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## Agriculture, Food and Nutrition Security Under Covid-19: Lessons from China

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**Abstract:** When Covid-19 began in China, various control measures – including road closures, restrictions of movement of people, and social distancing – were introduced. The economy as a whole and food supply chains were severely disrupted. After four months, the virus has largely been brought under control. The country is on the way to full recovery, and food markets and prices have returned to normal. This paper reviews how the pandemic affected Chinese agriculture and food supply, how the government responded and what lessons can be shared with other countries. The paper points out that timely monitoring of food prices, establishing green channels for input and output supplies and for workers, providing safety nets for vulnerable populations, and keeping trade open are critical for ensuring the smooth functioning of food supply chains and preventing potential food crises.

**Keywords:** Covid-19 pandemic, Covid-19 and agriculture, China, food supply chains, food security, nutrition.

### *INTRODUCTION*

The Covid-19 pandemic has changed many aspects of our economies and day-to-day lives. After health, the impact on food and nutrition security has been the most significant of the effects of the pandemic. In fact, if proper measures are not taken, the food and nutrition security of many, especially in developing countries, could be compromised, causing both short- and long-term humanitarian crises and reversing the achievements the world has made over the past three decades. As the epicentre has shifted from China to Europe, the USA, and South America, and more cases have been diagnosed in Africa and South Asia (WHO 2020), we need to think of the lessons that we can learn from countries where the infection spread early on. Since China was the first country to combat Covid-19, an assessment of the early impact on Chinese agriculture, food and nutrition security is feasible and can provide insights for other countries to take action to prevent food and nutrition security crises.

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## *IMPACT OF COVID-19 ON AGRICULTURE AND FOOD SUPPLY*

The outbreak began in December 2019, but the impact was not felt until January 23, 2020, when a lockdown was declared in Wuhan. This occurred just before the Chinese New Year. As is traditional, producers, processors, retailers, wholesalers, and even individual household families had stored food for at least two weeks prior to the event. Thus, the immediate impact was small. But as more provinces began to introduce lockdowns, physical distancing, restrictions on the movement of people and food, closed community (urban districts and rural villages and towns) management, and shutdown of non-essential economic activities (including transportation, construction, factories, restaurants, cinemas, and entertainment parks), the whole of February was the most difficult month in China for people's livelihoods and economic activities.

Poultry supply was affected from the beginning of February. Roadblocks disrupted feed supply, marketing of products, and the return of workers after the Chinese New Year holiday. The ban on the movement of live poultry (believed to be a potential disease risk) prevented farmers from marketing chicken and eggs, which led producers to bury chicks and ducklings alive. According to industry estimates, the supply of live chicken and ducklings decreased by about 50 per cent in February. The supply of meat – affected also by the extended impact of African swine fever – plunged (NBS 2020). The epidemic also affected farmers' purchases of seed, fertilizer, pesticides, and other inputs in crop production. Seed supply was a major concern. According to the China Seed Association (CSA 2020), the outbreak adversely affected the production and operation of more than 90 per cent of seed enterprises.

The supply chain as a whole – that is, the food system beyond agricultural and food production – was also affected significantly (Table 1). Within the whole supply chain, only 23 per cent of agricultural products are directly consumed by households, while 77 per cent are used as intermediate inputs, of which 41 per cent go to food processing enterprises, and 3 per cent are used by restaurants. In the wake of the coronavirus outbreak, many orders were cancelled and many restaurants had to close their doors. The supply of processed foods remained relatively abundant, but production was affected by a lack of workers and falling demand for agricultural products (Fan, Si, and Zhang 2020).

### *IMPACT ON FOOD PRICES*

In February (the first full month of lockdowns and restrictions), China's consumer price index, a gauge of inflation, went up 5.2 per cent year on year. But food prices surged 21.9 per cent, largely because of pork price hikes that were caused by the impact of African swine fever as well as the impact of Covid-19 (NBS 2020).

It is meaningful to look at price changes since the disease outbreak month by month. Table 2 presents monthly consumer price index and prices of major food items from

**Table 1** *The impact channel of Covid-19 and the sectoral economy performance in China during first quarter (percentage change in value added or revenue in 2020 over the same period of 2019)*

Sector	Specific impact	January–February	March	January–March
Total GDP		—	—	-6.8
Agriculture	The direct effects on crop production and demand are limited. The shocks on livestock are larger due to the insufficient feed and transportation blocks.	n.a.	n.a.	-3.2
Mining	Lack of labour and market demand.	-6.5	4.2	-1.7
Manufacturing	Manufacturers of essential goods such as health and food supplies have the green channel to move their goods, but productivity is affected by intermediate input supply logistic restrictions and labour shortages.	-13.5	-1.1	-10.2
Food processing	Production is affected by the shortages of labour and intermediate inputs.	-16	-4.8	-11.1
Textiles	Production is affected due to labour shortages domestically and the reduction of export demand globally.	-27.2	-5.5	-16.8
Auto parts and accessories	Production is affected severely due to the lockdown in Hubei and less demand due to limited movement.	-31.8	-22.4	-26
Construction	Affected by labour shortage and the supply of construction materials	n.a.	n.a.	-17.5
Utilities	A decline in demand due to the shutdown of transportation and closed factories.	-7.1	-1.6	-5.2
Services	Services are affected by social distancing measures, quarantine, contracted demand and labour shortage.	n.a.	n.a.	-5.2

*(continued on next page)*

**Table 1** (continued) *The impact channel of Covid-19 and the sectoral economy performance in China during first quarter (percentage change in value added or revenue in 2020 over the same period of 2019)*

Sector	Specific impact	January–February	March	January–March
Wholesale and retail	Many markets and shops are shut down and some businesses are operating online.	-20.5	-12	-18
Hotels and restaurants	Many of these sectors closed when social distancing measures were adopted.	-46	-44	-35
Transportation	The domestic public transport is partially closed and number of international flights also reduced.	n.a.	n.a.	-14
Other services	Labour shortage and less demand for services.	n.a.	n.a.	-2
<b>External shocks</b>				
Migrant farmers	Some migrant farmers had to stay at hometown due to the quarantine. The migrants who return to work declined by 30 per cent at the end of February.	n.a.	n.a.	n.a.
Exports	Drop in demand for exports due to lack of labour and cancellation of export orders.	-15.9	-3.5	-11.4

*Note:* The data for January to February and March are value added or revenue of the enterprise above designated size, while the data for the first quarter is the value added.

*Sources:* National Bureau of Statistics, available at [http://www.stats.gov.cn/tjsj/zxfb/202004/t20200417\\_1739327.html](http://www.stats.gov.cn/tjsj/zxfb/202004/t20200417_1739327.html); <http://data.stats.gov.cn/easyquery.htm>.

**Table 2** *Consumer Price Index (CPI) for food items during Covid-19, China, December 2019–April 2020*

	Total CPI	Food CPI	Grain CPI	Meat CPI	Egg CPI	Sea Food CPI	Vegetable CPI	Fruit CPI
2019.12	100	100	100	100	100	100	100	100
2020.1	101.4	103.9	99.9	102.0	92.2	104.6	127.5	106.1
2020.2	102.2	108.8	100.2	113.6	91.1	107.6	126.2	110.5
2020.3	99.5	100.3	100.4	101.5	90.1	99.3	96.1	104.5
2020.4	97.9	93.3	100.4	89.5	93.8	96.4	80.7	97.6

*Source:* Calculated from NBS (2020).

December 2019 to April 2020, with December 2019=100. Total consumer price index went to 101.4 in January 2020 and increased to 102.2 in February. Food price index went up to 103.9 in January, largely because of the Chinese New Year. The price index went up further to 108.8 in February which is due to the effect of Covid-19. The price index for meat, which includes poultry, beef, pork, and mutton, increased by 14 percentage points between December 2019 and February 2020. Prices of vegetable increased the most, by 23–24 percentage points in January and February. The impact on vegetables is rapid, because of its short production cycle, and prices were affected as early as January.

It is expected that food prices will become more stable, as the supply of grain is solid, and production of livestock, fruit, and vegetables have returned to normal. China's grain production was strong in 2019, providing a solid foundation for food supply. Grain output was 663 million tonnes, about 0.9 per cent more than the 2018 level. Currently, the stock of rice, wheat, and maize is high at 280 million tonnes at the end of 2019 and can meet domestic demand for one year. Grain imports accounted for only 1–2 per cent of domestic consumption in recent years. While China's soybean demand is mainly met by imports, which stood at 88.5 million tonnes in 2019, the supply of soybean from Brazil and the United States, the two largest producers of soybean, is stable. There is no sign that supply from these two countries will be disrupted by Covid-19.

#### *IMPACT ON AGRICULTURAL GROWTH AND EMPLOYMENT*

During the lockdown phase, the economy as a whole and the food system were hit significantly by Covid-19 and associated mitigation measures. Official data from the National Bureau of Statistics (NBS) show that total GDP declined by 6.8 per cent, with agriculture, industry, and services falling by 3.2 per cent, 9.6 per cent, and 5.2 per cent, respectively. While agricultural activity is often excluded from mitigation policies (because of special government policies which will be described in the next section), the indirect effects of the mitigation effort on the agricultural sector are significant. This is because China's agricultural sector has become more integrated

with the rest of economy, with 75 per cent of primary agricultural products used as intermediates, especially by agrifood processing industries. Many agrifood processing industries were directly hit by lockdown policies, further affecting downstream agriculture and other components of the supply chain and food system.

Zhang *et al.* (2020) modelled the economic cost of Covid-19 for the whole food and agricultural supply chains or system, and found it equivalent to the loss of 7 per cent of the system's value added and more than 9 per cent of its employment in the first quarter of 2020 compared with 2019. They also project that many sectors of manufacturing will continue to see negative growth in the second and third quarters of 2020, while growth in value added in agriculture and food systems will turn positive, though still modest. Full recovery depends on whether external demand from the rest of the world for Chinese exports will resume late this year. Without a resumption of export demand, China's total economy will grow less than one per cent in 2020, while the projected growth rate rises to 1.7 per cent with a resumption of export demand.

Zhang *et al.* (2020) point out that the negative shocks on employment from Covid-19 are significant. Total employment decreased by 175 million of full time jobs, about 23 per cent, in the first quarter or lockdown phase. Employment of full time positions in manufacturing fell by 63.8 million, in services by 77 million, and in agriculture by 34.4 million. While some of the lost jobs will reappear when the economy starts to recover, total number of jobs will still decline by 26.2 million in the second quarter or recovery phase. The impacts of export shocks on employment are large. If export demand does not recover, more than 17 million jobs will be lost. The shocks for unskilled labour are larger than for skilled labour. More than 46 million of full time jobs in agriculture and the food supply chain, or about 27 per cent of total employment, have been lost because of Covid-19 in the lockdown phase, the most significant job losses being in agrifood processing and services. Both unskilled and skilled labour employment have been affected significantly, with unskilled labour being hit much harder. Many jobs come back when the economy starts to recover, but the level of aggregate agricultural and food-sector employment continues to be lower than in the base period. Employment recovery is slower than in other sectors because of the slower recovery of restaurants and related services. Aggregate employment (full time jobs) in food and agriculture decreased by 8.6 million, and accounted for about 33 per cent of total jobs lost. Only when the economy returns to normal with a resumption of export demand will more jobs be created in the agriculture and food sector.

#### *IMPACT ON SMEs IN FOOD AND AGRICULTURE*

During the early stage of the outbreak, that is, from late January to early February, many small and medium size enterprises (SMEs) particularly those in food and agriculture were severely affected. The Enterprise Survey for Innovation and

Entrepreneurship in China (ESIEC) at Beijing University conducted a survey on the “condition of micro, small and medium-sized enterprises (SMEs) amidst the coronavirus outbreak.” Based on the survey data, Dai, Hu, and Zhang (2020) found that the impact experienced by upstream and downstream firms under coronavirus conditions were not identical, reflecting their different positions in the supply chain. While enterprises downstream in the chain directly provide goods to consumers, upstream enterprises provide intermediate goods required by downstream actors. In general, upstream enterprises enjoy the advantage of economies of scale. They can also rely on the capital structure to form large enterprises. In contrast, downstream enterprises, including those in food and agriculture, consist mostly of labour-intensive, micro, small, and medium-sized firms. Upstream entrepreneurs hold different points of view regarding the impact of the novel coronavirus outbreak. In short, they believe that the impact of the outbreak will be relatively small in the long run. The biggest issue for them is labour shortage. In contrast, entrepreneurs in downstream firms face declining consumer demand as well as shortages of raw materials caused by disruptions in the supply chain. And like upstream enterprises, they too are experiencing shortages in the supply of labour. Agriculture and food enterprises, which are usually downstream enterprises, have thus suffered disproportionately.

A study by Min, Zhang, and Li (2020) of Wuhan, the epicentre of the virus in China, also found that over 80 per cent of sample food suppliers had been negatively affected by the Covid-19 pandemic. The decrease in revenues of food suppliers because of the Covid-19 pandemic was also affected by family size, household registration, number of Covid-19 patients in the local community, the food categories that the suppliers sell, and food sources. The impact of the pandemic control measures on different stages of food supply chain is also differentiated. E-commerce platforms played a more important role than the traditional supply chain in guaranteeing food supply in Wuhan during the period of pandemic prevention. Although the control measures affected local food supply chains negatively, the effects are believed to be short-term and could be eliminated when the control measures regarding food transportation are relaxed.

#### *GOVERNMENT POLICIES DURING COVID-19*

The Chinese government introduced numerous policies to mitigate the impact of the pandemic on food and agriculture from the very beginning. On January 30, 2020, the Ministry of Agriculture and Rural Affairs (MARA), the Ministry of Transport and the Ministry of Public Security jointly issued an Emergency Notice on Ensuring the Normal Circulation Order of “Food Basket” Products and Agricultural Production Materials, which strictly prohibits unauthorised interception, road breaks and traffic disruption with respect to the transportation of agricultural inputs and outputs, and ensures the normal flow of “food basket” products and agricultural input materials.



In early February, Premier Li Keqiang called on Ministries to coordinate to ensure an ample supply of food and effective logistics for delivering agricultural inputs, emphasising the responsibility of local authorities. In the Chinese system, provincial governors are responsible for adequate grain supply while mayors of cities are responsible for meat and vegetables. Feed production and slaughter enterprises are required to accelerate production in order to restore and increase the effective supply of livestock and poultry products. They are also being provided with production guidance and technical services to strengthen animal and plant epidemic prevention and control. All of these measures must be implemented effectively, and as soon as possible, to avoid a hiccup in supply (Fan, Si, and Zhang 2020).

A MARA document of February 10, 2020, specified incentives for farmers to start farming (while observing necessary disease prevention and other measures) to support agricultural production. On February 15, in order to resume livestock production, MARA and two other ministries jointly rolled out measures to support the reopening of feed and meat processing enterprises as soon as possible and to ensure the smooth delivery of raw materials and products. To encourage food imports to ease the pressure on food supply, the General Administration of Customs of China announced on February 16 that more countries and companies would be allowed to export agricultural and food products to China. The administration also pledged to speed up customs clearance, shorten the quarantine and review period, and open green channels for agricultural products in key ports. MARA has also published a plan for 2020, outlining targets for crop planting areas and measures to ensure grain production and supply, improve plantation structure, and control chemical pesticide and fertilizer use in crop production (Fan, Si, and Zhang 2020).

With all these policies and measures in place, it is expected that China's food supply in 2020 will remain stable, although meat prices are likely to remain under pressure because of the impact of the epidemic on the livestock sector. Securing imports of soybean and meat will be key to avoiding further spikes in domestic meat prices.

#### *LESSONS FROM CHINA*

The Covid-19 virus is still spreading and it is difficult to say when it will be contained. The unprecedented severity and global scope of Covid-19 necessitates timely and decisive decisions and action. The Chinese experience shows that early actions must be taken to make sure that the whole supply chain work smoothly. Global and national coordination are equally important. The pandemic will also trigger debates on how to shape agrifood systems in order to prevent food shortages and hunger during crises and provide adequate nutritious food for all citizens in long run. The Chinese experience has taught us several important lessons.

First, there is a need to monitor food prices and markets closely. The Chinese experience has shown that transparent dissemination of information will strengthen government management over the food market, prevent people from panicking, and guide farmers to make rational production decisions. The 2017–18 food price crisis (its level and volatility) led to millions of smallholder farmers and poor urban consumers in the world falling into poverty and hunger. The World Trade Organisation, the World Health Organisation, the Food and Agriculture Organisation, the World Food Programme, the World Bank, and the Consultative Group on International Agricultural Research (CGIAR) should set up a working group to monitor prices, stocks, supply and demand, and trade not only at the global and national levels, but also at the local, regional and community levels. Local monitoring is critical as roadblocks and restrictions on people’s movement can lead to food shortages in different areas. The African Green Revolution Alliance (AGRA) has already set up a platform to monitor prices in Africa by working with telecommunication companies and national governments. The Agricultural Marketing Information System (AMIS) hosted by FAO has responded by further building national capacity in tracking price and market information at the sub-national level.

Secondly, it is necessary to ensure that international and national agricultural and food supply chains function normally. China has set a good example of how to ensure food security during the current epidemic by, for instance, opening a “green channel” for fresh agricultural products, and banning unauthorised roadblocks. E-commerce and delivery companies can also play a key logistical role. For example, as lockdown measures have increased the demand for home delivery of groceries, e-commerce companies have come up with an in-app feature for contactless delivery, allowing a courier to leave a parcel at a convenient spot for a customer to pick up, thus eliminating person-to-person interaction. Special policies have also been introduced to transport rural migrants from point to point without stops in transit, so that economies can return to normal as soon as possible while also protecting rural migrants from infection.

Thirdly, social safety nets are needed to protect those who are the worst affected and most vulnerable. These safety nets, which could be in the form of cash or in-kind transfers (context-specificity is important here), should be accompanied by intervention by health and nutrition officials, because investing in the health and nutrition of vulnerable populations could lower the mortality rate of diseases such as Covid-19. Social safety nets are also crucial in post-epidemic “reconstruction” efforts. Many countries are planning to introduce stimulus packages for economic recovery. A part of each stimulus package must be used to set up social protection systems for protecting vulnerable populations from current and future crises.

Fourthly, more investment is needed to build a more resilient food system. Such investment must come from national governments as well as the international

community, as enhancing the capacity of developing countries to prevent or contain a food security crisis is a collective effort. The impact of SARS, MERS and the ongoing Covid-19 pandemic on food and nutrition security has been relatively small in China, Singapore, and South Korea, largely because of the strength of their economies and societies. They will also be able to resume agricultural production very quickly. These countries were also able to effectively connect domestic and international markets to ensure that supply chains did not break. The Ebola outbreak had a significant impact on the economies, agricultural production, markets and trade of West African countries, as well as a significant negative impact on food security and nutrition of the population in the region (FAO 2016). China has already planned to enhance its medium and long term production capacity by using part of the stimulus package to invest in R&D, rural infrastructure and farmers' education. China must ensure that these investments are well designed and implemented.

Finally, there is a need to build safeguards for the prevention and control of zoonotic diseases. The international community needs to do more to prevent future outbreaks of zoonotic diseases such as Ebola, SARS, and avian flu, by means of measures that include regulating meat, seafood and wildlife markets. Many zoonotic diseases – HIV, Ebola, MERS, SARS, and possibly Covid-19 too, all originated in wildlife and jumped to humans. China introduced various laws, regulations, and policies on wildlife markets after the SARS outbreak in 2003. More regulations and policies have been introduced after the outbreak of Covid-19. It is equally important that these laws, regulations and policies are implemented, monitored, and evaluated.

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