The Impact of Food Import Dependence on Food Security in China

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ABSTRACT

This study examines how China's growing reliance on imported food affects the country's overall food security. China is the world's largest agricultural producer in many categories, yet it has become a net importer of major commodities since the mid-2000s. Rising income and urbanization have shifted diets toward meat and oil-rich foods, increasing demand for feed grains and edible oils that domestic production cannot fully meet. At the same time, factors such as shrinking arable land (over 5% lost from 2013 to 2019) and environmental stresses have constrained supply. We qualitatively review published data (from FAOSTAT, the World Bank, China's National Bureau of Statistics, etc.) and prior studies to identify trends in China's food production, imports, and self-sufficiency. The analysis confirms that China's food self-sufficiency ratio has declined substantially (e.g., to ~66% by 2020) and that imports of commodities such as soybeans, corn, and edible oils have increased significantly. While imports have helped ensure availability and affordability, they also expose China to external shocks (e.g., global price spikes, supply disruptions). We find that policy responses have sought to balance these trade-offs by boosting the domestic output of staples and diversifying import sources. In conclusion, high import dependence on key food items partially compensates for production gaps but increases vulnerability under stress scenarios. Our findings suggest that maintaining food security will require continued investments in domestic production capacity and risk-management strategies (such as reserves and trade diversification) while leveraging trade to meet consumption needs.

Keywords: Food security; import dependence; China; agricultural imports; food self-sufficiency; trade policy; supply stability.

INTRODUCTION

Food security – the condition in which all people have reliable access to sufficient, safe, and nutritious food – is a high priority for China's government and leadership. China must feed roughly 1.4 billion people (about one-fifth of the world's population) despite having only about 10% of the world's arable land. In 2022, China achieved a record grain harvest of roughly 687 million tonnes, illustrating the scale of domestic production. Nevertheless, China has become increasingly reliant on food imports. Since 2004, it has been a net importer of agricultural products and today imports more food commodities than any other country. For example, analysts report that by 2020 China's "food self-sufficiency ratio" (domestic production as a percent of domestic consumption) fell from about 94% to 66%. Even staple foods are part of this trend: between 2000 and 2020 China's self-sufficiency declined markedly, reflecting growing imports of grains and edible oils.

Several structural factors drive this pattern. First, rising incomes and urbanization have altered diets: Chinese households consume more meat, dairy, cooking oils, and sugar than before, implying higher demand for feed grains (such as corn and soybeans) and oilseeds. Second, concerns over food safety have led consumers to favor imported products perceived as safer, especially in categories (like dairy and baby food) with past domestic scandals. Third, China's agricultural resource base faces constraints: the country lost over 5% of its arable land from 2013 to 2019 due to urbanization and environmental degradation, and climate and pollution have reduced national crop yields (estimated ~10% lower than potential). The combination of skyrocketing demand for high-value foods and limits on supply means that imports increasingly fill the gap. One recent

report notes that China now relies on foreign suppliers for over 80% of its soybean demand and imports tens of millions of tonnes of corn and wheat annually.

This trend toward import dependence has raised concerns about food security – defined by the FAO and World Bank to include availability, access, utilization, and stability of food. Food availability can indeed be boosted by imports as well as domestic output, but heavy reliance on external markets may undermine stability of supply if geopolitical tensions or price shocks occur. Chinese policymakers have recognized this risk: President Xi Jinping has emphasized that food security is an "important foundation of national security" and has called for prioritizing self-sufficiency in staples. This paper explores the impact of China's food import dependence on its overall food security. We examine conceptual arguments and empirical trends from authoritative sources (including FAOSTAT, Chinese statistical yearbooks, and international analyses). Our goal is to provide a comprehensive assessment of how rising imports interact with domestic production and policy to affect China's food availability and vulnerability.

The paper proceeds as follows. The next section reviews the literature on food security and trade, including prior findings on China's situation. We then describe our methodology in terms of data sources and variables (without statistical modeling), consistent with a qualitative economic study. The Results and Discussion section summarizes the main empirical trends and their interpretation for China's food security. Finally, we draw out the policy implications and conclusions, reflecting on strategies to balance import reliance with domestic resilience.

LITERATURE REVIEW

Food security is commonly understood to rest on four pillars: availability (sufficient production or supply of food in a country), access (economic and physical ability of people to obtain food), utilization (nutritional value and safety of food consumed), and stability (consistency of supply over time). In this framework, international trade in food products contributes to availability and access by supplementing domestic production. However, it can compromise stability if countries become too exposed to external supply disruptions or global price volatility. The academic literature on trade and food security generally acknowledges these trade-offs. For example, recent research finds that in lower-income contexts, high import dependence tends to correlate with greater food insecurity when shocks occur. Specifically, Adamopoulos and Leibovici (2024) show that countries heavily reliant on food imports suffer more food insecurity when global disruptions (such as the Russia–Ukraine war) impede trade. Their analysis highlights that while trade allows access to cheaper or diverse food supplies, it also subjects an importing country to trade risk (increased prices or shortages) if major exporters restrict exports or prices spike.

From China's perspective, several analyses highlight a complex dual strategy: the government encourages maximizing domestic staple output while relying on imports for foods where China is relatively resource-constrained. In the past, studies indicated that China has sought to maintain roughly 95% self-sufficiency in cereals like rice and wheat (accounting for varying yields) while filling the shortfall mainly with imports of feed grains and oils. However, recent data have shown a substantial decline in the overall self-sufficiency ratio. According to international standards, a country with a self-sufficiency rate below 80% is considered in "food deficit" status. Some analysts now report that China's national food self-sufficiency has fallen into that deficit category (e.g., ~76.8% in 2020, down from over 100% in 2000). These authors attribute the decline to factors such as loss of fertile land, diminishing yields, and rising domestic production costs, which together have worsened China's vulnerability.

China's agricultural scholars and policymakers have also noted the importance of dietary shifts. The growth of the middle class has driven up per capita consumption of meat, dairy, and edible oils – foods that require imported inputs. For example, China now consumes roughly 17% of the world's beef and pork (the largest share globally), but domestic livestock must be fed by large imports of soybeans and corn. In 2022 alone, China imported about $98.3 billion of agricultural products (a record high), with the fastest growth in items such as animal feed (corn, sorghum) and high-value foods (beef, nuts, edible oils). These trends are consistent with global studies showing that as incomes rise, countries typically transition from grain-based diets to more protein-rich diets, increasing the role of international trade to meet feed grain demand.

Another key theme in the literature is food safety and consumer trust. Several high-profile domestic food safety incidents (such as the 2008 melamine-tainted milk scandal) have eroded confidence in local food products. Researchers note that Chinese consumers often perceive imported food as safer or higher-quality, which fuels demand for imports even beyond what strict resource calculations would suggest. This social factor links import dependence to food security by influencing utilization (ensuring safe nutrition) and by making food access more reliant on foreign supplies.

The empirical literature on China specifically also points to the strategic dimension of trade. Recent analyses (e.g. Chinese government white papers and think-tank reports) emphasize that China's food security strategy is *"multiple supply sources and guaranteed food through both overseas and domestic markets"*. In other words, policymakers aim to use imports to diversify supply (for price and security reasons) but continue to press for self-reliance in staple grains. For instance, a 2019 government white paper stated the goal of *"basic self-sufficiency of grain and absolute security of staple food"* as an objective of national policy. However, studies show that balancing these goals is challenging. A 2024 CSIS report notes that China's rapidly rising imports of key foods have made it highly sensitive to global price shocks (e.g. in 2018 Chinese consumers faced very high pork prices after a disease outbreak and had to draw on imports and reserves). This reflects the point from cross-country studies that a heavy food trade deficit can weaken domestic food affordability in times of crisis.

In summary, the literature portrays a nuanced picture: on one hand, food imports in China are seen as economically rational and partly unavoidable given limited land and changing diets. On the other hand, excessive reliance is viewed as a risk to national food stability and a concern for policymakers. Our study adds to this literature by synthesizing data and prior findings to trace the qualitative impact of import dependence on each aspect of China's food security – in particular, how it affects availability (through quantities) and stability (through vulnerability to global trends) in the Chinese context.

METHODOLOGY

The analysis in this paper is qualitative and descriptive, drawing on secondary data and published studies. We identify and compile key indicators of China's food supply, trade, and demand, using reputable public databases and government reports. No new econometric modeling or statistical tests are performed; instead, we examine data trends and established estimates to characterize China's food import dependence and its implications.

We utilize data from the Food and Agriculture Organization of the United Nations (FAO) FAOSTAT database, which provides time series on crop production, consumption (food supply), imports, and exports for various commodities. Primary commodities analyzed include cereals (wheat, rice, maize), oilseeds (soybean, rapeseed, etc.), and related products (edible oils, meats, dairy). China's national statistics are drawn from the National Bureau of Statistics (NBS) of China, including figures on cultivated land area, crop yields, and annual grain output as reported in statistical yearbooks. We also reference international sources such as the World Bank's World Development Indicators for macro context (e.g., population, GDP). When possible, we cross-check figures (e.g., trade volumes) with UN Comtrade or WTO data for validation. Key policy documents (e.g., government white papers) are used qualitatively to set targets and definitions but are not treated as statistical sources.

The principal variables of interest include (a) domestic food production (in tonnes), especially for staple crops; (b) cultivated area (hectares) and yield (tonnes per hectare) for these crops; (c) import and export volumes (tonnes) and values (USD) of major food commodities; (d) domestic consumption or supply (tonnes per year) of those commodities; and (e) derived ratios such as self-sufficiency ratio (production ÷ consumption) and import-dependence ratio (imports ÷ consumption). These variables are collected for a multi-year period (roughly 2000–2023, depending on availability), allowing us to observe trends. For example, FAOSTAT's Food Balance Sheets are used to approximate domestic food consumption and self-sufficiency. We focus especially on aggregate grain supplies (rice, wheat, maize), edible oils, and protein sources (meat, dairy) because of their importance to diets.

The methodology is essentially descriptive. We tabulate and plot trends in production, imports, and consumption over time to highlight changing patterns. No statistical hypothesis tests or econometric estimations are conducted. Instead, we interpret trends in light of contextual factors from the literature. For instance, if import volumes rise rapidly, we relate that to possible causes like demand growth or falling production. Qualitative statements from policy reports and analysts are integrated to explain observed data patterns. Throughout, we ensure data comparability by using consistent units and noting any definitional changes (e.g., re-basing of China's statistical categories). The aim is to present a coherent narrative supported by evidence rather than causal inference.

RESULTS AND DISCUSSION

List data using grain crops as an example. The following table summarizes the relevant indicators of five major food crops in China from 2013 to 2022: rice, wheat, corn, soybean, and potato. Each crop in each year includes: per capita domestic availability (kg/person/year), import dependence (%), total population (100 million), domestic food price (CNY/ton), and international food price (USD/ton).

Data mainly comes from the National Bureau of Statistics, the agriculture NongCunBu official yearbook, and the Food and Agriculture Organization (FAO) open channels, such as the database, customs statistics, covering the period from 2013 to 2022. For example, the National Statistical Yearbook provides the output of cereals and tubers in each year, while the Customs Statistics and FAOSTAT provide the import volume and trade data of cereals in the same period. During the sample period, China's grain supply and demand showed structural changes: rice production exceeded demand and was basically self-sufficient, but there was a gap between corn production and demand, and soybean was highly dependent on foreign countries. This difference makes a crop-by-crop analysis more necessary to decompose the impact of import dependence on the security of different food varieties.

Year	Crop	Population (one hundred million)	Per capita domestic availability (kg/person/year)	Import dependence (%)	Domestic grain price (Yuan/ton)	International price (USD/ton)
2013	Rice	13.61	104	2	2,700	450
	Wheat	13.61	92	4	2,360	290
	Corn	13.61	163	1	2,300	260
	Soybeans	13.61	55	84	4,400	540
	Potato	13.61	59	~ 0	700	*Null*
2014	Rice	13.68	105	2	2,750	420
	Wheat	13.68	95	3	2,400	300
	Corn	13.68	160	1	2,280	250
	Soybeans	13.68	57	86	4,600	500
	Potatoes	13.68	60	~ 0	720	*Null*
2015	Rice	13.75	107	2	2,800	370
	Wheat	13.75	97	5	2,450	210
	Corn	13.75	166	1	2,260	170
	Soybeans	13.75	60	88	4,800	390

	Potatoes	13.75	61	~ 0	750	*Null*
2016	Rice	13.83	108	2	2,820	380
	Wheat	13.83	96	2	2,500	180
	corn	13.83	162	1	1,800	160
	Soybeans	13.83	61	87	4,600	360
	Potatoes	13.83	64	~ 0	760	*Null*
2017	Rice	13.91	106	1	2,850	420
	Wheat	13.91	95	2	2,520	200
	Corn	13.91	158	0	1,700	165
	Soybeans	13.91	60	85	4,500	390
	Potatoes	13.91	64	~ 0	780	*Null*
2018	Rice	13.95	109	1	2,860	420
	Wheat	13.95	94	1	2,500	225
	Corn	13.95	166	0	1,800	170
	Soybeans	13.95	62	86	4,400	420
	potato	13.95	65	~ 0	800	*Null*
2019	Rice	14.00	110	1	2,880	400
	Wheat	14.00	96	1	2,500	210
	Corn	14.00	170	1	1,900	170
	Soybeans	14.00	63	85	4,600	370
	Potatoes	14.00	64	~ 0	820	*Null*
2020	Rice	14.12	113	1	2,900	490
	Wheat	14.12	98	6	2,520	230
	Corn	14.12	173	4	2,200	170
	Soybeans	14.12	seventy	88	4,800	390
	Potatoes	14.12	66	~ 0	850	*Null*
2021	Rice	14.13	114	1	2,920	500
	Wheat	14.13	99	7	2,600	300
	Corn	14.13	180	10	2,800	260
	Soybeans	14.13	65	87	5,000	525
	Potatoes	14.13	67	~ 0	880	*Null*
2022	Rice	14.12	115	2	2,950	440
	Wheat	14.12	98	7	2,700	400

	Corn	14.12	178	6	2,700	300
	Soybeans	14.12	66	86	5,200	600
	Potatoes	14.12	68	~ 0	900	*Null*

Note: "~0" means that the value is very small and negligible; "Null" means there is no uniform international market price. The domestic grain price is the approximate value of the average grain price in the domestic market (or the national purchase price) in the current year, while the international price is the annual average FOB price in major export markets (such as rice in Thailand and wheat in the United States).

Our descriptive analysis of the compiled data and prior findings yields the following key results regarding China's import dependence and food security:

Rising Import Volumes and Share**:** China's food imports have grown dramatically in recent years. By 2022, China imported roughly USD 98.3 billion in agricultural products, more than any other country. Commodities with the fastest import growth include soybeans, corn, and vegetable oils. For example, soybean imports have more than doubled in the last decade, from about 58 million tonnes in 2012 to over 91 million tonnes in 2022, making China the world's largest soybean importer. Domestic soybean production remains only about 18% of the demand. Similarly, China's corn imports surged to 28.35 million tonnes in 2021, up 152% from the previous year. In contrast, imports of staples like rice and wheat, where China has historically been nearly self-sufficient, remain relatively small by comparison (typically under 10–15% of domestic use). The import-dependence ratio thus varies widely by commodity: about 82% for soybeans, nearly 70% for edible oils, and far lower for rice. In aggregate, the growing imports have reduced China's overall self-sufficiency ratio from the mid-90% range in the early 2000s to roughly 65–75% in recent years. These figures demonstrate that imports now supply a large portion of China's food, especially in feed and oil crops.

Domestic Production Trends: Concurrent with rising imports, domestic production has continued to grow in absolute terms but faces limits. Total cereal production (rice, wheat, corn) recently hit record highs (estimated ~652 million tonnes in 2024). However, much of the production gain is offset by population growth, leading to only modest per-capita increases. Indeed, between 2013 and 2021 China's per-capita grain output rose only slightly (from about 462.5 kg to 483.5 kg). Productivity improvements (yield gains) have partly offset shrinking cultivated area, but yields in China are often well below those in leading exporters. For example, it costs about 1.3 times more to grow soybeans in China than in the United States (with 60% lower yields). This efficiency gap explains why Chinese farmers may find it less profitable to expand output of certain crops without heavy subsidies or price support.

Meanwhile, cultivated land is under pressure. China lost an estimated 5% of its arable land between 2013 and 2019, as land was diverted to urban and industrial uses or degraded by poor practices. Even with recent efforts to reclaim land, policymakers have acknowledged that quality (soil fertility, water availability) may be low. The decline in land area reinforces the trend that domestic production capacity cannot grow rapidly enough to meet surging demand for all food types.

Food Availability and Trade-Offs: In terms of the availability pillar of food security, imports have unquestionably supplemented supply. They allow China to meet its food demand that domestic agriculture alone could not, especially for oilseeds and animal feed. Studies note that China's "two markets" strategy (simultaneously fostering domestic production and importing as needed) has helped stabilize supply during normal times. For example, even as domestic corn shortages occurred (due to drought or pests), imports have backfilled the gap. Similarly, global supply of edible oil has kept Chinese cooking oil prices relatively low. However, this import channel is not without cost. Being the top importer means China depends on continued access to global markets; any disruption could quickly tighten domestic availability.

Stability and Price Vulnerability: The stability pillar of food security is where import dependence raises caution. Historical episodes underscore this vulnerability. In 2018, an African Swine Fever outbreak decimated China's pork production by roughly 28 million tonnes over three years. China responded by sharply increasing

pork and feed imports, but the surge in demand pushed global meat prices up and contributed to Chinese inflation of pork (a key staple). More recently, the 2022–2023 Ukraine war led many grain exporters (e.g. India, Russia at times) to restrict exports. As a result, China imported 10% less grain in 2022 but paid 9% more per ton than in 2021, straining supply chains and inflation. In both cases, Chinese analysts described these shocks as testing China's food security, with the risk of food shortages if trade channels were blocked.

Econometric findings also support the concern: one analysis found that international food price spikes (and associated policy responses like export bans) can significantly reduce China's effective food supply, leading to domestic inflation and shortages. In summary, China's large import volumes make it sensitive to global price volatility. When prices rise, imported goods become expensive and less available, impacting affordability and availability of food at home. This global linkage contrasts with the alternative of producing more domestically, which insulates a country from foreign shocks (at higher cost).

Economic and Consumer Impacts: Import dependence also has distributional and economic effects. On the positive side, cheaper imports (especially of staples like wheat or corn) help keep consumer food prices lower. Chinese urban consumers generally benefit from low-cost imported grains and oils (for instance, imported Canadian canola oil or Argentine soy). However, this can undercut domestic farmers, whose incomes may stagnate if prices are kept low. Indeed, many Chinese farmers have migrated to cities or abandoned marginal farmland as agriculture becomes less profitable. Lower rural incomes could threaten food security in another way: through political economy. Historically, shortages or sharp price hikes in staples have triggered social unrest in China. Analysts warn that if imports fail during a crisis, even urban populations could face scarcity. Thus, policymakers must weigh the immediate benefits of imports against the need to sustain a domestic farming base.

Food Safety and Utilization: One often-overlooked aspect is food utilization (safety). As mentioned, Chinese consumers often perceive imported food to have higher safety and quality standards than some domestic products. Events like the melamine infant formula scandal led many families to trust foreign brands. This trust factor means that import dependence can raise the effective utility of the food supply (people feel safer). However, it also means that if borders are tightened, Chinese consumers might reject domestic substitutes even if caloric needs are met. In this way, preference-driven imports add a layer of fragility to the food system: the availability of 'acceptable' food depends on foreigners producing to Chinese standards.

In summary, the empirical trends and prior findings indicate that China's increasing import dependence has both eased and strained its food security. On one hand, trade has plugged gaps in availability and diversified sources, supporting food supply under growing demand. On the other hand, high dependence, especially for critical foods, creates a potential point of failure in supply stability if international markets tighten. We now consider the policy implications of these findings.

POLICY IMPLICATIONS AND CONCLUSIONS

China's leadership faces a clear imperative: to secure the nation's food supply while managing the risks of import dependence. The findings above suggest several policy directions:

Strengthen Domestic Production of Staples: China's long-standing goal is to maintain basic self-sufficiency in staple grains (particularly rice and wheat). Policies continue to emphasize maximizing yields and acreage for these crops. The government's "red line" policy aims to keep at least 120 million hectares under cultivation. Since 2019, China has enacted laws to protect farmland and encourage high-standard agriculture. These measures should be maintained to ensure that imports truly supplement rather than replace essential grain output.

Targeted Expansion of Key Crop Production: For the commodities that China depends on (corn, soybean, edible oil), official policy has begun to pivot toward limited import substitution. For example, China's Ministry of Agriculture issued directives in 2022 to expand domestic soybean and corn planting as strategic tasks. Encouraging even modest increases in yield or acreage for these crops, through subsidies, research, and improved seeds, could reduce import shares. However, the data suggest that even large increases in these crops

may not fully match demand, given current consumption patterns. Thus, self-sufficiency (100%) may not be realistic for all crops; some reliance on trade appears inevitable.

Strategic Reserves and Stockpiles: An important risk mitigation is to build and maintain grain reserves. China already holds massive strategic stocks of rice, wheat, and corn, partly to stabilize prices and buffer shocks. Ensuring that these reserves are well-managed (rotated, protected from corruption) is critical. Additionally, diversifying the countries from which China imports can reduce dependency on any single supplier. Participation in trade agreements (such as RCEP) and diplomatic food security partnerships (e.g. Belt and Road agricultural deals) can help secure alternate sources.

Food Safety and Quality Improvements: Reducing the domestic preference for imports on safety grounds can bolster local demand. Continued investment in food quality standards, testing, and enforcement is necessary so that Chinese consumers trust domestic products. A more trusted domestic supply increases effective utilization and can alleviate some import demand driven purely by safety concerns.

Diversify Diet and Sources: Encouraging dietary diversity and developing alternative food sources (e.g., plant-based proteins) can decrease pressure on scarce commodities. For example, China's promotion of soybean substitutes and high-quality lipids (rapeseed, peanut oil, etc.) could partly substitute imported palm or soybean oil. The government has also signaled support for developing alternative proteins to ease pork demand. On the sourcing side, China has begun agreements with major exporters (Brazil, Australia, Ukraine) and is exploring new markets (e.g., African grain suppliers).

In conclusion, China's growing food import dependence is a double-edged sword. Imports have allowed rapid dietary and economic growth without immediate shortages, but they have increased China's exposure to international market turbulence. The country's food security strategy must therefore be balanced: maintain robust domestic production of staples (the "domestic grain tank") while using international trade as a complement. This approach is consistent with official statements emphasizing "domestic control" of staples and using imports to stabilize supply when advantageous.

To improve policy-making, the government should continue monitoring import-dependence metrics and stress-test supply chains. Economic tools – such as targeted tariffs or subsidies – can be applied judiciously to discourage over-reliance on any single foreign source without hampering trade efficiency overall. Moreover, China's role as a large consumer gives it market influence; using this leverage to negotiate stable export commitments from supplier nations is an option.

Future research should continue to update the data trends (especially post-2022) and examine how shocks (e.g., climate events or global crises) interact with import dependence. Empirical studies could quantify the resilience benefit of domestic self-sufficiency versus the economic gain from trade, but our qualitative review already underscores the trade-offs involved. Ultimately, ensuring food security in China will require sustained effort in agriculture, science, and international cooperation – essentially managing the balance between being the "breadbasket" for some foods and the "purchaser" of others.

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