China's Stockpiling and Mobilization Measures for Competition and Conflict

Panel II: China's Approach to Self-Sufficiency, Stockpiling and Sanctions Preparedness

Testimony before the U.S. – China Economic and Security Review Commission

Dr. Gustavo F. C. Ferreira

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United States Department of Agriculture

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I. Introduction

The People's Republic of China (PRC) is the largest food producer in the world, and agriculture has played a pivotal role in its emergence as a global economic powerhouse. Chinese economic transformation throughout the twentieth century was sparked by agrarian reforms (e.g., the "Household Responsibility System") that transferred rights and the responsibility for profits and losses to individual farmers. These policy changes resulted in dramatic improvements in agricultural production and laid the foundations for the Chinese industrial revolution. As a testament to that success, the PRC has achieved high levels of food self-sufficiency in major crops such as rice and wheat.[1] More recently, agricultural trade and investments have become important components of PRC's diplomacy and its Belt and Road Initiative.[2]

[1] Kai Cui and Sharon P. Shoemaker, "A Look at Food Security in China," NPJ Science of Food 2, no. 4 (20 February 2018), https://doi.org/10.1038/s41538-018-0012-x.

[2] Fred Gale, James Hansen, and Michael Jewison, China's Growing Demand for Agricultural Imports, Economic Information Bulletin No. 136 (Washington, DC: U.S. Department of Agriculture, February 2015), accessed 7 March 2022, https://www.ers.usda.gov/publications/pub-details/?pubid=43940.

Despite this remarkable progress, Chinese authorities are increasingly challenged to feed their 1.4 billion people. Recent events such as the COVID-19 pandemic, several outbreaks of African swine fever, floods and droughts sweeping multiple regions, and the war in Ukraine all have revealed some of the fragilities of the PRC's food systems.[3] For instance, these events caused pork prices (the main source of protein for Chinese population) to spike and the imports of grains and oilseeds to soar to unprecedented levels. The PRC is now the world's largest buyer of key agricultural commodities such as corn and soybeans – it accounts for nearly 60 percent of global soybean export flows.[4]

These developments are in clear contrast with China's decades-long efforts to develop and implement policies aimed at grain self-sufficiency. The Chinese Communist Party (CCP) is seeking to curve international dependency by supporting domestic agricultural production, investing in agricultural research, stockpiling large grain reserves, launching campaigns against food waste (i.e., "Clean Plate Campaign"), and providing guidance for livestock producers to reduce corn and soybean volumes in livestock rations among others policies.[5] In addition, the PRC is diversifying its pool of suppliers of major imported commodities to mitigate geopolitical risks with the United States.

Despite these concerted efforts, these self-sufficiency goals are threatened by demographic pressures, growing urbanization, climate change, land and water scarcity, changing diets, livestock diseases, and extensive pollution. This written testimony seeks to address a list of questions presented by the U.S. – China Economic and Security Review Commission that touch on these issues. The questions were organized and clustered by common themes under the sections below. The questions can be found at the beginning of each section and were highlighted (in blue) for added visibility.

- The PRC's dependency on agricultural imports.
- The PRC's policies to reduce dependency on agricultural imports.
- Challenges for the PRC to achieve overall food self-sufficiency.
- The PRC's Grain Stockpiles.
- Indicators of preparation for conflict.
- Potential global impacts associated with the PRC achieving food self-sufficiency.
- Policy recommendations.

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[3] Orange Wang, "China Food Security: How's It Going and Why's It Important?," China Macro Economy, 29 November 2020, accessed 13 May 2021, https://www.scmp.com/economy/china-economy/article/3111623/china-food-security-hows-it-going-and-whys-it-important.

[4] "China Confident It Can Replace US Soybeans with Supplies from South America," MercoPress, 11 July 2018, accessed 27 April 2022, https://en.mercopress.com/2018/07/11/china-confident-it-can-replace-us-soybeans-with-supplies-from-south-america.

[5] Eva Dou, "China's Mealtime Appeal amid Food Supply Worries: Don't Take More than You Can Eat," Washington Post (website), 5 October 2020, accessed 21 June 2021, https://www.washingtonpost.com/world/asia_pacific/china-food-shortage-clean-plate/2020/10/02/578daa0e-0223-11eb-b92e-029676f9ebec_story.html.

It is important to recognize that some of the questions in this testimony cannot be fully addressed. Questions about the reliability of PRC's official agricultural statistics and internal political pressures makes it difficult to accurately assess the state of food security in that country. While the complexities and nuances of these issues prevent us from being able to paint the full picture with a few simple brushstrokes, this testimony shares observations and analyses that might shed some light on these issues.

II. The PRC's dependency on agricultural imports

- How import-dependent is China on agricultural products? Who are China's largest food suppliers, and has China taken any steps to reduce dependency or diversify its agricultural suppliers?

- China depends on the United States for a number of agricultural imports, such as in soybeans. In addition, China has committed to purchasing more agricultural products from the United States as part of the 2020 Phase One Trade Deal. To what extent is China taking these and other political considerations into account as it seeks to increase its domestic productive capacity in agriculture?

Grains are essential to the PRC's national food security because they are a main source of human food, animal feed, and raw materials for processed food products. In fact, the term "food security" translates literally to "grain security" in the Chinese language. Thus, grain self-sufficiency has been at the heart of long-term Chinese food security plans, with established targets at 95 percent or higher for rice, wheat, and corn.[6] When combined, these commodities account for 99 percent of Chinese grain production.[7] Thanks to government market interventions (e.g., subsidies or prices incentives) and large-scale investments in agricultural R&D and infrastructure, the PRC achieved high levels of grain self-sufficiency throughout the 1980s and 1990s.[8] The PRC also established national grain stockpiles in 1990 and a system that coordinates central state and provincial grain reserves. It must be highlighted that these strategic reserves are a state secret, and outsiders have little information about their true size and quality.

Despite earlier successes, self-sufficiency rate of certain foods fell below the 95 percent target in the early 2000s and agricultural imports began to surge. Past concerns about national food security led the Chinese government to commission studies looking at changing food consumption patterns starting in the 1980s. Those studies predicted important deficits in key food products such as grains, meats, and vegetable oils by the end of the twentieth century.

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[6] Kai Cui and Sharon P. Shoemaker, "A Look at Food Security in China," NPJ Science of Food 2, no. 4 (20 February 2018), https://doi.org/10.1038/s41538-018-0012-x.
[7] Yong-sheng Wang, "The Challenges and Strategies of Food Security under Rapid Urbanization in China," Sustainability 11, no. 2 (2019): 542, https://doi.org/10.3390/su11020542.
[8] Funing Zhong and Jing Zhu, "Food Security in China from a Global Perspective," Choices 32, no. 2 (2017), accessed 7 March 2022, https://ideas.repec.org/a/ags/aaeach/257826.html.

A seminal study, published almost 20 years ago, argued that grain production in the PRC would stagnate due to limited arable land, lack of important productivity grains, water insufficiency, and environmental problems. The same study predicted that the PRC would have to import 200 million tons of grain by 2020.[9] Interestingly, in that same year, the PRC's combined imports of corn, soybeans, wheat, rice, and sorghum already totaled 150 million metric tons.

Today, meal imports (through meal and seed) account for about 90 percent of the PRC's domestic consumption whereas for vegetable oil imports (through vegetable oil and seed), that share is about 80 percent of domestic consumption. In recent years, the PRC began to import more meal - at the expenses of seeds from alternative suppliers such as Russia, Ukraine, and Canada. The following section highlights and discusses the PRC's dependency on key grain imports, with a specific emphasis on soybeans.

Soybeans

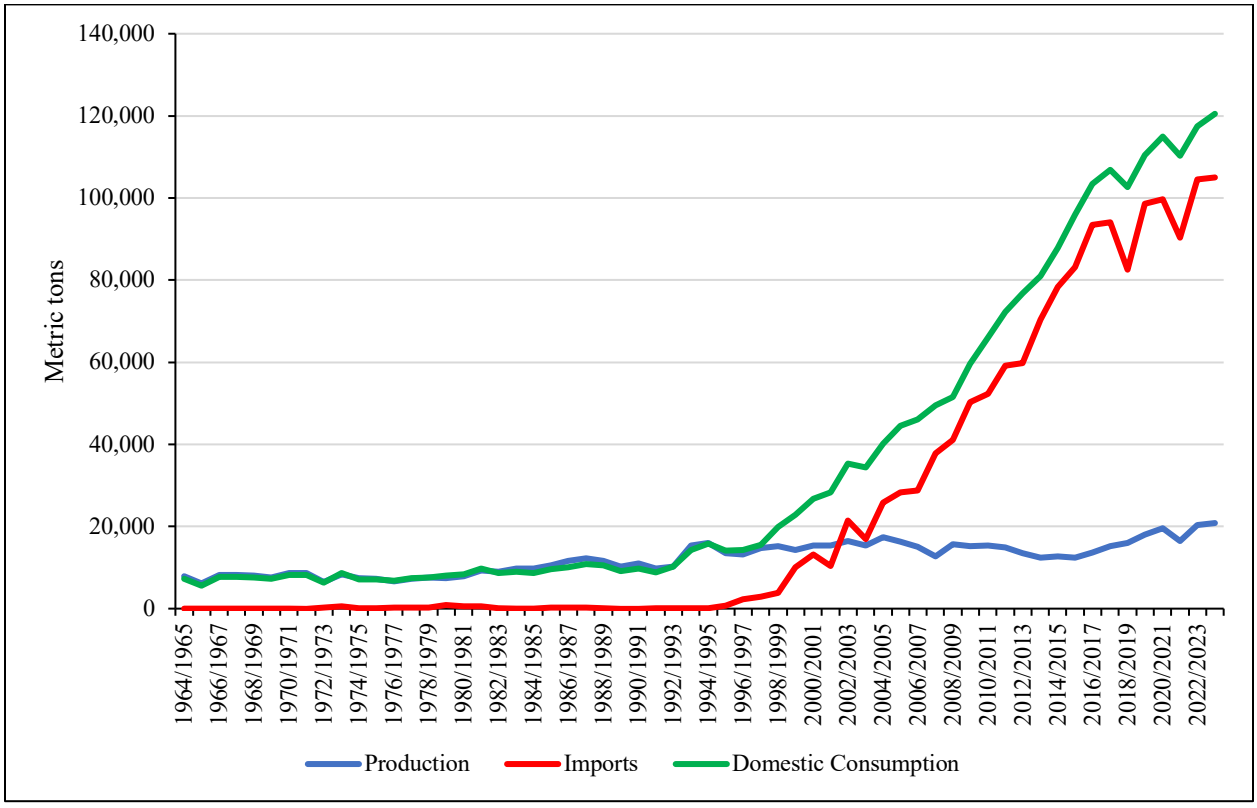
The PRC's annual imports have increased significantly over time and now range between 100 and 120 million metric tons (see figure 1). At the same time, and despite new policies and incentives, domestic soybean production has increased modestly to just above 120 million metric tons. As a result of this supply and demand imbalance, the PRC now accounts for about 60 percent of worldwide soybean imports. Such large volumes are necessary to meet its domestic demand for animal protein and edible oils. Nevertheless, some pundits believe that the PRC's soybean imports may have reached their highest point given the nation's ongoing efforts to increase domestic soybean production and diversify feed rations for its livestock sector.

The PRC mainly imports soybeans from Brazil and the United States, which are in different hemispheres and therefore have different crop cycles. Brazilian farmers usually plant soybeans in September and October and harvest the crop from January to March. In contrast, Most U.S. soybeans are planted in May and early June and harvested in late September and October. For many years, The United States was the PRC's top soybean supplier, but in the past 15 years Brazil gradually claimed that title. As a result, in 2023, 73 percent of total Brazilian soybean exports went to the PRC in comparison to a 55 percent share in the United States. For additional context, during the U.S.-China trade war, Chinese purchases of U.S. soybeans plummeted in 2018 following the implementation of 25 percent retaliatory tariff put in place by the PRC. As a result, the PRC's share of Brazilian soybean exports peaked at 82 percent in 2018 whereas the U.S. share reached a record low at 18 percent.

[9] Lester R. Brown, Who Will Feed China? Wake-up for a Small Planet (New York: W. W. Norton, 1995).

Another important consideration is that, with favorable weather conditions, production in South America could supply the PRC with all its annual soybean import needs, although at a higher cost. While such strategy would help the PRC mitigate geopolitical risks with the United States, it would also create a new risk. More specifically, the PRC would become entirely dependent on weather and crop conditions in the Southern hemisphere which seems problematic given that this region has been impacted by significant weather events in recent years. For example, in 2022, Argentina endured widespread drought conditions that caused significant declines in corn and soybean production that year. Nevertheless, the PRC is expected to continue importing more soybeans from Brazil than the United States for price competitiveness and geopolitical reasons.

Figure 1. Soybeans production, domestic consumption, and imports in the PRC between 1960 and 2022 (Metric tons).



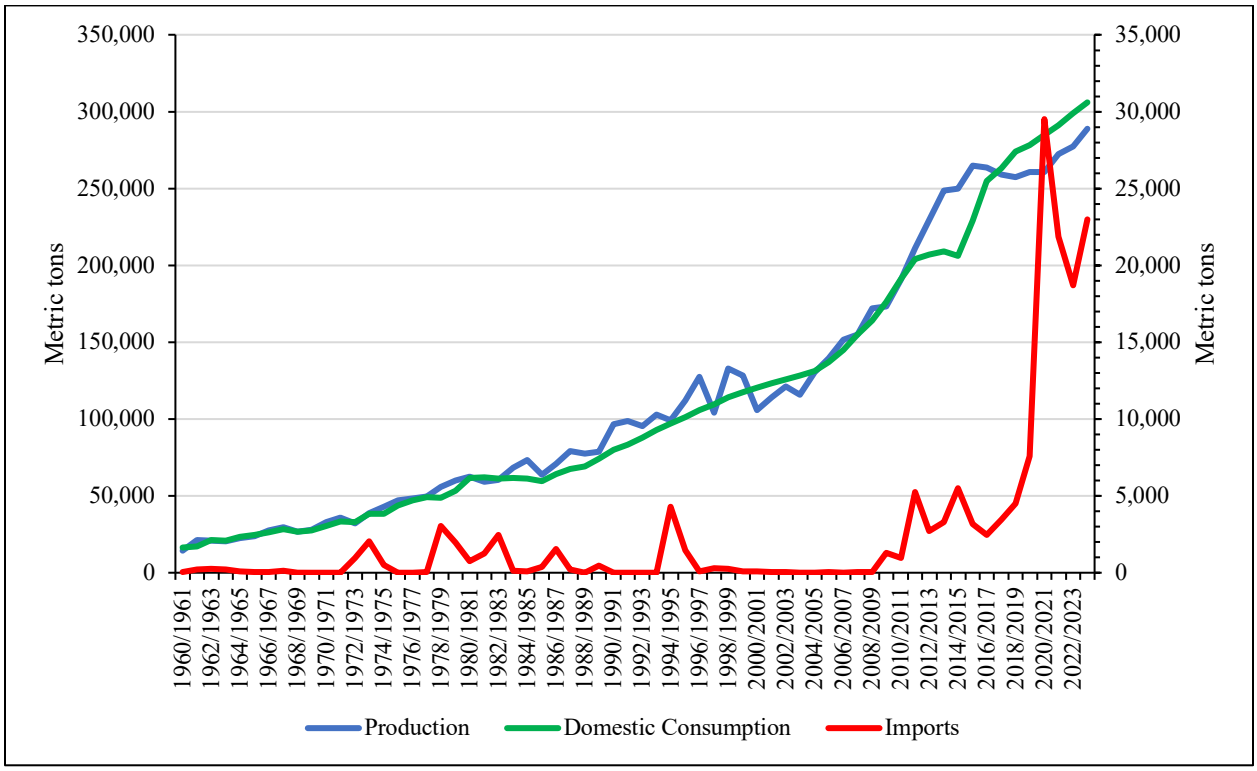
Source: U.S. Department of Agriculture.

Corn

The PRC is the second largest corn producer in the world and has achieved very high rates of self-sufficiency in this crop. Concurrently, the PRC also became a major corn importer as demand for feed and processed foods continues to grow in that country. In 2021, the PRC was the world's largest corn importer when it purchased nearly 30 million metric tons of this commodity (see figure 2) - mostly from the United States, Brazil, and Ukraine with the latter accounting for one third of that volume.

This surge in imports represented 10 percent of the PRC's domestic corn consumption. It is important to note that the Chinese authorities must manage its annual volume of corn imports – typically between 25 and 30 million tons. This is to prevent imports from outcompeting and undermining domestic corn producers.

Figure 2. Corn production, domestic consumption, and imports in the PRC between 1960 and 2022 (Metric tons).



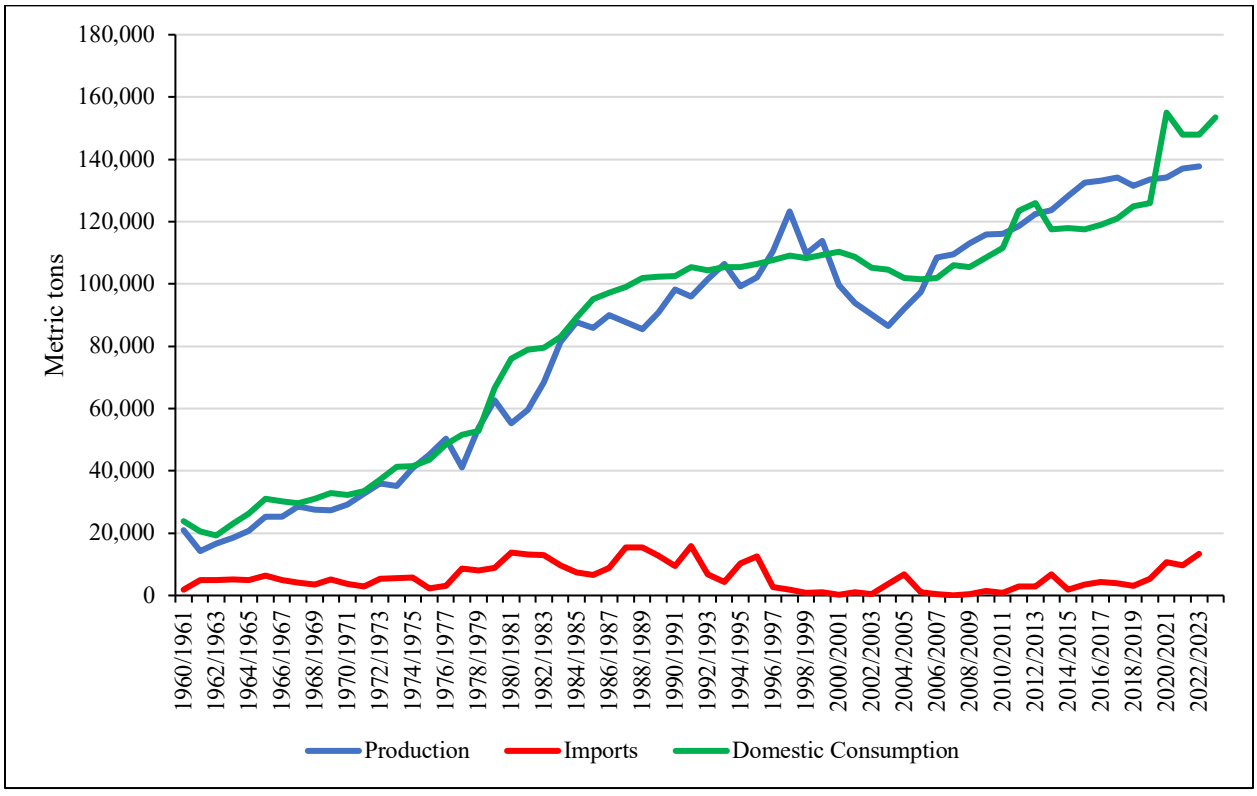
Source: U.S. Department of Agriculture.

Wheat

In 2023, the PRC was the world's largest wheat producer, and the country has achieved very high levels of self-sufficiency with this commodity. This is reflected in figure 3 where the PRC's wheat production has consistently met much of the domestic demand which kept wheat imports relatively low and stable for many years; however, and despite having import quotas for wheat, the PRC recently began to import growing volumes of wheat from countries such as Australia, Canada, and the United States. After the trade war with the United States, the PRC found alternative wheat suppliers that include Russia and Central Asian nations such as Kazakhstan.

To cement this diversification effort, the PRC and Russia signed a $26 billion agreement in 2023 which opened the Chinese market to Russian food exports to include 70 million tons of grain, legumes and oilseeds over the next 12 years. This contract and the lifting of numerous sanitary restrictions in 2022 also opened Russian wheat exports to the Chinese market.[10] In the near future, wheat exports are expected to account for the majority of Russian grain exports to the PRC.

Figure 3. Wheat production, domestic consumption, and imports in the PRC between 1960 and 2022 (Metric tons).



Source: U.S. Department of Agriculture.

[10] "Russia, China expand agricultural trade," *World* Grain, 8 November, 2023. https://www.world-grain.com/articles/19248-russia-china-expand-agricultural-trade

II. The PRC's policies to reduce dependency on agricultural imports

- What policies are the government implementing in pursuit of these goals, and what are the motivations driving these policies?

The PRC's political class has been extremely sensitive about the importance of ensuring food security for its population given the historical precedents of famines and food crises triggering political instability and regime collapse in China. To address these concerns, the PRC has been developing and implementing a series of policies aimed at improving its capacity of ensuring food security and food price stability over years via stable grain output coupled with sufficient grain inventories and imports. President Xi Jinping made food security a national priority and recurrently stresses is strategic importance. Under his leadership, the PRC is employing a multipronged approach to improve food security and reduce its dependency on vegetable protein sources, mostly soybean meal and vegetable oil imports. More specifically, in the Five-Year Agricultural Plan, which runs through 2027, the PRC made increasing self-sufficiency in soybeans and other grains and oilseeds a national priority. This section discusses some of the PRC's ongoing efforts to reduce its dependence on agricultural imports and strengthen its food self-sufficiency.

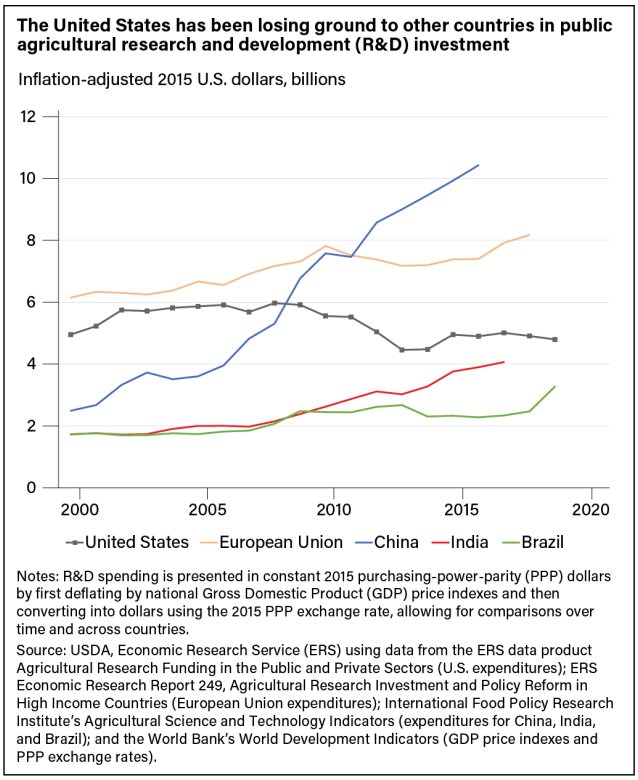
Examples of policies fomenting food security

China's State Council issued a circular on February 11, 2022, announcing a plan to "advance agricultural and rural modernization during the 14th Five-Year Plan period (2021-2025)." The latter policy was designed to guarantee a steady supply of grain and other staple agricultural products by 2025. This is to be achieved via the stabilization of grain acreage and farmland above the self-instituted red line of 120 million hectares and by the optimization of grain species.[11]

Public investment in agricultural research and development

The PRC is increasing its public investment in agricultural research and development to strengthen scientific and technological support for modern agriculture, to improve abilities for agricultural equipment research and application, and to boost development of its seed industry. The latter has been an area of great focus given that PRC's seed industry remains far behind its counterparts in the United States and other major agricultural producing countries. To close that gap, the PRC is seeking to improve its seed technology through more investments in genome editing capabilities and enhancing national and regional breeding capacity for crops and livestock.

[11] Chris Lyddon, "Food security emerges as top priority for China," *World Grain*, 14 August 2023. https://www.world-grain.com/articles/18900-food-security-emerges-as-top-priority-for-china



Source: USDA

Diversification of food rations

Food security concerns are driving the PRC to cut soybean meal use in animal feed. This was codified in 2023 in a three-year action plan to reduce soybean meal rations use in animal feed from14.5 percent in 2022 to less than 13 percent by 2025. There is also a push for the makers of feed rations to incorporate alternative oilseeds such as rapeseed or sunflower seed which could be imported from countries such as Canada or Ukraine. Such efforts could reduce the PRC's soybean imports down to 82 million metric tons by 2025, according to some experts; however, there is also a limit as to how much soybeans can be reduced in the feed ration formulas due to its protein content.[12]

Diversification of supplying nations

The PRC has made public that, in the long-term, it will seek to diversify its agricultural importer portfolio, especially away from the United States. As previously discussed, the most visible example of this has been the rise of Brazil as the world's largest soybean producer and the PRC's top supplier of this commodity. From 2019-2023, 73 percent of all Brazil's exports were sold to the PRC whereas that same share declined to 51 percent for the United States.

[12] Dominique Patton, "Food security drives China to cut soymeal use in animal feed," *Reuters*, April 14, 2023. https://www.reuters.com/world/china/china-food-security-law-comes-into-force-aims-absolute-self-sufficiency-2024-05-31/

The PRC has also significantly increased its imports of feed grains and wheat from the central Asian countries and others along the Belt and Road initiative.[13] Very recently, the PRC authorized the import of two genetically modified (GMO) corn varieties grown in Argentina. This decision will further diversify the PRC's corn supplying portfolio and will open new export opportunities for Argentinean corn producers.[14]

IV. Challenges for the PRC to achieve overall food self-sufficiency

- What are the greatest challenges China faces in attaining its goals in stockpiling, self-sufficiency, and overall agricultural security?
- Given China's changing demographics and rising levels of education, does China have the labor force it needs to attain self-sufficiency in agricultural production?
- In the event of a protracted crisis where a portion of the labor force is unavailable to farm, would China be able to maintain the level of agricultural productivity necessary to sustain self-sufficiency? If so, for how long? If not, what may the government do to fill in the gap in production?
- To what extent do China's current challenges with environmental pollution limit its ability to attain self-sufficiency in agriculture and water management?

Despite the growing policy focus on improving the PRC's food security status, the country faces serious structural issues and unpredictable shocks that may undermine those efforts. This section discusses such challenges and the PRC's ability to address those problems in the long run.

Loss and shortages of arable land

Despite being the third largest nation in the world, the PRC falls behind other major food producing countries in terms of the availability of arable land. Rapid urbanization, pollution, and uses of land for other purposes have all contributed to a rapid decline of agricultural land in the PRC. Between 2013 and 2019, the PRC reported a decline of over 5 percent of its arable land, largely attributed to destructive farming practices and local governments repurposing agricultural land for infrastructure and real estate.[15]

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[13] Chris Lyddon, "Food security emerges as top priority for China," *World Grain*, 14 August 2023. https://www.world-grain.com/articles/18900-food-security-emerges-as-top-priority-for-china

[14] Farm Journal AgWeb "Argentina on Track to Start Corn Exports to China in July," May 28, 2024 https://www.agweb.com/markets/pro-farmer-analysis/argentina-track-start-corn-exports-china-july#:~:text=Meanwhile%2C%20China%20authorized%20the%20import,were%20awaiting%20certification%20for%20importation

[15] Jinxia Wanga et al., "Growing Water Scarcity, Food Security and Government Responses in China," Global Food Security 14 (2017): 9–17, https://doi.org/10.1016/j.gfs.2017.01.003.

The pollution rate in the country's farmland soil is estimated at 10 percent, and about 2.5 percent of that land cannot be cultivated due to excessive contamination with heavy metals.[16] As a result, it is estimated that the country has a domestic planting area shortage of 90 million hectares. This farmland shortage is expected to worsen and will further undermine the PRC's goals of food self-sufficiency. Due to its severity, this issue captured the attention of the Chinese political class and Xi expressed concerns over the fast degradation of the nation's farmland. As a response, the the Central Document No. 1 from 2019 set out a "farmland red line" policy with a target of preserving at least 120 million hectares of farmland - an area slightly larger than Sweden.[17] In pursuit of this goal, the PRC has introduced farmland restoration measures, crop rotation practices, and fallow land systems.

Additionally, Chinese authorities created a strategy for "reclaiming" farmland by reverting agricultural land that had been repurposed for industry, real estate, and infrastructure. In addition, the National High-Standard Farmland Construction Plan (2021–2030) laid out a national plan for enhancement of farmland quality. Furthermore, the CCP accepted a growing reliance on imported soybeans to free up millions of cropland acres for other higher yielding crops.

Despite these efforts, as environmentalist and pundits had predicted, production growth for rice, wheat, and corn has slowed down during the last decade mostly due to decreases in area planted. It remains unclear whether central and local authorities will be successful in protecting farmland against alternative and more lucrative uses.

Climate change

Due to climate change, the PRC will face increases in the frequency, duration, and intensity of extreme weather events such as droughts and severe flooding. These weather shocks will impact agricultural production in the PRC and in its main supplying countries and present risks to the country's food security both in the short term and long term. As an illustrative example, the summer in 2022 was the country's driest and hottest since consistent records began being kept in 1961. During that year, severe droughts impacted the Yangtze River Basin which produces two-thirds of the nation's rice - the most widely consumed staple in the country.[18] Academic research presented evidence that shifting climate patterns coupled with ozone pollution accounted for yield loses of 10 percent in the PRC. Between 1981 and 2010, this amounted to annual loses of 55 million tons of crops.[19]

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[16] Wang, "The Challenges and Strategies of Food Security"; Bishwajit Ghose, "Food Security and Food Self-Sufficiency in China: From Past to 2050," Food and Energy Security 3, no. 3 (2014): 86–95, https://doi.org/10.1002/fes3.48.

[17] Zongyuan Zoe Liu, "China Increasingly Relies on Imported Food. That's a Problem," *Council on Foreign Relations*, January 25, 2023. https://www.cfr.org/article/china-increasingly-relies-imported-food-thats-problem

[18] Genevieve Donnellon-May and Zhang Hongzhou, "What Do We Really Know About China's Food Security?" The Diplomat, February 07, 2023. https://thediplomat.com/2023/02/what-do-we-really-know-about-chinas-food-security/

[19] Tian Hanqin et al., "Climate extremes and ozone pollution: a growing threat to China's food security," Ecosystem Health and Sustainability 2, no. 1 (2016).

The climate risk has been exacerbated by the growing geographic concentration of global production of key agricultural commodities. In this context, we could see global stocks plummeting and prices surging when adverse weather simultaneously impacts crop production in various major producers of a particular commodity (e.g., major floods impacting soybean crops in Argentina and Brazil or severe droughts disrupting wheat production in Russia and Australia). In response to these growing threats to its food security, the PRC has focused on building resiliency within its agricultural sector by: funding very large public investments seeking to mitigate the negative impacts of climate change, promoting more sustainable agricultural practices, encouraging farmers to switch to crops that cope better with adverse weather conditions, etc.[20]

Labor shortages

As the PRC continues economic transition, labor force will continue to migrate out of rural regions toward more urban and industrial areas as people search for higher pay jobs. A decreased availability of agricultural laborers could become a constraint in the country's effort to increase its agricultural production. The PRC aspires to overcome this growing constraint by fomenting technological innovations in agriculture (e.g., farming drones, application of AI, etc.) as well as an increasing mechanization in farming operations. The PRC's government has also introduced a series of subsidies and fiscal incentives (i.e., abolition of taxes on agriculture) to turn farming into a more lucrative and appealing economic activity. As birth rates decline and rural-urban migration continues to flow, the labor pool in farming areas will continue to shrink and it is not clear whether the PRC will succeed in reversing this trend.

Water and land pollution

The PRC's agricultural sector became heavily dependent on irrigation after important public investments over the last five decades to expand irrigated crop areas. Today, half of the cultivated land is irrigated and between 70 and 90 percent of Chinese grain, cotton, and vegetable production comes from this irrigated land. However, the sustainability of the current agricultural model is now in question due to widespread water scarcity.[21] Irrigation agriculture accounts for 60 percent of the PRC's total water demand and is characterized by inefficient delivery—30 to 40 percent efficiency versus 70 to 80 percent in developed countries.

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[20] Kevin Dong, Mallie Prytherch, Lily McElwee, Patricia Kim, Jude Blanchette, and Ryan Hass, "China's Food Security: Key Challenges and Emerging Policy Responses," Center for Strategic and International Studies, March 15, 2024.
https://www.csis.org/analysis/chinas-food-security-key-challenges-and-emerging-policy-responses

[21] Jinxia Wanga et al., "Growing Water Scarcity, Food Security and Government Responses in China," Global Food Security 14 (2017): 9–17, https://doi.org/10.1016/j.gfs.2017.01.003.

Another problem is that PRC's freshwater resources are geographically unevenly distributed, with 80 percent of the water resources concentrated in southern providences; the northern part of the country is expected to run dry within thirty years. This spells trouble for food security because the northern provinces account for 65 percent of the country's cultivated land and 50 percent of the country's grain production.

The groundwater water table in the PRC has fallen steadily or has been contaminated following over forty years of excessive water withdrawals. In addition, there have been significant declines of the river runoff across the six major river basins. The United Nations concluded that the PRC is facing extreme water shortages and the underlying causes behind this water crisis include growing demands from the agricultural sector, rapid urbanization, and pervasive pollution of water sources. Climate change will likely worsen water scarcity in all river basins in northern providences and some river basins in the south. If not addressed, water scarcity will endanger irrigated agricultural production of wheat and rice—productivity of these two crops in rainfed areas is much lower than yields from irrigated operations.

The PRC authorities are trying to address these problems with significant investments in water-saving technologies, enhancement of agricultural irrigation systems, and very large projects such as the South-North Water Diversion project; however, progress is impossible to monitor and some of the larger water projects are plagued with delays, disputes between provincial governments, and questions about their long-term environmental impacts.

Food Waste

In line with what occurs in developed economies, food waste is also a growing problem in the PRC. Due to inefficiencies, it is estimated that between 14 and 18 percent of Chinese total grain production is lost along different stages of the supply chain—production, processing, and distribution or transportation. The CCP has been tackling this issue and launched a national campaign last year in which President Xi Jinping asked people not to waste food. Chinese authorities are also encouraging families to preserve food stocks that could be interpreted as setting the stage for a scenario in which they may need to implement stringent measures to secure food supplies.

V. The PRC's Grain Stockpiles

- In which agricultural commodities is China seeking to stockpile and bolster self-sufficiency, and why? What are current agricultural stockpiles volumes and domestic production levels, and how much would these levels need to increase to meet the government's goals, if at all? Is this attainable?

The PRC routinely maintains large stockpiles of selected grains, but these are a state secret, and outsiders can only speculate about their location, true size, and quality. Official communications state that the PRC has built nearly 700 million metric tons of grain storage capacity[22]; however, some experts argue that Chinese officials might not know exactly how much grain is stored at any given time because of the difficulty of tracking these stockpiles.

Another important unknown has to do with how long these strategic reserves would sustain the PRC in the event of a conflict or major trade disruptions. It is not possible to accurately estimate that, but anecdotal evidence indicates that the PRC has somewhere between one to two years' worth of stocks of key agricultural commodities.

Another critical function of these stockpiles is to stabilize domestic prices of key agricultural commodities. For instance, Chinese authorities might release stockpiles into the market when facing upward price pressures in one specific commodity (e.g., corn prices shot upward in 2020 and they sold excess wheat stocks to feed companies). In other instances, the PRC stockpiled too much of a commodity and had to release stocks (to the domestic and export markets) in a gradual manner to avoid crashing domestic prices. The observed reality is that, in recent years, the PRC achieved food price stability amid major disruptive shocks such as the COVID-19 outbreak and the war in Ukraine. In contrast many other nations such as the United States and the European Union have been grappling with persistent food inflation.

The USDA Production, Supply and Distribution (PS&D) data supports the idea that the PRC has amassed very large commodity stockpiles. An analysis of PS&D ending stock numbers indicate that PRC now accounts for significant and growing shares of the world's grain reserves. For instance, in the 2023/24 season, the PRC accounted for 67 percent of the world's corn ending stocks and nearly 60 of the world's rice stocks (see figure 4).

The observed growth in commodity stock levels should be explained by either increases in domestic production, larger imports, or a combination of both. According to Chinese officials these massive stockpiles have been supported by bumper crops for 19 years in a row. More specifically, with few exceptions, the China Statistical Yearbook has been reporting annual increases in domestic grain production. However, some pundits question such claims and point out that the PRC's fast-growing imports are indicative of its inability to keep up with expanding domestic consumption. Some studies argue that the actual domestic grain production is significantly lower than what is officially reported due to: (i) government subsidies to the major grain-producing counties that created incentives for over-reporting production; and (ii) the higher risk of data manipulation and misreporting at the lower administration level.

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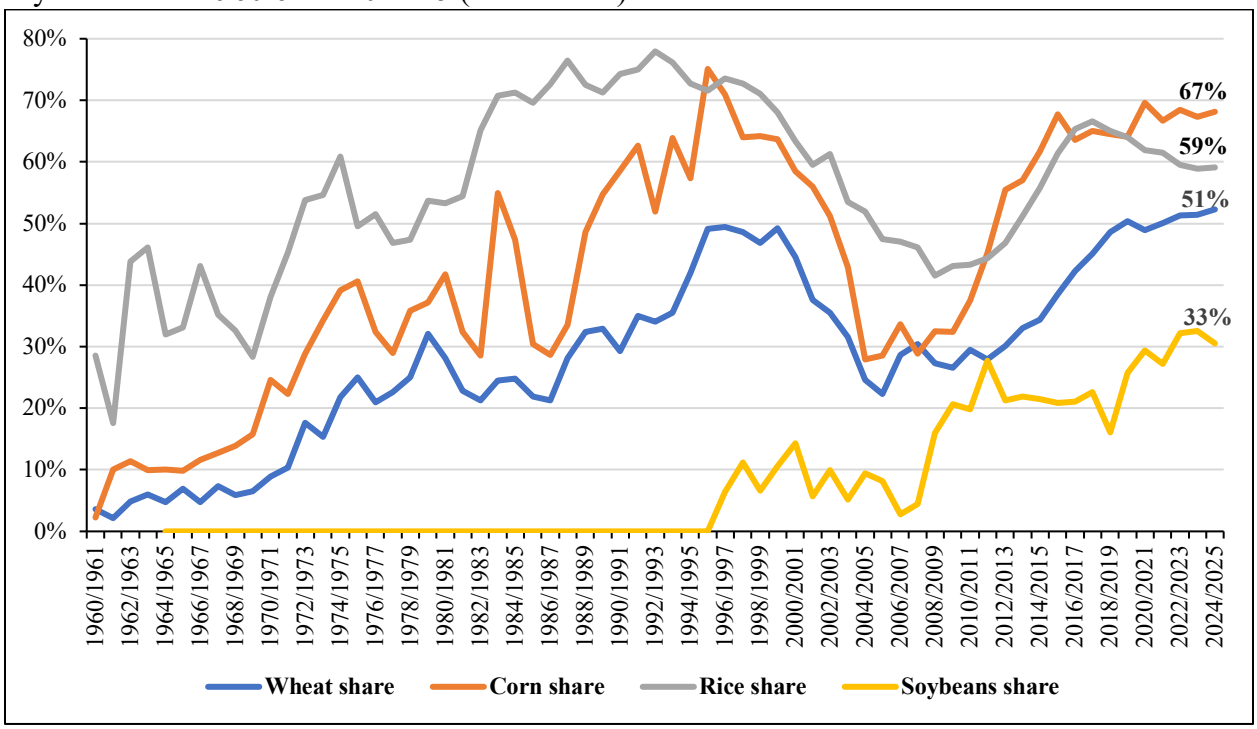
[22] Cui Can, "Official: China's ability to safeguard food security enhanced," *The State Council Information Office of the People's Republic of China*, China SCIO, May 11, 2023. *http://english.scio.gov.cn/m/pressroom/2023-05/11/content_85284741.htm#:~:text=China%20has%20been%20improving%20its,operation%2C%20an%20official%20said%20Thursday.*

Figure 4. The PRC's share of the world's annual ending stocks for wheat, corn, rice, and soybeans from 1960/61 to 2024/25 (Metric tons).



Source: USDA

There are also concerns about the accuracy and reliability of grain reserves data due to lack of transparency and recent arrests and investigations associated with corruption – note that the current Agriculture Minister Tang Renjian is now under investigation by the anti-graft agency for "serious violations" of the law. In addition, there are also questions about the quality of the grain reserves. That is because such massive stocks require a very large grain storage infrastructure and complex management to ensure the quality of those stored commodities.[23]

VI. Indicators of preparation for conflict

- To what extent can outside observers distinguish between preparations for conflict and preparations for other types of non-security related crises (such as a natural disaster) in the agricultural sector? Are there certain metrics that would conclusively indicate China is preparing for a conflict?

[23] Genevieve Donnellon-May and Zhang Hongzhou, "What Do We Really Know About China's Food Security?" *The Diplomat*, February 07, 2023. https://thediplomat.com/2023/02/what-do-we-really-know-about-chinas-food-security/

There has been a clear effort by Chinese officials to reduce the nation's high dependency on imported soybeans and overall oils/oilseeds; however, it is very difficult to discern whether this is just a government's reaction to this vulnerability or another step in the preparations for conflict. Furthermore, reliability issues with the PRC's official agricultural data makes it hard to judge the state of its food security situation and the true calculus behind some recent agricultural policies. Despite the obstacles, U.S. observers should identify and monitor unusual/unexpected developments that deviate from normal market considerations. Below are some examples of possible indicators:

- A significant and prolonged surge in soybeans and soymeal imports that goes counter to market signals. An example of such scenario would be a surge in soybean and soybean meal imports in a context of very low profit margins for Chinese hog farms, reduction in hog herd sizes or contracting demand for pork meat amongst Chinese consumers.

- Another example would be PRC purchasing large volumes of U.S. soybeans in the months following soybean harvest season in South America, which stretches from January to June. This is because during those months, the PRC normally gets most of its soybean imports from Brazil, Argentina, and Paraguay as they become more price competitive than U.S. soybeans.

- The PRC's population is no longer growing or might have started to decline; however, as more families move up to the middle class, demand for meat and dairy will likely continue to increase in coming years. To meet this growing demand, the PRC will have to increase its livestock and dairy production or resort to more imports. In that context, increases in imports of oilseeds (for poultry and hogs) and feed grains (for beef and dairy operations) that are not matched by proportional increases in livestock production could point to an expansion of strategic grain reserves beyond their current levels. If detected, such trend should warrant closer monitoring and analyses.

- The United States and its allies should also watch for unusual surges in the PRC's imports of food products with longer shelf lives. For example, Chinese imports of dairy products have grown dramatically in recent years, and milk powder accounts for half of those imports, mostly originating from New Zealand. It must be noted that milk powder is widely used to produce infant formula and other milk products. Chinese consumers became increasingly suspicious of domestic milk products after a series of deadly food contamination scandals involving infant formula. If the PRC anticipates a conflict to disrupts its dairy imports, it is reasonable to expect the share of milk powder to increase at the expenses of other fresh dairy product imports because of its extended shelf live. Another possible course of action would be for the PRC to expand its domestic dairy production. However, this would only increase the need for more imported animal feed.

- The PRC is also a large exporter of certain agri-food commodities such as fish and seafood, vegetables, fruits, nuts, and vegetable oils, among others. Food products account for nearly 7 percent of the total volume of Chinese exports and 2.5 percent of their value. Gradual or sudden decreases in Chinese traditional agricultural exports that are not explained by market factors could indicate a redirection of exports toward stockpiling the national strategic food reserves.

- In the past, the PRC resorted to imports when domestic commodity prices for specific grains were high relative to global prices. For instance, when adverse weather conditions impacted the 2021 Chinese corn crop, domestic prices soared, and the PRC imported record levels of corn from the United States and other countries. Therefore, noticeable increases in commodity imports in a context of low domestic prices would go against economic logic and should warrant close monitoring as they could be motivated by nonmarket factors.

- Another relevant indicator would be a significant and counterintuitive shift in the PRC's food imports portfolio. Bulk commodities and grains continue to account for the largest share of the nation's agricultural imports. However, rising income levels of Chinese households has transformed their tastes and sparked a demand for higher value imported foods such as wine, coffee, and tea. A sudden decrease in imports of luxury and value-added food products coupled with unusual surges of staple food imports could represent an effort to build reserves that cover basic nutritional needs during conflict at the expenses of luxury food products. Another example would be an increase in imports of specific types of wheat that are used in certain breads and processed goods that may not be typically grown in the PRC.

5. How might China's targeted agricultural stockpile volumes and domestic production increase in the lead up to a period of higher activity, such as in a conflict or crisis scenario?

It is unlikely that stockpiles will reveal obvious information about preparations for conflict because it is hard to assess the true rationale behind observed increases in stock levels (e.g., demand-driven or price opportunistic build up versus preparations for possible embargos and trade disruption). Moreover, food supply for military is top secret in the PRC.

Soybeans present a good case study that illustrates this issue. Every year, the PRC imports very large volumes of soybeans (105,000 metric tons in 2022/23 crop year) to be crushed for soybean meal and soybean oil. Those soybeans that are not crushed in any given year, are assumed to go into stocks. However, due to lack of accurate data, it is no longer possible to fully track soybean crushing pace in the PRC. As a result, it is difficult to accurately estimate the volume of soybeans being stockpiled.

Despite the unknowns and lack of reliable data, the PRC has increased its stocks of major commodities to very high levels in recent years (see figure 1), Thus, it is important to continue monitoring stockpile levels in the upcoming years and contrast them against ongoing supply and demand conditions.

VII. Potential global impacts associated with the PRC achieving food self-sufficiency

- What could be the global economic impact of China's pursuit or achievement of self-sufficiency in agriculture? What would be the social and political impacts?

As previously stated, it is highly unlikely that the PRC will ever achieve self-sufficiency in a number of agricultural products. However, if ever materialized, such scenario would certainly reshape global agricultural markets and therefore warrants discussion.

The most significant impact would be the loss of the PRC as a primary destination market for many food product exports produced by global agricultural powerhouses such as the United States, Brazil, Argentina, Australia, New Zealand, Paraguay, among others. Some of these nations' macroeconomic stability are very dependent on their agricultural export sector for tax revenues and foreign currency. For instance, soybeans are now Brazil's primary agricultural export commodity by volume, accounting for more than 60 percent of the soybeans grown domestically. Furthermore, exports from the soybean complex (i.e., soybeans, soybean oil, and soybean meal) reached $67.3 billion in 2023, which represented 40 percent of Brazil's total export revenue.[24]

For the United States, the loss of one its main export destination market would completely reshape its agricultural sector as farmers would have to find alternative markets or switch crops and farming activities. As an example, following the U.S.-China trade war, the United States began to pursuit alternative markets for its soybeans. This diversification efforts have resulted in important increases in U.S. soybean exports to other markets such as Egypt, Mexico, Japan, Indonesia, Taiwan, and Bangladesh. Interestingly, Brazil continues to become more dependent on the Chinese market.

Another possible strategy to soften the loss of the PRC export market would involve policies and private investments that result in higher use of feedstocks and other agricultural products by other parts of the U.S. economy (e.g., energy sector). It is important to note that the U.S. soybean crush capacity has experienced rapid and steady growth since 2021 to meet an increasing demand for soybean oil, particularly from the renewable diesel sector.

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[24] Colussi, J., G. Schnitkey, J. Janzen and N. Paulson. "The United States, Brazil, and China Soybean Triangle: A 20-Year Analysis." farmdoc daily (14):35, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, February 20, 2024.

An important caveat is that such impacts would not be felt immediately by the agricultural exporting nations as it would take many years for to the PRC to achieve food self-sufficiency. For some agricultural products those goals are unlikely to be ever achieved (e.g., soybeans and other oilseeds). The slow progress by the PRC would give nations time to adjust their agricultural policies, traders to seek new markets, and farmers to change their crops.

VIII. Policy recommendations

- The Commission is mandated to make policy recommendations to Congress based on its hearings and other research. What are your recommendations for Congressional action related to the topic of your testimony?

The opacity and dearth of reliable data on food production and stockpiling makes it very difficult for outsiders to depict an accurate picture of the food security situation in the PRC. As a result, it is very difficult for U.S. analysts to assess whether actions and in the PRC's agricultural space (i.e., increase in commodity imports, changes in trade patterns, new agricultural policies) are simply market driven, politically motivated, or in a worst-case scenario, a preparation step toward conflict.

This is a blind spot that would require close interagency collaboration between federal government agencies with the specific technical expertise (e.g., U.S. Department of Agriculture) and the intelligence community (IC) which could collect new information and data. Such cooperation could yield the following results:

1) The identification and monitoring of indicators and metrics in the agricultural space that may signal potential preparations for a conflict by the PRC.
2) The joint analysis and interpretation of collected data and intelligence.

The creation of such working groups would require new authorizations and appropriated funding. Dedicated funding should support the deployment of federal government agencies' subject matter experts (SMEs) to work closely with the IC - as a core part of their work rather than as an additional duty.

If the United States is to effectively exploit the PRC's dependency on food import as part of broader economic statecraft, it will need to work closely with other countries to forge an effective coalition against the PRC in the event of a conflict. That is because a trade embargo or a naval blockade might not be sufficient or feasible options for the United States to truly disrupt critical Chinese imports such as animal feeds. Thus, the United States must strengthen its economic and diplomatic ties with other global agricultural powerhouses such as Brazil, Argentina, or Ukraine and perhaps even begin to design compensation mechanisms that would incentivize these nations to temporarily forego their agricultural exports to the PRC in the case of conflict. Such conversations should involve the participation of a broad set of stakeholders such

as the State Department, U.S. Department of Agriculture, the Office of U.S. Trade Representative, academic experts, industry groups, among others.