CHINA AND THE FUTURE GLOBAL FOOD SITUATION

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The future of China's grain economy has been the subject of much debate. Some observers predict rapidly increasing grain imports that will strain the world's productive capacity. Most of China's own economists disagree: researchers in the Chinese Academy of Agricultural Sciences have long predicted and still believe the nation will remain at least self-sufficient. Whatever course China's grain economy takes, the stakes are high for China's own development and for the stability and health of the world's agricultural trade. This brief examines alternatives for China's grain production, consumption, and net trade, taking into account underlying structural factors.

ANNUAL GRAIN PRODUCTION AND USE

Total grain production rose to 385 million tons (all tons are metric tons) in the early 1990s, making China the largest producer of cereals in the world. Direct consumption of grains took up about 67 percent of total supply in the early 1990s—about 225 kilograms per capita per year—high even in Asia. The share of animal feed was 20 percent and rapidly rising to meet China's burgeoning demand for meat.

China's food economy is undergoing a series of fundamental changes. Despite recent subsidies to urban consumers due to temporary grain shortages, longer-term policy changes will make urban consumers almost entirely dependent on markets for their consumption needs. With income growth rates among the highest in the world, sharp increases in the demand for food (particularly meat) are inevitable. Rural consumption patterns differ from those in the cities. Consumers in many rural areas have limited choices because many of the products they desire on a daily basis (especially as their incomes rise), such as meat and fresh fruit, are not always available. As markets develop in rural areas, consumption will diversify.

The increase in population (just under 1 percent per year on average to 2020) and its changing structure will profoundly affect consumption in China. Across Asia, as countries have urbanized, the composition of the diet and behavior of consumers have changed dramatically. Urban dwellers consume less grain and demand more meat, milk products, and fish than their rural counterparts, even after accounting for differences in income and prices. China's urban population has grown from 19.4 percent in 1980 to 27.6 percent in 1992.

Sharp transitions are also under way on the supply side. While one-time institutional reforms contributed to the high growth in China's agricultural economy in the early 1980s, technology has been the main engine of agricultural growth in China. China's technological base grew rapidly before and during the reform period. For example, a breakthrough in hybrid rice, pioneered by Chinese scientists in the 1970s, increased yields significantly in many parts of the country and spread to nearly one-half of China's rice area by 1990. Robust investment in research has in part been responsible for these dramatic changes. However, there is concern that China's research system may now be suffering from neglect. Real investment in the research system stagnated from 1983 to 1990, before resuming real growth. The ability of China's research system to maintain a stream of technical innovations will be a major determinant of growth of supply and the nation's grain balance.

Investment in agricultural infrastructure, especially irrigation, has been another important factor in China's agricultural growth in recent decades. Irrigation investment and the stock of facilities have followed patterns similar to those for research.

CHINA'S GRAIN ECONOMY IN 2020

According to a comprehensive projections framework, developed by the authors, that accounts for the effects of urbanization and market development on the demand side and technology, agricultural investment, environmental trends, and institutional innovations on the supply side, per capita foodgrain consumption in China hit its zenith in the late 1980s and early 1990s. From a 1990 high of 225 kilograms, direct foodgrain consumption per capita is projected to fall by 2020. Although the average rural resident will consume more foodgrains through the year 2000 (with consumption declining in the first decade of the next century), urban demand for foodgrains is at a point where it will fall with further rises in income. Population shifts from rural to urban areas will compound the decline in per capita foodgrain consumption. In contrast, per capita demand for red meat is expected to more than double by 2020. The projected rise in demand for meat and other animal products will raise the proportion of feedgrain in total utilization of grain from 20 percent in 1991 to nearly 40 percent in 2020.

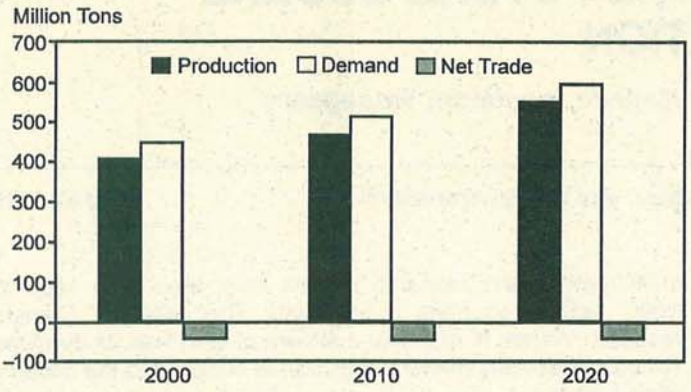
Baseline projections show that production will not be able to keep up with escalating demand (Figure 1). Aggregate grain supply is predicted to reach 410 million tons by the year 2000. Constrained by a technology base weakened by more than 10 years of falling agricultural investment, projected output is far below the optimistic estimates of Chinese officials who had hoped to meet a target of 455 million tons by 2000. After 2000, production is expected to accelerate slightly, largely due to an expected continuation of the moderate growth in agricultural investment in recent years.

Projected imports are expected to increase the fastest in the 1990s, reaching 40 million tons by 2000—nearly three times higher than the nation's historic high. By 2020, imports are projected to have stabilized at 43 million tons, mainly as a result of slowing population growth rates, continued urbanization, and a slight increase in growth in the output of grain compared with the 1990s. Wheat will account for most imports.

WHAT CAN GO WRONG

To check the robustness of the baseline projections, a number of alternative scenarios were run. In 2000, import projections for all scenarios are forecast to be well above the highest levels ever experienced in China. In the longer run, the most

Figure 1—Grain supply, demand, and net trade projections, 2000–2020



Source: Authors' projections.
Note: Negative values indicate imports.

plausible scenarios show that China will be a major importer of grain. It does not seem likely that China will ever be a long-term agricultural exporter.

Are there any assumptions that could lead to huge projected imports? The forecasts based on the scenarios generated by altering population, income, and public investment indicate that China's grain deficit in 2020 will probably not be greater than 50 million tons and only under extremely unlikely assumptions will imports exceed 100 million tons (Table 1). Outside the projections framework, there are other constraints that could keep imports in the short to medium run from exceeding 40–50 million tons. Port facilities in China are already badly strained; grain is handled almost exclusively by hand in bagged form. Domestic transportation and marketing infrastructure also are poor. China may not be willing to spend most of its hard-earned foreign exchange on food. And perhaps most important, China's leaders still firmly believe national security is closely tied to grain self-sufficiency and may artificially limit imports to a "reasonable" proportion of total domestic production.

But could the supply side of China's grain balance sheet break down? One of the most important determinants of sharply rising imports is investment in agricultural research. If investment in the agricultural research system fell by 1 percent per year (instead of rising by 3 percent per year as forecast under the baseline projections), by 2020 total production would have fallen to 354 million tons, below that of the early 1990s. Imports under such a scenario would reach a staggering 232 million tons, about equal to the total amount of grain being traded on current world grain markets.

How likely is it that such a supply breakdown could occur? It could only happen if investment continued to decline and the government did not react as imports rose. Given its ideological commitment to grain self-sufficiency, China's leaders will almost certainly develop countervailing policies if imports become too large. Investments in agricultural research and irrigation have begun to recover in recent years, and in the past several months, as grain prices have risen in response to short-term tightening of grain supplies, government policymakers have responded by committing to greater investments in agricultural research and development.

It is also difficult to construct a plausible scenario wherein environmental problems cause projected imports to expand to over 100 million tons. Only under the assumption that areas affected by erosion and salinity grow at 8 percent per year (after about 30 years, all of China's land would be degraded!) can projected levels of imports exceed 100 million tons. Such trends also assume that the government will take no action to mitigate these adverse environmental factors.

On the basis of these results, China will neither empty the world grain market nor become a major grain exporter. It does seem likely, however, that China will import more grain in the coming decades. If China's policymakers believe that the projected imports are too high (either politically or because they see other physical or economic constraints), they must revise investment strategies soon because of long lag times between the time of expenditure on research and the effects on production. Immediate attention should also be given to infrastructure and institutions. Investment in port facilities and commercialization of grain trading systems to handle the increased volume of incoming grain will help smooth the shock of production shortfalls and reduce the time and expense of importing grain. China's foresight in dealing with the challenge will most likely determine whether the gap between production and demand turns into a domestic agricultural crisis or leads to more effective development of the nation's food economy.

Table 1—Net imports of total grain under alternative scenarios

Year	Baseline	Population Growth		Income Growth		Technology Investment		Research Investment Declines by 1 Percent	Land Degradation at 8 Percent Per Year[a]
		Low	High	Low	High	Low	High		
		(million metric tons)							
2000	40	35	45	30	49	42	38	44	89
2010	43	26	57	20	67	70	14	130	154
2020	43	9	70	–2	96	106	–30	232	228

Source: Authors' projections.
[a]In this scenario, the hectares of eroded or salinized land increase by 8 percent a year.

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2020 VISION

"A 2020 Vision for Food, Agriculture, and the Environment" is an initiative of the International Food Policy Research Institute (IFPRI) to develop a shared vision and a consensus for action on how to meet future world food needs while reducing poverty and protecting the environment. Through the 2020 Vision initiative, IFPRI is bringing together divergent schools of thought on these issues, generating research, and identifying recommendations. The *2020 Briefs* present information on various aspects of the issues.