

China's Agriculture: Achievements and Challenges

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Persistent high food prices have drawn renewed attention to the role of China in world food markets. There is concern that China will be unable to keep expanding its food supply to meet growing demand for meat, becoming more dependent on world food markets and driving prices even higher. This article reviews achievements made by China's agriculture and highlights key challenges faced by that country in agriculture.

It has been over 30 years since China abandoned its large communal farms. Each "farm" had thousands of workers, assigned to production brigades. The communes were run by inefficient and corrupt top-down management, and state monopolies procured farm production at fixed prices. The communal farming system was a complete disaster, underscored by the 1959–61 famine when an estimated 30 million Chinese residents starved to death. The communes were broken up in the late 1970s in favor of small, family-run plots with profit incentives tied to production and market-determined prices.

The economic reforms that started in China's agricultural sector in the late 1970s then spread to other parts of the economy and we all know the rest of the story. China has enjoyed very strong income growth and has emerged as a main driver of global economic growth. Deng Xiaoping moved China from a top-down planned economy to a

market economy, and the results have been nothing short of phenomenal.

Achievements

Today, China produces 18% of the world's cereal grains, 29% of the world's meat, and 50% of the world's vegetables. This success makes China the world's largest agricultural economy, and it ranks as the largest global producer of pork, wheat, rice, tea, cotton, and fish. In fact, the value of China's agricultural output is twice the U.S. total. See Figure 1 for China's share of world food production across various commodities.

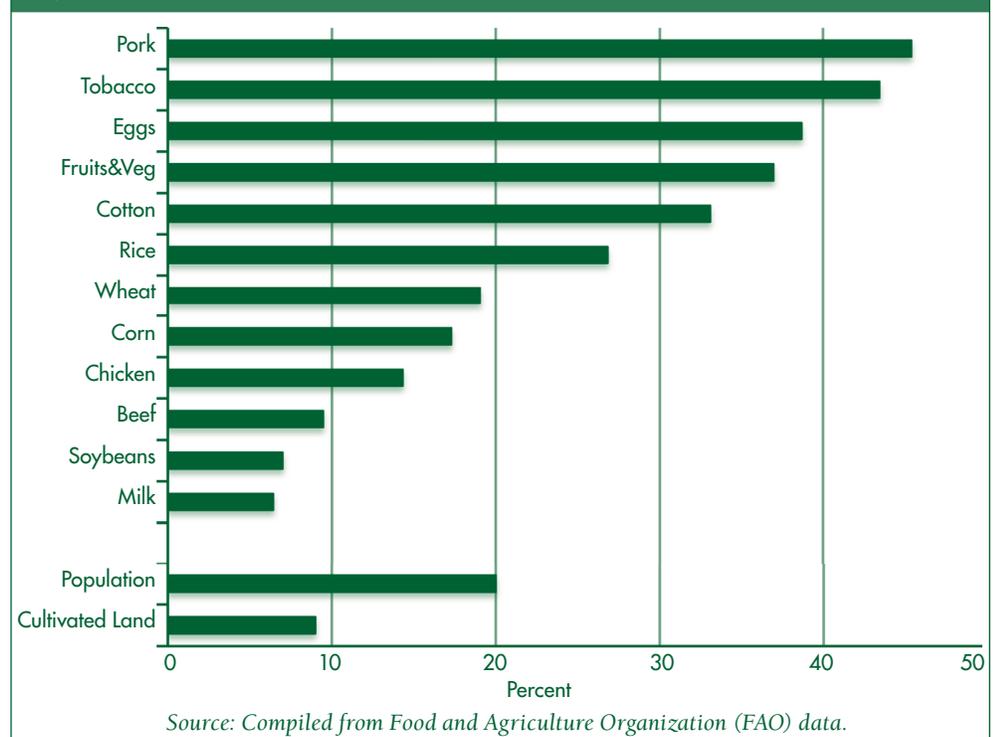
With only 9% of the global sown area, today China produces about 20% of the world's food—a miraculous turnaround since the struggles faced by China's agriculture in the 1960s and 1970s under the collective farms. Despite predictions that China was going to

starve the world, instead China has been able to balance its domestic grain supply and demand, with the exception of oilseeds. China's agriculture has made notable achievements in the last three decades. Will this continue?

After joining the WTO in 2001, China has played a greater role in world agricultural trade. China dramatically increased its trade dependence in agriculture, and it is currently the fifth largest exporter and fourth largest importer of agricultural products in the world. China's substantial increase in fruit and vegetable production was a major factor behind its agricultural export growth.

With imports growing faster than exports during the post-WTO accession years, China reversed its long-time status as a net agricultural exporting country to that of a net importing country since 2004. As expected, with liberalized trade and market forces at

Figure 1. China's Share of World Food Production





Grain production in 2010 was 80% above the 1978 level in China, but the farms remain very small and the work remains highly labor-intensive and difficult.

work, China increased its imports of land-intensive agricultural products.

Most of the increased imports came from soybeans and cotton. Today cotton and soybeans account for 43% of China's agricultural imports, a very concentrated portfolio. China is the world's largest importer of soybeans and cotton, accounting for 60% of global soybean imports and 40% of cotton imports.

China's agriculture is supporting a population of over 1.3 billion people today, compared to about 500 million in 1950, on a relatively fixed agricultural land base and shrinking water supply. The tale of China's agricultural success in meeting this challenge is two-fold. First, China has enjoyed very strong agricultural productivity growth, measured as the difference between growth of agricultural output and the growth of all inputs aggregated. Second, China has poured on farm inputs. China's annual agricultural productivity growth rate was 2.5% from 1970–2007, even higher than Brazil's and much higher than in the United States (which is less than 1.5%). At the same time, China's farmers have intensively applied more chemicals and fertilizer

to their crops to try and overcome the limitations of scarce land and water.

In the 1980s and 1990s agricultural production in China grew by 5.3% per year, much higher than in other populous countries such as India and Indonesia. Most of this growth came through yield gains rather than through increases in planted area. China boosted grain production by more than 50% during this time period. Grain production in 2010 was 80% above the 1978 level. Per capita food supply in China rose from 2,328 calories per day in 1980 to 3,029 calories in 2000, a 30% increase in just 20 years.

China's chemical fertilizer use has roughly doubled over the past two decades while pesticide use and mechanized inputs have increased even faster. China has slightly less agricultural land than the United States, but its chemical fertilizer use is now double that of the United States. China uses about one-third of the world's nitrogen fertilizer and 31% of phosphate fertilizer on its 9% share of the world's agricultural land. Unfortunately, the strong growth in chemical input use has resulted in considerable agricultural pollution.

Challenges

Let us not forget that China remains a developing country. In China 36% of the population still lives on less than \$2 per day and most of these poor are in the countryside. Even though economic reform started in agriculture, non-agricultural economic growth has left the farm population to fall behind. The image we have of the new affluent Chinese consumers buying Gucci handbags in modern boutique shops does not apply to the nation's farmers. China's farms remain very small (approximately 1 acre) and the work remains highly labor-intensive and difficult.

Almost 300 million workers remain in agriculture, and most farmers remain very poor, with per capita incomes about \$1,000/yr—less than one-third of the average urban income. The proportion of agriculture in China's GDP dropped from 28.1% in 1978 to 11.8% in 2010. Yet 38% of the labor force remains in agriculture (see Figure 2), a ratio that is far too high given China's level of development. As a result, labor productivity in agriculture remains low.

Raising farmers' incomes is one of the major policy challenges facing China's policy makers today. This may require relaxing a long-standing policy goal of food self-sufficiency. National food security goals require a very high grain self-sufficiency percentage, and farmers typically earn less money growing grain compared to other higher-valued crops.

Between 1981 and 2005, the percentage of people living below the poverty line dropped from 84% to 16.3%. This was part of the success story. But the challenge is that China's Gini coefficient (a measure of income inequality) grew from 29 in 1990 to 42 in 2007, reflecting a strong increase in income disparity within a relatively short period of time. Income inequality in China is now similar to that in Mexico, but the irony is that China is a communist country.

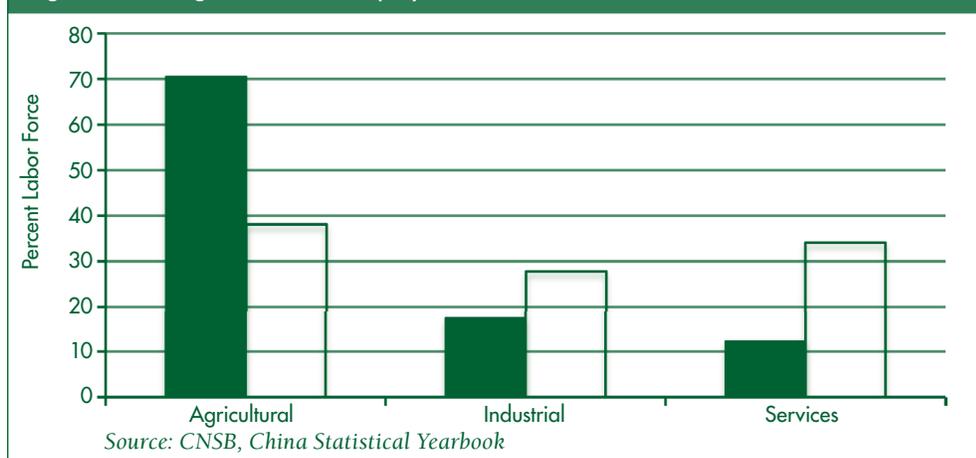
Income growth and urbanization, and the resulting changes in dietary patterns, particularly in developing countries like China, have important implications for food consumption and agricultural trade. Urbanization leads to a decrease in calorie consumption per person, but greater demand for processed food products. Low-value staples, such as cereals, account for a larger share of the food budget of the poor while high-value food items, such as dairy and meat, are a larger share of the food budget of the rich.

So rising incomes are usually associated with increased demand for meat, horticultural, and processed food products. In turn, increased demand for meat will result in increased demand for feed grains and protein meals. For instance, China's per capita incomes have more than tripled in the past 20 years and, as a result, some dramatic changes in food consumption have taken place in that country.

Per capita meat consumption has more than doubled in the last 20 years in China. Meeting increased demand for meat and other dietary changes will continue to be a challenge for China. This will require more water supplies because it takes about 2,000 liters of water to produce 1kg of wheat, compared to about 16,000 liters of water for 1kg of beef.

Today, much of China's agriculture is very irrigation-dependent. With 20% of the world's population and 7% of its fresh water, China faces important water issues. Agriculture uses 76% of the country's water, but it is facing greater competition from urban areas. In the relatively dry northern region, the water availability per person is only a quarter of that in the south. Yet the north is where almost half China's population lives, and where most of its maize, wheat, and vegetables are grown. Groundwater is intensively used in the north, but not in the south. This means that water efficiency must

Figure 2. Change in China's Employment Structure



be improved in the north. Pricing of surface water and groundwater could play a greater role in the allocation.

China's farmland essentially belongs to local governments, a holdover from the commune era. This means that land cannot be bought or sold by farmers, only leased. This raises a number of policy issues with respect to the transition of China's agricultural sector towards a more modern industry. Lack of land ownership discourages investment and consolidation into larger and more efficient farms. Land-use rights are now attached to village residency, discouraging permanent out-migration from agriculture and keeping farm incomes low.

Conclusion

China's agriculture has made remarkable achievements since 1980, but there remain critical issues. Grain security is still at the center of government policy and this serves to discourage the production of higher-valued horticultural crops, thus taxing farmers. Resource scarcity (especially water) and agricultural pollution are major problems that are resolvable but require immediate action. The rural-urban income gap and land tenure are also significant issues. There seems little doubt that China will become more reliant on land-intensive food imports, but at the same time it will expand exports of labor-intensive food products.

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