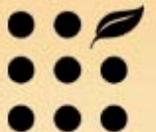


China's Future: Trade for Sustainable Food

Fred Gale

Senior Economist

USDA, Economic Research Service



China: Famine to feast in one century



www.cqzg.cn

Sichuan famine, 1937

Rural Jilin Province, 2002

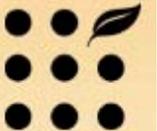


Food is now abundant in China.

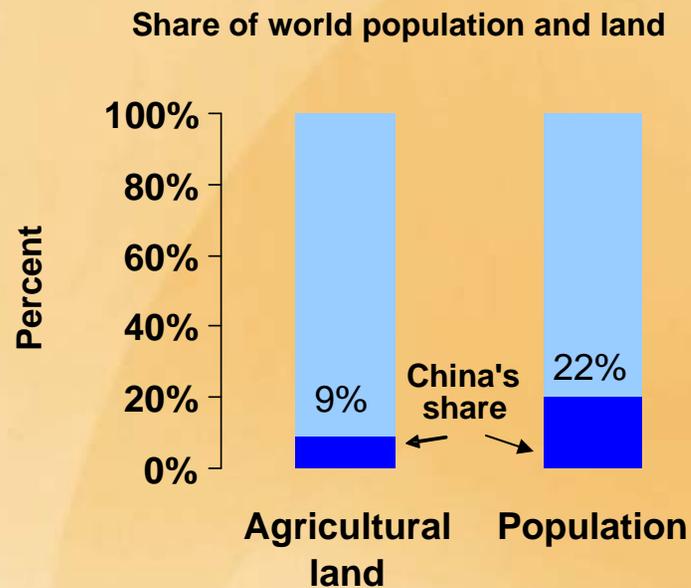


← Scraping bark from a tree to eat
During a famine in Henan Province, 1942

Supermarket in Tongling City, 2009



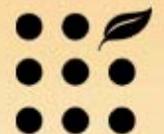
China: Limited Resources



China population doubled



Source: ERS analysis of data from Food and Agriculture Organization and China National Bureau of Statistics.



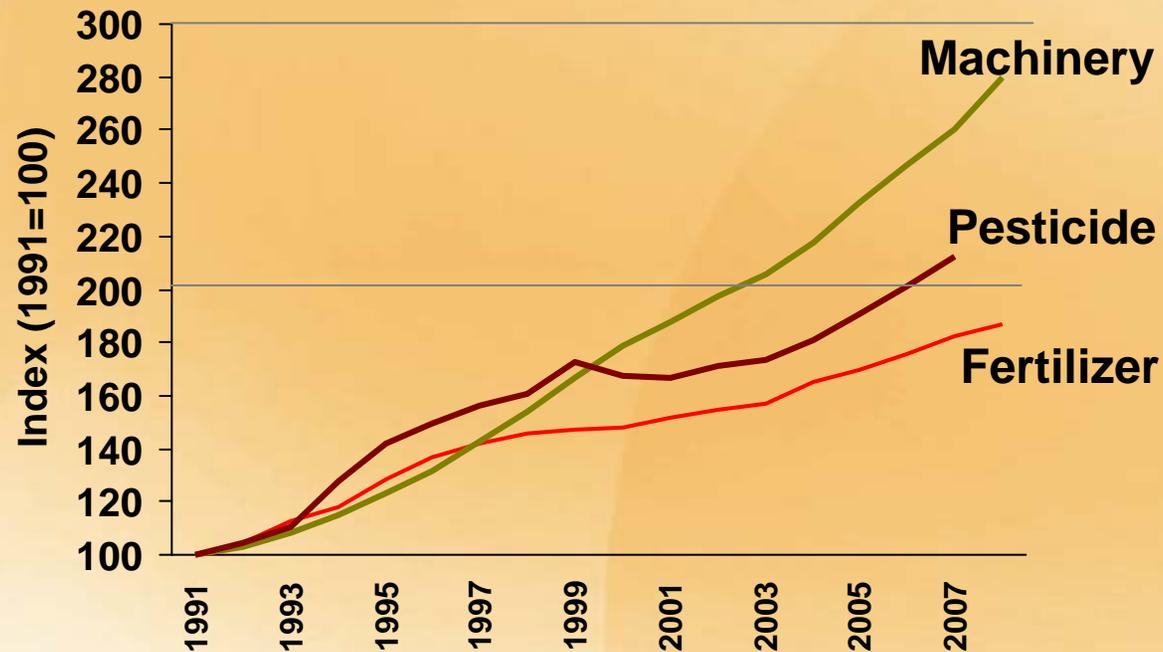
Intensive agriculture

- Crops with high yields per unit of land
- Sequential multiple cropping and intercropping
- Greenhouses and plastic mulch to extend growing season
- More mechanized planting and harvesting
- Move to concentrated grain-based animal agriculture

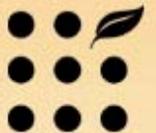


More inputs, more output

Use of agricultural inputs rose

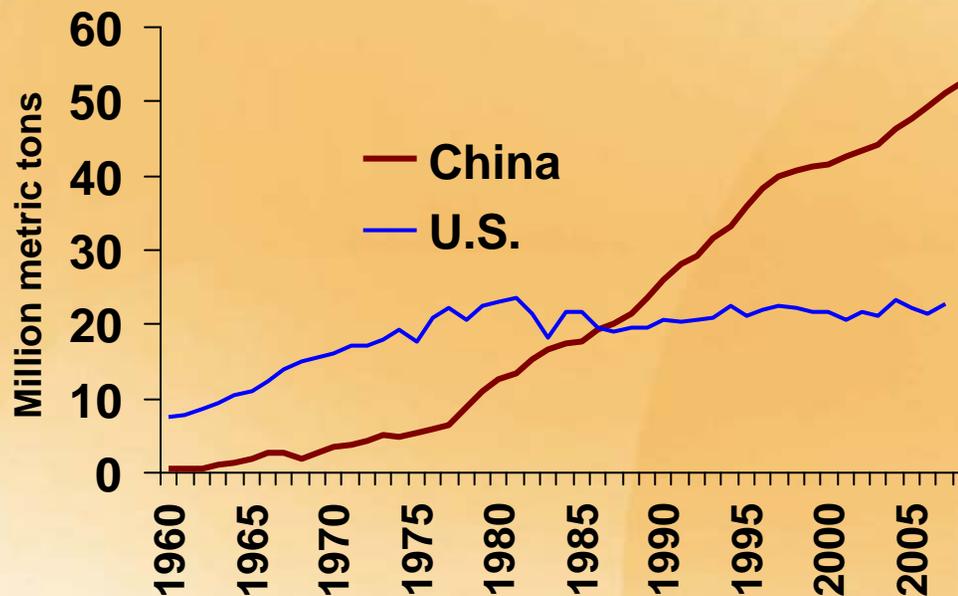


Source: ERS analysis of data from China National Bureau of Statistics.

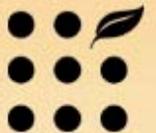


China uses twice as much chemical fertilizer as the United States

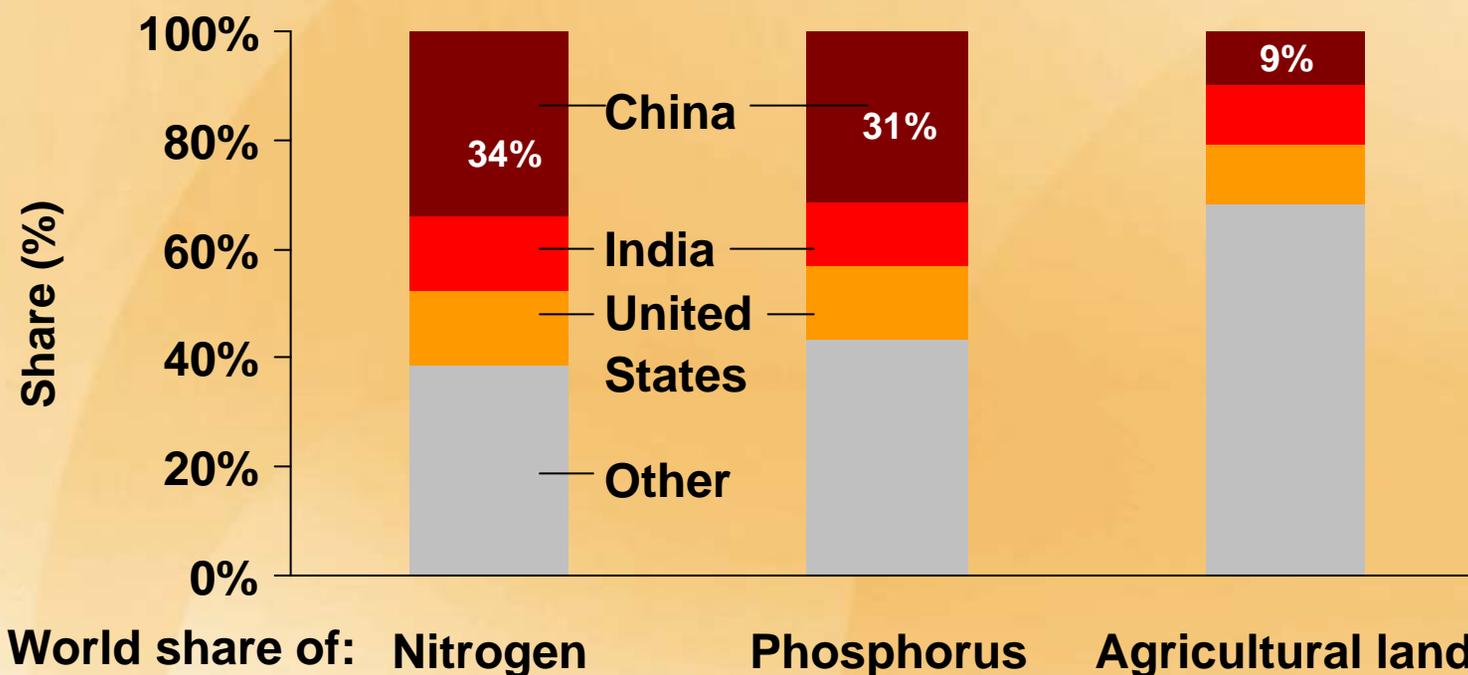
Chemical fertilizer use



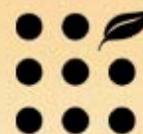
Source: ERS analysis of data from USDA and China National Bureau of Statistics.



China's share of world chemical fertilizer use is three times its share of agricultural land



Source: ERS calculations based on 2006 data from Food and Agriculture Organization



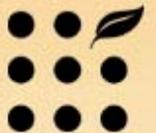
China has a large livestock population

Livestock inventory	China	United States
	Million	
Poultry	4,834	2,188
Hogs	419	68
Sheep and goats	279	6
Cattle	105	96
Horses and donkeys	14	4

Source: 2007 agricultural censuses of China and United States, except China data on cattle, horses and donkeys, and agricultural land obtained from *China Statistical Yearbook*.

Results of intensive cultivation: Resource depletion, agricultural pollution

Intensive cultivation of land coexists with urbanization and industrialization.

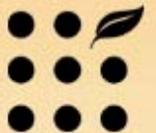


Resource depletion

- Groundwater depletion in northern China
- Soil erosion and fertility loss
- Overgrazing and desertification



Photo from Chinese news report shows effect of heavy application of chemical fertilizer on soil.

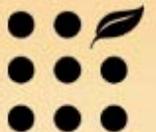


Ministry of Environmental Protection, 2009: rural villages and towns “generally suffer from severe environmental problems”

- New “pollution census” shows agriculture is a major polluter
- Fertilizer runoff into surface water and groundwater.
- Livestock and poultry waste: nitrogen, phosphorous, bacteria.
- Pesticides and veterinary drugs residues on food and accumulation in environment.

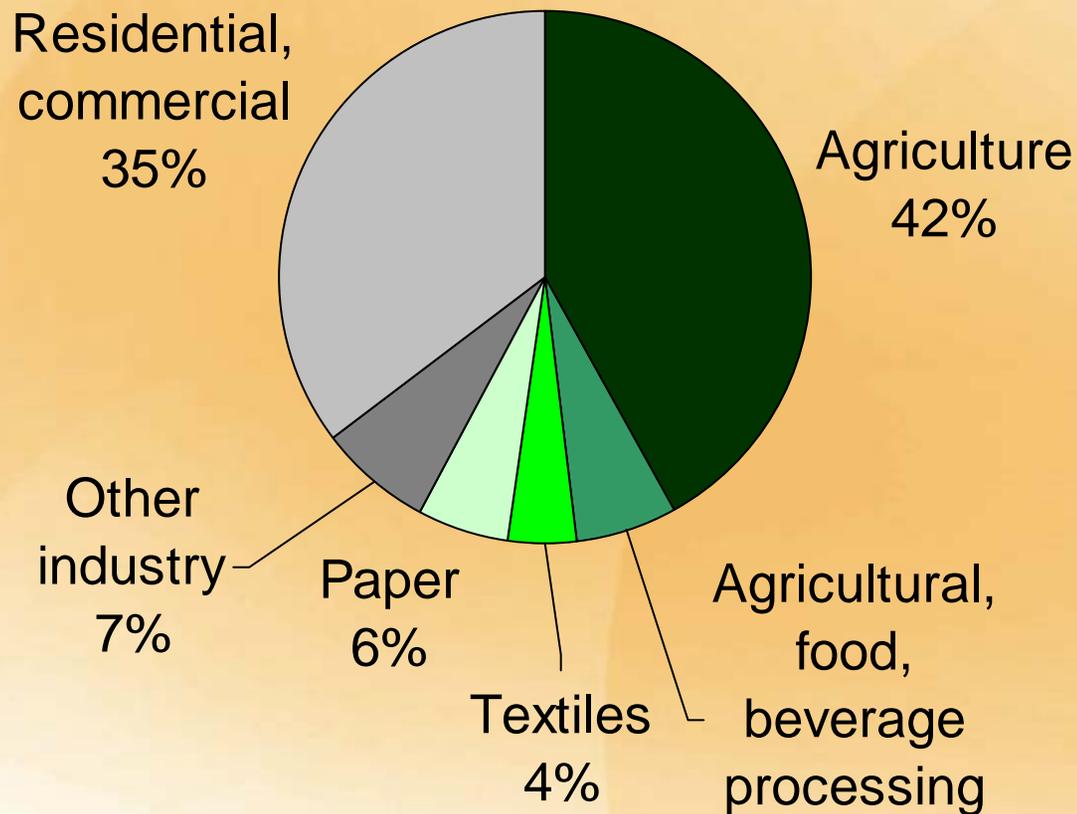


Irrigation canal choked with vegetation is an Indicator of high concentrations of nutrients from agricultural runoff. (This canal supplies a farm preparing for organic certification.)

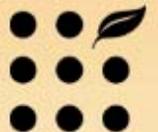


China's pollution census: agriculture is major polluter

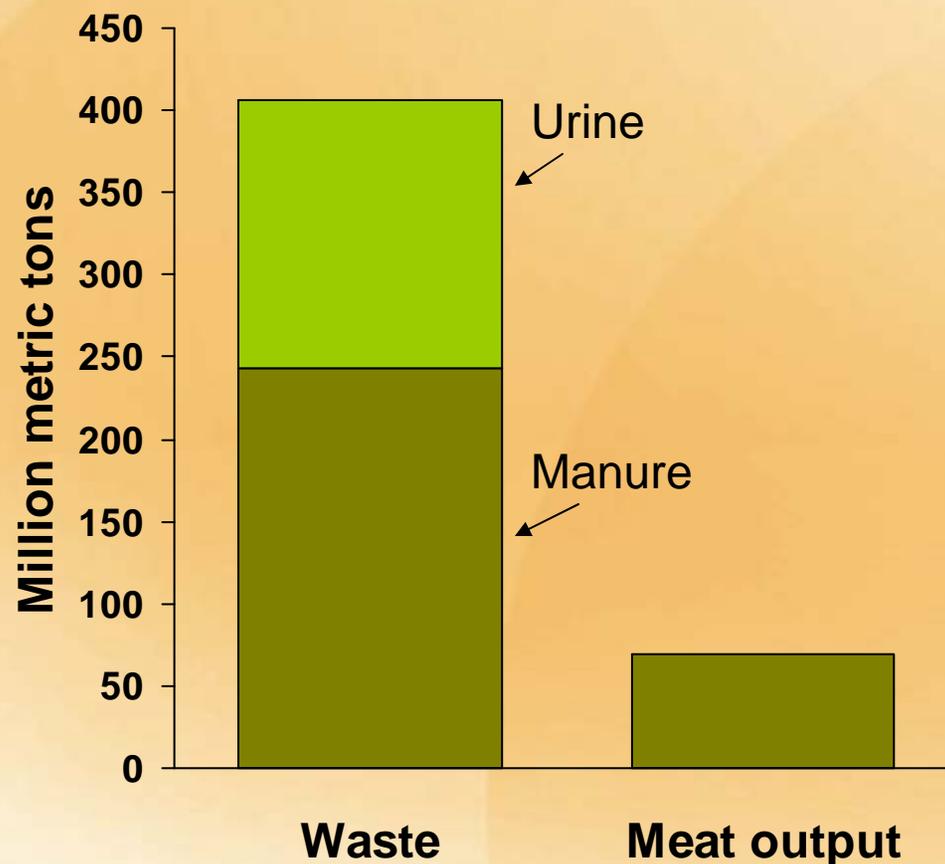
Water pollution measured by COD (Chemical Oxygen Demand), 2007



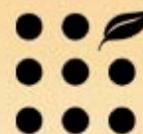
Source: ERS calculations from data in "Communique on First Pollution Census," February 6, 2010.



China livestock waste estimated at over 400 million metric tons



Source: "Communique on First Pollution Census" and China National Bureau of Statistics. Data for 2007.



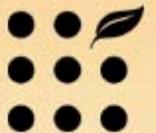
A photograph of a greenhouse with people working inside, overlaid with a green text box. The greenhouse is covered with a white plastic sheeting, and the interior is filled with rows of green plants. Several people are visible, some wearing hats, working in the field. The background shows some trees and a building under a clear sky.

China's officials respond with "green" measures

- Just announced: \$1.76 billion to address rural pollution, 2010-2012
- Call for environmentally friendly technologies and modes of production
- Compensation for returning erodible land to forests or grassland
- Demonstration programs in water-saving irrigation, conservation tillage, restoring organic matter, ecological agriculture...

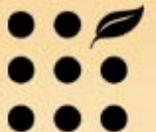
But many Chinese policies work against sustainability

- Raising grain production is a top priority.
- Low prices for fertilizer, water, fuel discourage conservation.
- Policies support concentrated livestock production.
- Specializing in chemical-intensive corn and horticultural crops increases overall input use.
- Lack of land ownership rights discourages long-term stewardship.



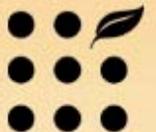
Imports relieve stress on domestic resources

- Example: To grow China's imported soybeans domestically, it would take:
 - 26 million hectares of land
 - 3 million metric tons of fertilizer
- Other imports: cotton, rubber, palm oil, cassava, tropical fruit, meats
- China adjusted biofuel policies to cope with scarcity
 - Grain-based ethanol production capped
 - Importing ethanol co-products as feed
 - Ethanol tariff recently cut



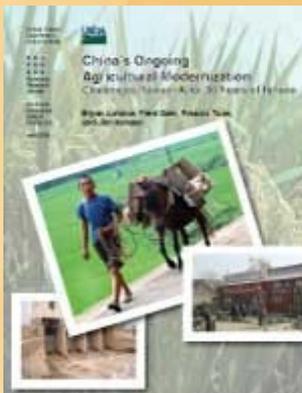
Sustainability is global

- The bounty produced by U.S. farmers helps feed people in resource-scarce countries like China.
- Trade and markets send signals about resource scarcity; farmers all over the world respond to scarcity in China.
- China's participation in global markets is important to wise use of resources.



More on China: USDA/ERS “China Briefing Room”
<http://www.ers.usda.gov/Briefing/China/>

China’s Ongoing Agricultural Modernization



<http://www.ers.usda.gov/publications/eib51/>

“Who Will China Feed?”



<http://www.ers.usda.gov/AmberWaves/June08/Features/ChinaFeed.htm>

