Cultivated Land Conversion in China and the Potential for Food Security and Sustainability

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**Background:** Why Cultivated Land and Food Security of China?

- Food has increasingly become a global security issue. The 2007/08 global food price crisis, plus 2008-2009 economic down turn, has pushed food issue high on the global political agenda. Although China has been doing well in terms of feeding its population and reducing its poverty levels, then why we concern China’s food security now? Two reasons:
  1) Potentially, China as the most populous nation in the world, if China were to face food insecurity, the impact on world food security would be devastating.
  2) In reality, China’s food security is challenged by variety of ways, most notably by the loss of its cultivated land.
- Thus, today I will discuss China’s food security issue from the following view points.
Points of Discussion

1. Food Security in Theoretical Perspective;
2. Cultivated Land Conversion (CLC) and Food Security (FSe) in China: Discourses and Securitisations;
3. Cultivated Land and Food: a Matter of Security Concern (Q of Why);
4. Thinking Thoroughly about Food Security Governance (FSG).
1. Food Security in Theoretical Perspective

- **International Security Studies (ISS)**
  - Security for Whom/What? *(Referent Object of Security)*
  - Security from What
  - Who Provide Security & How?

- **Non-Traditional Security Studies (NTSS)**
  - Sectors: From military threats → other sorts of threats: the societal, environmental and economic;
  - Levels: Security for the state → other referent objects – such as individuals, groups, even ecological systems.

- **Food Security**

- **Human Security (HSe)**
  - Referent objects of security → individuals and groups, especially for those weak and vulnerable people.

- **Traditional Approaches**
  - State-Centric
  - External and military threats
  - Negative/Reactive approach to security
Food Security in Theoretical Perspective

- **Security Negative v. Positive Approaches**
  - Negative: *reactive*, emphasises on resource scarcity & the onset of intra- & inter-state *conflict*
    → Referent Object, Provider = the state
  - Positive: more concerned with *root causes* of insecurity, the building of conditions for a *long term* security
    → Peacefully reducing human vulnerability by addressing the root causes of human insecurity

- **Human Security Approach to FSe & FSG**
  - Beyond negative approach to security
  - Beyond mere grain outputs and food sufficiency
  - Access of food by all people, at all times.
2. CLC and Food Security in China: Discourses and Securitisations

- People’s Republic of China 1949~ (Food Rationing 1954~1994)
- The Great Leap Forward (1958-1961)
- The Cultural Revolution (1966-1976)

- The Impact of the Great Leap Forward
  - Loss of arable Land: **7.25m ha**, 1958-1959
  - Estimate of: 27m famine deaths

- Economic Reform: (1980s~1990s)
  - Rural reform/privatization ➔ was to lift the nation from chronic food shortages and massive malnutrition (Deng estimated: more than 100m people suffered from recurrent food shortages).
  - Achievements ➔ Increase in food production, 1998 peak.

- China’s Food situation in the 21 Century
  - 1998-2003: fall in grain production & grain stocks
  - 2004~: new policies on agriculture and farmland
  - China in the global food price crisis.
The Great Leap Forward
(1958-1961)

• Loss of arable Land: 7.25m ha, 1958-1959
• Estimate of: 27 million famine deaths.
Economic Reform: (1980s~1990s)

- Rural reform/privatization ➔ was to lift the nation from chronic food shortages and massive malnutrition (Deng: more than 100m people suffered from recurrent food shortages).

- Achievements ➔ Increase in food production, 1998 peak
安徽凤阳小岗村 Xiaogang Village, Fengyang, Anhui Province, 1978

(Household Contract Responsibility System)
China: Grain Outputs

Year
1978 1985 1991 1993 1995 1997 1999 2001 2003 2005 2007

(10,000 tonnes)
0.0 10000.0 20000.0 30000.0 40000.0 50000.0 60000.0

Source: NBS, China, 2009

512.3 million (1998) 528.7 million (2008)
### Per Capita Output of Major Agricultural Products

<table>
<thead>
<tr>
<th>Year</th>
<th>Grain (kg)</th>
<th>Pork, Beef and Mutton (kg)</th>
<th>Aquatic Products (kg)</th>
<th>Milk (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>319</td>
<td>9.1</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>327</td>
<td>12.3</td>
<td>4.6</td>
<td>1.2</td>
</tr>
<tr>
<td>1985</td>
<td>361</td>
<td>16.8</td>
<td>6.7</td>
<td>2.4</td>
</tr>
<tr>
<td>1990</td>
<td>393</td>
<td>22.1</td>
<td>10.9</td>
<td>3.7</td>
</tr>
<tr>
<td>1995</td>
<td>387</td>
<td>27.4</td>
<td>20.9</td>
<td>4.6</td>
</tr>
<tr>
<td>2000</td>
<td>366</td>
<td>37.6</td>
<td>29.4</td>
<td>6.6</td>
</tr>
<tr>
<td>2001</td>
<td>356</td>
<td>38.0</td>
<td>29.9</td>
<td>8.1</td>
</tr>
<tr>
<td>2002</td>
<td>357</td>
<td>38.5</td>
<td>30.9</td>
<td>10.2</td>
</tr>
<tr>
<td>2003</td>
<td>334</td>
<td>39.5</td>
<td>31.6</td>
<td>13.6</td>
</tr>
<tr>
<td>2004</td>
<td>362</td>
<td>40.4</td>
<td>32.8</td>
<td>17.4</td>
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<tr>
<td>2005</td>
<td>371</td>
<td>42.0</td>
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<tr>
<td>2006</td>
<td>380</td>
<td>42.7</td>
<td>35.0</td>
<td>24.4</td>
</tr>
<tr>
<td>2007</td>
<td>381</td>
<td>40.1</td>
<td>36.0</td>
<td>26.7</td>
</tr>
<tr>
<td>2008</td>
<td>399</td>
<td>40.3</td>
<td>37.0</td>
<td>26.8</td>
</tr>
</tbody>
</table>

Global grain production per capita:
- 2005 = 318 kg
- 2006 = 305 kg

Source: NBS, China
Will China Feed it’s People?

Who Will Feed China?
By Lester Brown (1995)

A solid answer to “Who will feed China”, People’s Daily
03 Jan. 2006

In 2006 UN ends its 26-year food aid to China

Still Food Security ???
3. Cultivated Land and Food: a Matter of Security Concern

Inherent difficulties:
3.1 Cultivated Land as Limited Resources

Further Challenges:
3.2 Urbanization & Environmental Impacts on the CL Loss
3.3 Global Food Situation impact on China
3.1 Cultivated Land as Limited Resources

- Land **Characteristics** of China
- Cultivated land: **Quantity & Quality**
- **Population** & Land → The Relationship
Topographic Features

Land Character: Quantity & Quality

- Mountains 33%
- Plateaus 26%
- Basins 18.8%
- Plains 12%
- Hills 9.9%
China: Population Density Map

每平方千米
1人——400人——600人
Account for 7.8% world’s cultivated land (US, India, Russia, China)

per capita = 0.09 ha

World average = 0.24 ha

0.053 ha ➔ the warning line

China Total land area: 960m ha

Year 2008: Population: 1.328 billion

Source: NBS, China 2009; FAO 2010
## China: Population Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population (year-end)</th>
<th>Year</th>
<th>Total Population (year-end)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>96259</td>
<td>1999</td>
<td>125786</td>
</tr>
<tr>
<td>1980</td>
<td>98705</td>
<td>2000</td>
<td>126743</td>
</tr>
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<td>1985</td>
<td>105851</td>
<td>2001</td>
<td>127627</td>
</tr>
<tr>
<td>1990</td>
<td>114333</td>
<td>2002</td>
<td>128453</td>
</tr>
<tr>
<td>1991</td>
<td>115823</td>
<td>2003</td>
<td>129227</td>
</tr>
<tr>
<td>1992</td>
<td>117171</td>
<td>2004</td>
<td>129988</td>
</tr>
<tr>
<td>1993</td>
<td>118517</td>
<td>2005</td>
<td>130756</td>
</tr>
<tr>
<td>1994</td>
<td>119850</td>
<td>2006</td>
<td>131448</td>
</tr>
<tr>
<td>1995</td>
<td>121121</td>
<td>2007</td>
<td>132129</td>
</tr>
<tr>
<td>1996</td>
<td>122389</td>
<td>2008</td>
<td>132802</td>
</tr>
<tr>
<td>1997</td>
<td>123626</td>
<td>2015</td>
<td>139685</td>
</tr>
<tr>
<td>1998</td>
<td>124761</td>
<td>2030</td>
<td>146749</td>
</tr>
</tbody>
</table>

Figure 1. Cultivated Land Area, 1988–2005

3.2 The Urbanization & Environmental Impacts

The causes of Cultivated Land reduction:

- **construction** occupancy (most problematic);
- conversion of cultivated land for **ecological restoration** purposes (e.g. conversion of some cultivated land to woodland and wetland);
- **natural disasters**;
- agricultural structural adjustment (i.e. changing the type of crops, eg, growing grapes instead of rice).
The Urbanization Impacts

Population and Its Rural/Urban Composition

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Population</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(year-end)</td>
<td>Population</td>
<td>%</td>
</tr>
<tr>
<td>1978</td>
<td>96259</td>
<td>17245</td>
<td>17.92</td>
</tr>
<tr>
<td>1985</td>
<td>105851</td>
<td>25094</td>
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</tr>
<tr>
<td>1990</td>
<td>114333</td>
<td>30195</td>
<td>26.41</td>
</tr>
<tr>
<td>1993</td>
<td>118517</td>
<td>33173</td>
<td>27.99</td>
</tr>
<tr>
<td>1995</td>
<td>121121</td>
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<td>29.04</td>
</tr>
<tr>
<td>1996</td>
<td>122389</td>
<td>37304</td>
<td>30.48</td>
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<tr>
<td>2000</td>
<td>126743</td>
<td>45906</td>
<td>36.22</td>
</tr>
<tr>
<td>2003</td>
<td>129227</td>
<td>52376</td>
<td>40.53</td>
</tr>
<tr>
<td>2005</td>
<td>130756</td>
<td>56212</td>
<td>42.99</td>
</tr>
<tr>
<td>2008</td>
<td>132802</td>
<td>60667</td>
<td>45.68</td>
</tr>
</tbody>
</table>

The urbanization rate

By 2020

58%

Sources: NBS, China 2009
Land Used by Construction

2005—2009 年国有建设用地供应情况

10000 ha

Source: MLR, China, 2010
Land Occupancy/Reclamation, 1997 – 2005

Reduction:
- Irrigated paddy fields (— 931.3 thousand ha)
- Irrigable lands (— 299.3 thousand ha)

Addition:
- with irrigation and drainage facilities → → → less than 40%

Problem of Policies of cultivated land protection

Cultivated land

Occupied by

- high quality
- good location
- high production level

Added with

- medium and low quality
- bad location
- low production level
Cultivated land is damaged also by over using Chemical Fertilizer

<table>
<thead>
<tr>
<th>Area</th>
<th>Chemical Fertilizer Use (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World total</td>
<td>99.5</td>
</tr>
<tr>
<td>Asia</td>
<td>146.8</td>
</tr>
<tr>
<td>Africa</td>
<td>21.4</td>
</tr>
<tr>
<td>North America</td>
<td>96.9</td>
</tr>
<tr>
<td>South America</td>
<td>78.9</td>
</tr>
<tr>
<td>Europe</td>
<td>82.2</td>
</tr>
<tr>
<td>Australia</td>
<td>51.4</td>
</tr>
<tr>
<td><strong>China</strong></td>
<td><strong>327.2</strong></td>
</tr>
</tbody>
</table>

Source: Sun and Shi (2003); Tan(2008)
Environmental Impact on Land

30 years Economic development →
- natural resources – consumed
- pollutants – discharged

The Result:

- **Soil losses**, per year 5 billion tonnes → most severe in the world (Lu & Huang 2010)
- **Desertification**, per year 666.7 thousand ha, (farmland ≈ 200 thousand ha)

- **Conversion of cultivation for ecological purposes**
  - 7.23 million ha (between 1997-2008)
  - 58.8% of the total reduced quantity
Gu Lianhong, a senior researcher with Oak Ridge National Laboratory in the US:

The lab's research had shown climate change will cause China's per capita grain output to dramatically drop after 2020, even taking technological progress into consideration. (‘Climate threatens food supply’, China Daily, June 22, 2010)
3.4 Global Food Situation: Challenges to China

- The food price crisis of 2007/2008 triggered widespread concern over the volatility of agricultural prices → additional pressure on China’s depends on global food market.
- China’s growing needs for grain supply.
- Limited global food market.
6 bumper harvests → supply-demand situation is still tightly balanced
(Agriculture Minister, Han Changfu, Global Times, 9 July 2010).

China: Grain Outputs

<table>
<thead>
<tr>
<th>Year</th>
<th>Grain Outputs (10,000 tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>528.7 mt (2008)</td>
</tr>
<tr>
<td>1985</td>
<td>530.82 mt</td>
</tr>
<tr>
<td>1991</td>
<td>530.82 mt</td>
</tr>
<tr>
<td>1995</td>
<td>530.82 mt</td>
</tr>
<tr>
<td>1997</td>
<td>530.82 mt</td>
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<tr>
<td>1999</td>
<td>530.82 mt</td>
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<tr>
<td>2001</td>
<td>530.82 mt</td>
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<tr>
<td>2003</td>
<td>530.82 mt</td>
</tr>
<tr>
<td>2005</td>
<td>530.82 mt</td>
</tr>
<tr>
<td>2007</td>
<td>530.82 mt</td>
</tr>
</tbody>
</table>

2009 = 530.82 mt
By 2020 needs 572.5 mt

Implication
Implications:

- The harvest would need to **grow by 0.8 % per year** to match demand = to increase grain supply by at least **4 million tonnes** annually for the next 10 years.
- Yet the world supply-demand situation is also tightening.
- International Grain trade – limited scale \( \approx 240 \text{mt} \), \( \approx \) half of China’s grain outputs. Rice Trade \( \approx 15\% \) of China’s rice consumption.
4. Food Security Governance

- FSe Multidimensional Causes
  - Natural Conditions; Balance between economic growth, environment & sustainable development; and Global food situation.

- Who are the most targeted by food insecurity?
  - Human Security Aspect of Food Security

- FSG needs to think seriously about:
  - Security for Whom?
  - Security from What?
  - Who Provides Security and How?
FSe: Beyond Food Self-Sufficiency & National Security

- **Beyond self-sufficiency** – The multiple causes of food insecurity, especially when food security is strongly linked to land, meant that FSG must go beyond the traditional understanding of FSe as just self-sufficiency. We need to focus more on **root causes**, and concerned more about long-term food security conditions, rather than short-term resource conflicts.

- **Beyond national security** – a human centred approach. The referent object of security – people, vulnerable groups; while in terms of addressing food insecurity, the state and other actors, especially those farmers should be the important actors in the processes of FSG.

- **FSG ‘Though Government’** – achieve multilevel cooperation to address those challenging issues, such as climate change, rapid urbanization, increased competition for water and natural resources, land management, and population growth.
Thank You !!!