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China’s Future:
Trade for Sustainable Food

Fred Gale
China’s Future: Trade for Sustainable Food

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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

Share of world population and land

Agricultural land
Population

Percent

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

Index (1991=100)

Machinery

Pesticide

Fertilizer

China uses twice as much chemical fertilizer as the United States

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

<table>
<thead>
<tr>
<th>Livestock inventory</th>
<th>China</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry</td>
<td>4,834</td>
<td>2,188</td>
</tr>
<tr>
<td>Hogs</td>
<td>419</td>
<td>68</td>
</tr>
<tr>
<td>Sheep and goats</td>
<td>279</td>
<td>6</td>
</tr>
<tr>
<td>Cattle</td>
<td>105</td>
<td>96</td>
</tr>
<tr>
<td>Horses and donkeys</td>
<td>14</td>
<td>4</td>
</tr>
</tbody>
</table>

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

- Agriculture: 42%
- Residential, commercial: 35%
- Paper: 6%
- Other industry: 7%
- Textiles: 4%
- Agricultural, food, beverage processing: 4%

Source: ERS calculations from data in “Communique on First Pollution Census,” February 6, 2010.
China livestock waste estimated at over 400 million metric tons

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

“Who Will China Feed?”
http://www.ers.usda.gov/AmberWaves/June08/Features/ChinaFeed.htm