty and food insecurity during such times (Hale et al 2020). To address the root causes of food insecurity, the government should also provide financial support for vulnerable populations who may face challenges in accessing food on a regular basis. While the pandemic heightened the effects of food insecurity, inadequate access to food faced by vulnerable populations regularly risks deterioration of health and well-being (FAO 2008). Food security should be evaluated at a household level regularly instead of focusing solely on sufficiency in the national supply during an emergency.

To bridge the disconnect between employees of neighbourhood committees and residents, the use of online communities should be encouraged to ensure local residents receive up-to-date information. Instead of informal online groups created by residents, neighbourhood committee employees should form online communities through platforms such as WeChat to encourage discussion around their needs. These official groups would be beneficial as it would ensure that individuals receive up-to-date information and have an easy way to connect with neighbourhood committee employees. One of the barriers that made it difficult for neighbourhood committees was the lack of available manpower. To help overcome this, large neighbourhoods could increase the number of temporary workers hired in order to maintain online groups and handle more requests. In Wuhan, a local resident reported that the WeChat group she joined was created by her neighbours and did not provide any useful information due to the lack of moderators and neighbourhood committee employees in the group (Observer Network 2020b). By facilitating discussion, employees would have a better understanding of the needs of residents while they would feel more connected and empowered to voice their concerns. Online discussions could be used for general inquiries, making orders for group buying, or sharing tips on how to cope with outbreaks of COVID-19. This would create a sense of community and belonging during a time of isolation and loneliness.

To fulfill the “utilization” dimension of food security, safe practices for handling food, specifically

raw meat or seafood should be implemented. Since raw meat requires storage in refrigerated environments which may cause the virus to live on surfaces for longer resulting in a potential risk of contamination to consumers, a focus on safely handling meat would be crucial (Pressman et al 2020). Government guidelines around handling raw meat, such as ensuring individuals are properly disposing of the packaging, avoiding cross-contamination, and cooking meat to a minimum temperature before consumption, would further provide individuals with a better understanding of how to safely utilize foods. Additionally, good hygiene practices have been found to greatly reduce the spread of COVID-19 and instructions around how to properly sanitize packaged food once they are brought home could also prevent unnecessary outbreaks (FDA 2020).

Another aspect of food utilization is the importance of food skills. Since the variety of food available heavily depended on location during the outbreak, it was important for individuals to know how to utilize specific foods to continue to cook nutritious meals. For individuals who regularly eat out rather than cooking at home, a lack of food skills would have been another barrier to food utilization and food security. Furthermore, the closure of wet markets in Wuhan and the limited availability of fresh foods could lead to poor dietary choices and result in increased rates of obesity or malnutrition. Initiatives focusing on how to make nutritious home-cooked meals would better equip individuals to utilize available foods during emergency situations, when cooking at home may be the more convenient option. Future policies should also provide guidance on different ways to utilize locally available foods and encourage urban agriculture practices.

Food quality should continue to be a priority even during emergency situations. Improving the quality of food throughout the delivery process would ensure individuals continue to obtain their required intake of nutrients. This is especially important since purchasing food was often done through group buying. With group buying there is a limited variety of foods and the individual has minimal control over the timing and frequency of

orders. Since group orders are not made daily, when individuals received food of poor quality, they were faced with the choice of cooking meals without this item until their next order arrives or continuing to use the item. Policies to ensure companies follow strict guidelines around maintaining food quality, such as timely food safety inspections, mandatory training, and a reporting system, would be beneficial as consumers would continue to have access to their required nutrients.

Another consideration for future responses includes taking the other roles of food into account. Food not only provides nutrition and energy, but also plays a role in bringing communities together through celebrations, family gatherings, and cultural traditions (Cason 2006). When an emergency situation such as COVID-19 arises, the discussion around food often ends at whether or not basic needs are met while the other benefits it brings, such as reducing social isolation, are neglected. Despite this, during these times when staying at home is encouraged, individuals who are isolating themselves with their family are able to enjoy mealtimes together as opposed to eating out alone. Future policies should consider the challenges that come with food insecurity beyond nutrition. This could include forming online groups for neighbourhoods or complexes to reduce loneliness or encouraging individuals who live alone to reach out to their friends and family. For certain populations, such as older adults, who are often more susceptible to loneliness, a formal program or initiative would be beneficial as it would promote the social benefits that food brings while encouraging open conversations around this topic (Wright et al 2006). Raising awareness on the benefits of food aside from its nutritional value could lead to reduced seclusion and improve the health of individuals, especially during a time of isolation and instability.

Furthermore, food security and its relation to eating disorders is often left out of discussions, especially during emergency situations. Studies have found that the risk of developing eating disorders heightens with food insecurity and stressful periods of time (Zhou 2020). Since COVID-19 called for individuals to make many changes in their daily

lives, creating a sense of uncertainty, negative emotional responses and stress was heightened. One common coping method is overeating which leads to the development of unhealthy eating habits such as binge-eating disorder (Zhou 2020). Additionally, during a time when healthy food options were limited and it was difficult to keep up an exercise routine, individuals may develop unhealthy eating habits and become at higher risk of obesity or malnutrition. In order to reduce the prevalence of eating disorders and maintain healthy eating habits, policies should consider the psychological aspect of food insecurity and provide online programs to support individuals struggling with food and mental health. By creating exercise programs or healthy eating guides online to support individuals who are overweight and promoting a healthy body image, mental health during an emergency situation, such as COVID-19, could be better prioritized.

## Conclusion

Throughout the policy responses to COVID-19, all levels of the Chinese government coordinated and combined in efforts to ensure food security. The different food security policies discussed in this paper related to topics such as agricultural production, transportation, online buying, and price stability, all of which aimed to improve three main dimensions of food security: availability, affordability, and stability. While policy responses focused on food utilization were lacking, its importance in ensuring food security needs to be addressed in policy and research. The central government provided overall direction for local governments and ensured consistency of response. Many of the tactics used such as incentives for farmers to cultivate more land, sending inspection teams to monitor prices, and encouraging the use of group buying were effective although challenges arose during policy implementation. Local residents expressed their concerns around communicating with neighbourhood committee employees and increases in food prices. In conclusion, food insecurity is often further heightened during emergency situations and should be integrated into policy responses in



a holistic manner. The findings from this analysis can guide future food security policies addressing emergency situations both in China and internationally.

## Note

1. 1 Chinese yuan is equal to 0.14 US dollar.

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