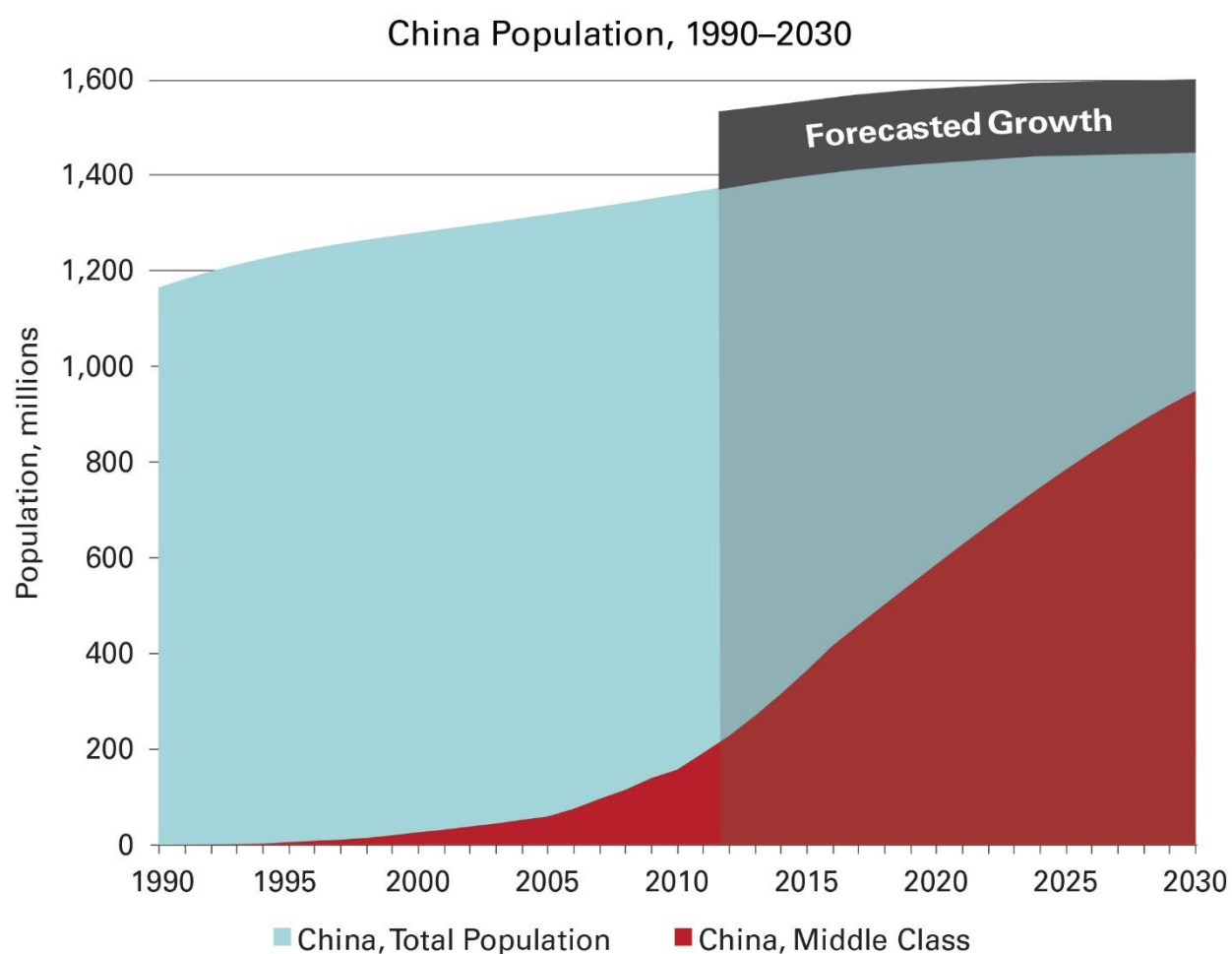


China's Agricultural Productivity Imperative

The enormity and complexity of the challenges facing China's agriculture and food system are difficult to fully grasp.

Two decades ago, the Chinese middle class numbered just 2.5 million people. That number has increased by more than 100 times today.¹ The middle class in China is expected to grow even further, reaching 950 million by 2030, roughly three times the current population of the United States (Figure 1).

Figure 1



Source: UN Department of Economic and Social Affairs, Population Division (2013) Kaufman, Kharas, and Penciakova. Brookings Institution (2012)

© 2018 Global Agricultural Productivity Report® (GAP Report®)

The rise in population and incomes has radically transformed Chinese consumers' food demand. **Consumption of poultry, pork and dairy has increased exponentially.²** In response to domestic

demand, China's imports of fresh and chilled pork increased from 136,000 metric tons in 2000 to 1.62 million metric tons in 2016.³



A Chinese family enjoys a leisurely visit to a park the Cixi wetlands in Zhejiang Province. The increased buying power of China's rapidly growing middle class is transforming the country's food and agriculture systems. Photo: You Ji / World Bank

Chinese consumers are also changing where they shop, and what motivates their purchases. Young urban consumers between the ages of 20-35 shop at modern retail food stores. Chinese consumers are focused on nutrition, with more than 82 percent of people willing to pay more for foods they know are higher quality and more nourishing.⁴

Chinese consumers are also concerned about the safety of the foods they eat, particularly domestic rice and other food crops that may have been grown in contaminated farm soil. They are willing to pay more for trusted international brands that they know are high-quality and safe.

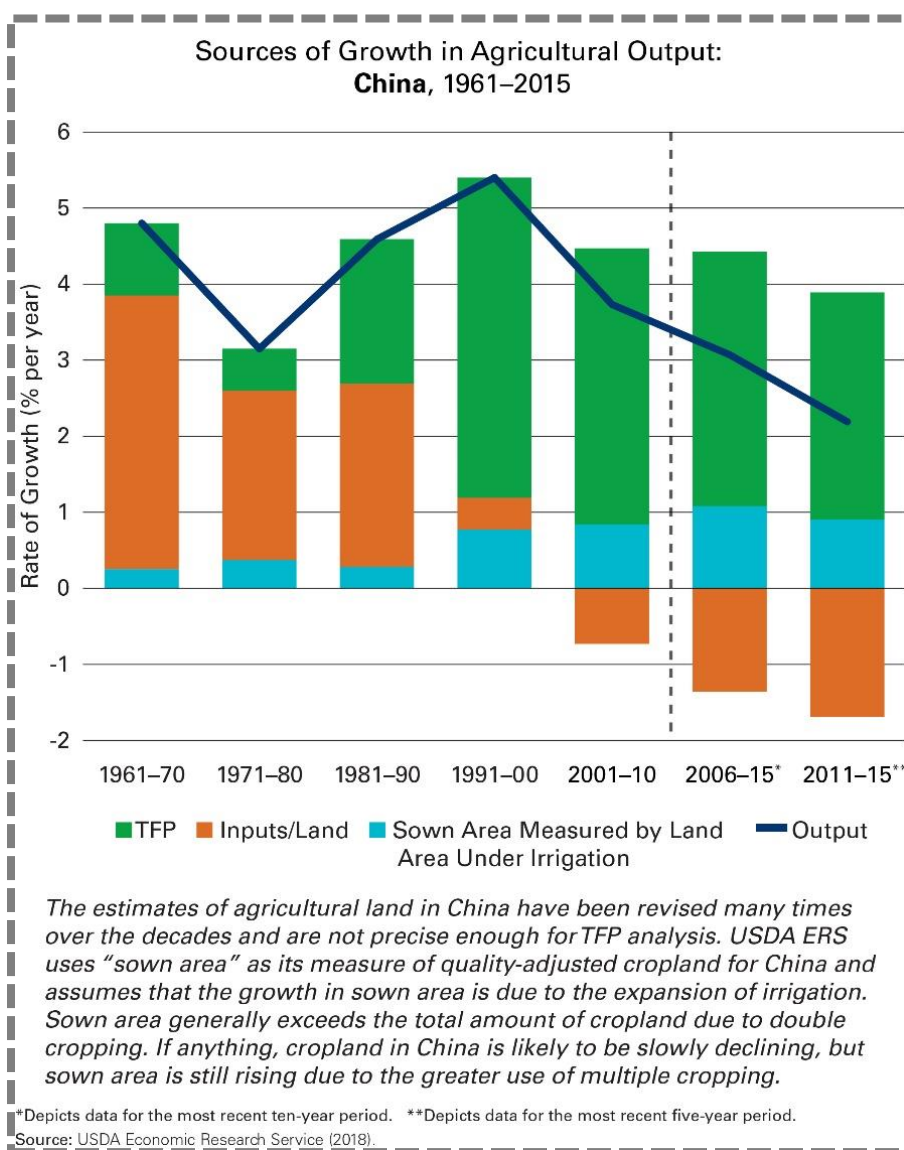
Chinese Government Prioritizes Productivity Growth

China has had remarkable success in developing its agriculture sector since the [Opening and Reform period](#) began in 1978.

Since 1978, the percentage of China's population that depends on agriculture for a living has declined from 70 percent to 35 percent.⁵

This transition correlates with significant improvements in agricultural productivity (Figure 1).

Figure 2



Average annual **Total Factor Productivity (TFP)** in China grew from 1.9 percent in the 1980s to 4.21 percent in the 1990s. From 2001 to 2015, China's TFP grew at an average rate of 3.5 percent per year, twice the global average during that period.

China has also increased the amount of "sown area" to increase output. This has been achieved by extending irrigation to previously rainfed cropland. (See note for Figure 2.) Extending irrigation increases the output from that land and enables more than one crop to be grown each year.

Maintaining or increasing China's phenomenal levels of productivity growth will be difficult.

Climate change, combined with decades of poor farm management practices, have reduced the health and productivity of China's agricultural land and water supply. Improving these soils, reducing erosion and ensuring widespread use of good nutrient management practices will be essential.

China has limited land resources for cultivation and the amount of agricultural land is likely declining already. (See note for Figure 2.) The amount of available land will continue to decline as competition for land between urban and agricultural areas increases with population and urbanization growth.

As young people migrate from rural to urban areas, agricultural labor is harder to come by and the average age of farmers is rising. Today, 60 percent of those working in agriculture in China are over the age of 45, whereas only 14 percent are under age 35.



Most young people leave rural areas for better job prospects in the cities. Attracting young, entrepreneurial farmers will be essential for productivity growth in China's agriculture sector. Photo credit: Steve Harris/World Bank

Mechanization rates are rapidly rising to fill the agricultural labor shortage. In 2014, 60 percent of crop production was mechanized and the crop area under mechanized cultivation doubled from

2004 to 2014.⁶ Even with increased mechanization, China will need younger farmers to replace those who are aging.

In anticipation of these challenges, the government has prioritized investments in agricultural development and food security. China invests twice as much as the U.S. in agricultural research and development, an investment that will stimulate productivity growth in coming decades.

Urbanization Policy to Support Agricultural Productivity



Traffic in Beijing. Photo credit: Li Lou/World Bank

China's policies promoting and managing urbanization are also intended to stimulate consolidation and productivity in the agriculture sector. China hopes that urbanization will increase the average amount of arable land available per each family farm, promote mechanization, and increase average rural income.⁷

By moving people into cities, China also seeks to create dynamic economic centers that promote consumption and stimulate economic growth in the surrounding rural environments. Current urbanization policies are focused on the development of small- and medium-sized cities that can support an agricultural sector in the surrounding peri-urban areas.

Michael Shyer, former intern at the Global Harvest Initiative, contributed to this article.

China Ramps Up Peri-Urban Farming for Beijing Consumers

Case Study

Many Chinese farms today are still quite small (on average less than 0.6 hectares of land per household) and provide low qualities of life for Chinese farmers. But China's agri-food system has begun transforming over the past 30 years from a traditional, smallholder-based production system to a more modern form of peri-urban farming for cities.

The Central Government agriculture policy now promotes larger, more advanced farms, intended to provide more income per farmer, and enabling the purchase of more technology and inputs. The Chinese Government hopes that this model will increase agricultural efficiency while making agriculture more attractive among youth, while also providing farmers with a better quality of life.



An area of explosive growth has been in the peri-urban greenhouse production of vegetables for consumers in the Beijing market.

Some 290 cooperative farming families cultivate vegetables covering 200 hectares of land. These vegetables include sweet corn, eggplant, tomatoes, potatoes, peppers, and many others, and are sold primarily to large retail stores for urban consumers in Beijing.

Photo Credit: Margaret Zeigler/GHI

The greenhouses on this farm are technologically advanced and environmentally efficient. They grow vegetables year-round, using minimum amounts of needed fertilizer, crop protection products and water for irrigation. In cooperation with

nearby chicken farms, the waste from the nearby chickens is treated in stages to provide clean water for irrigation and to capture biogas for energy use. The liquid water is separated from the solid waste in the treatment process, recycling as much of the waste as possible into useful inputs.

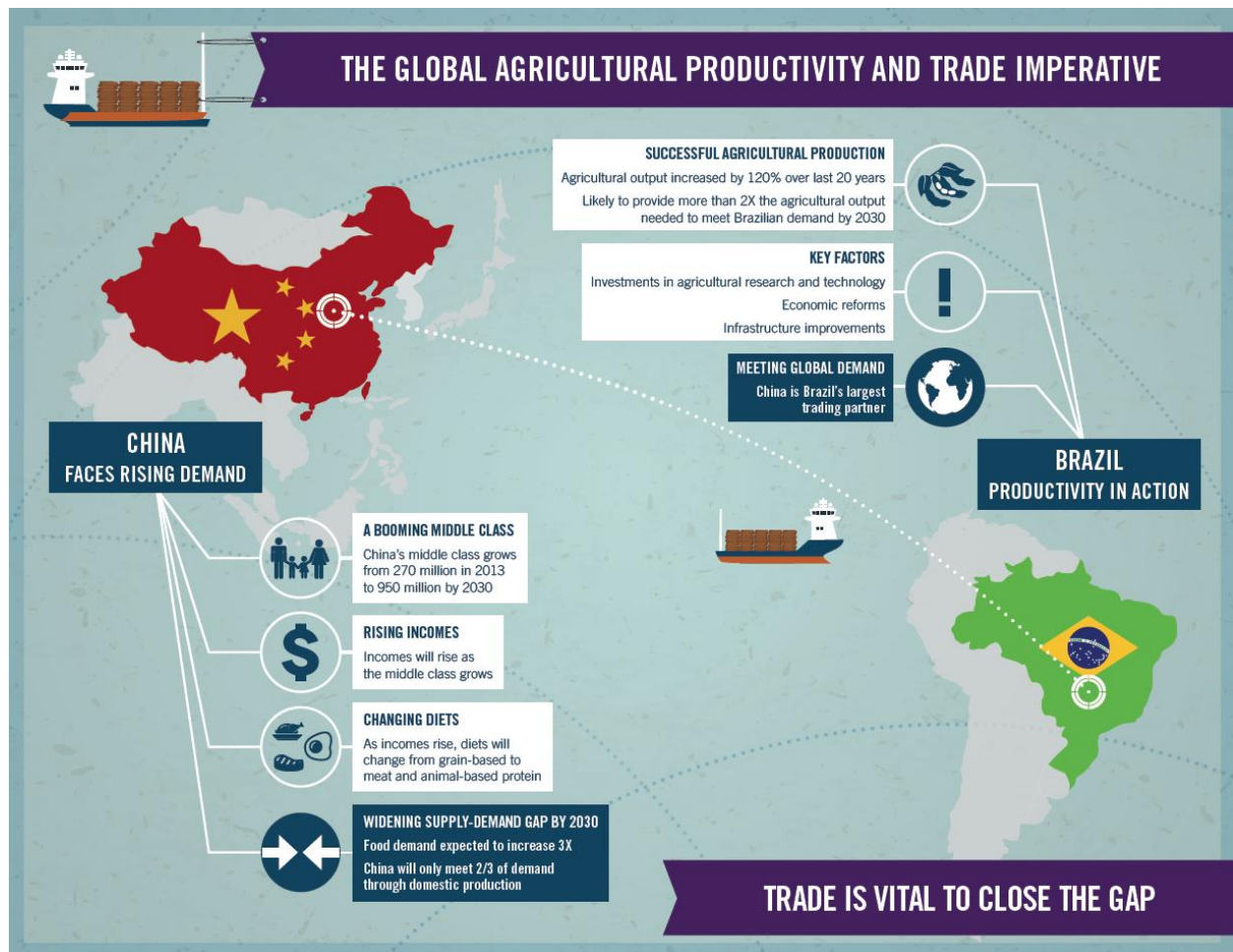
These cooperatives are part of a greater movement by China to consolidate and modernize the countryside. China imagines an agricultural future where farmers live in orderly communities and perform agriculture on a larger scale, free from the uncertainties and risks of smallholder farming.

The China-Brazil Connection

Despite remarkable success in improving the productivity of its agriculture sector, by 2030, China will likely only be able to meet 74 percent of its demand through productivity growth. Most of the remaining food demand will be met through trade.

The Latin America region produces a surplus of food and products. **Brazil, driven by TFP (total factor productivity) growth, is expected to reach a level of agricultural output more than twice as large as its domestic demand.**

Brazil's agricultural productivity and output growth is largely the result of greater investments in agricultural research and technology, combined with successful economic reforms and infrastructural improvements.



China already relies heavily on Brazil for food, animal feed and other agricultural products. Fully 30 percent of Brazil's agricultural exports go to China. Graphic source: 2013 Global Agricultural Productivity Report (GAP Report), Global Harvest Initiative.

As production has increased, Brazil has steadily increased exports to China, especially soybeans. Brazil exported 54 million metric tons of soybeans to China in 2017, principally for animal feed.⁸

Brazil's soybean producers are poised to take even more of the Chinese market share. Because of the tariffs imposed on U.S. soybeans as part of the U.S.-China trade dispute, Chinese buyers are turning to Brazil as a cheaper source. From January to August 2018, Brazil exported 80 percent of its soybean production to China, up from 77 percent over the same period in 2017.⁹

Endnotes

¹ Kaufmann, D. Kharas, H. and Penciakova, V. (2012) Development, Aid and Governance Indicators (DAGI). Brookings Institution. <http://www.brookings.edu/research/interactives/development-aid-governance-indicators#/worldmap/2/12/2011/48/all>

² Patton, D., "China's pork demand hits a peak, shocking producers, as diets get healthier," Reuters (Beijing), June 21, 2017.

³ UN Comtrade Database, accessed on August 13, 2018. This figure does not include prepared pork products.

⁴ "New Eating Trends in China: The Healthier the Better," Nielsen Research, September 22, 2016.

⁵ "OECD-China Meeting: Demographic Change And Agricultural Modernization," Michael Shyer, policy intern, Global Harvest Initiative, 2013.

⁶ "Development of Agricultural Mechanization in China," PowerPoint presentation by Cheng Fang, UN Food and Agriculture Organization, 2017.

https://forum2017.iamo.de/microsites/forum2017.iamo.de/fileadmin/presentations/B5_Fang.pdf

⁷ "Chinese family farm businesses emerge," Xia Cheng, CCTV, January 2, 2013.

⁸ COMTRADE Database.

⁹ "Brazil exports 80 percent of soy to China in January-August: agriculture ministry," Reuters, September 14, 2018.