Balancing Conservation and Development by Paying for Ecosystem Services in China

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World Forest Institute
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Why Visit China?
But Some May Have Hesitations…
Forests of China

Forest coverage:
1949: 8.6%
2008: 20.36%

2004-2008: 20 million ha = California
The World is Watching China

2000-2005

Country                  Annual Change (1 000 ha/yr)
China                           + 4058
US                                    + 159

TABLE 2.5
Ten countries with largest annual net loss in forest area 2000–2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual change (1 000 ha/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>-3 103</td>
</tr>
<tr>
<td>Indonesia</td>
<td>-1 871</td>
</tr>
<tr>
<td>Sudan</td>
<td>-589</td>
</tr>
<tr>
<td>Myanmar</td>
<td>-466</td>
</tr>
<tr>
<td>Zambia</td>
<td>-445</td>
</tr>
<tr>
<td>United Republic of Tanzania</td>
<td>-412</td>
</tr>
<tr>
<td>Nigeria</td>
<td>-410</td>
</tr>
<tr>
<td>Democratic Republic of the Congo</td>
<td>-319</td>
</tr>
</tbody>
</table>

TABLE 2.6
Ten countries with largest annual net gain in forest area 2000–2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual change (1 000 ha/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>4 058</td>
</tr>
<tr>
<td>Spain</td>
<td>296</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>241</td>
</tr>
<tr>
<td>United States</td>
<td>159</td>
</tr>
<tr>
<td>Italy</td>
<td>106</td>
</tr>
<tr>
<td>Chile</td>
<td>57</td>
</tr>
<tr>
<td>Cuba</td>
<td>56</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>50</td>
</tr>
</tbody>
</table>
## Contradiction between the supply and demand of forest products in China

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand</th>
<th>Supply</th>
<th>Shortage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>240 m$^3$</td>
<td>170 m$^3$</td>
<td>70 m$^3$</td>
</tr>
<tr>
<td>2015</td>
<td>330 m$^3$</td>
<td>195 m$^3$</td>
<td>140 m$^3$</td>
</tr>
</tbody>
</table>

**Short-term:** Increase timber importation  
**Long-term:** Determined by its basic national conditions

**Solution:** “Program for Fast-growing and High-yielding Forest”

*In 2001 - 2015, about 13.33 million ha fast-growing and high-yielding plantations will be established, offering 130 million m$^3$ of timber*
Challenge 1: Forest Resources are Scarce

Forest Coverage
2/3 of world average

Forest Area per person
1/4 of world average

Forest Stock Volume per person
1/7 of world average
Challenge 2: Forest Distribution Unbalanced

- 6.5%
- 14%
- 30%
- 38%
Challenge 3: Afforestation Will Be More Difficult

• Chinese government’s commitment to UNFCCC* in 2009
  ✓ 2010, forest area increase 4 million ha
  ✓ 2011-2020, annual mean afforestation area > 5 million ha
  ✓ 2050, compare with 2020, increase 47 million ha

• 13% good land for afforestation

• 52% poor quality of land for afforestation

• Pay higher cost for future

* UNFCCC: United Nation Framework Convention on Climate Change
Challenge 4: Forest Quality is Poor

- Didn’t care much about the source of seeds and seedlings
- Most of forests are not managed timely.
- There are large area of non-thinned young and middle aged forest.

Strictly protect past, not care about future
Challenge 5: Huge Population

Forest Cover and Population Change in China

President Mao called on “More People, More Power”
Eco-compensation policies issued in 1998

China Will Completely Ban of Logging of Natural Forest in Yangtze River and Yellow River Catchments

Aug 28, 1998
Peoples' Daily
Oversea Edition

Natural Forest Protection Program initiated in response to 1998 Floods
Areas of Natural Forest Protection Program

-40%
Results

- Reduce timber production 86 million m$^3$ totally (2000-2007)

- 740,000 workers unemployed
  - One-time compensate to 278,000 workers
  - Provide basic subsidy for others

- Total investment:
  - 1998-2010: 16 billion USD
  - 68 million ha
Conversion of Farmland to Forests

> 25 degree
Conversion of Farmland to Forests

- One time reimbursement for reforestation: $110/ha
- Annual cash subsidy: $44/ha
- North China: 1500 kg grain/ha/year (or $154/ha/year)
- South China: 2250 kg grain/ha/year (or $230/ha/year)

- Only 0.09 ha/farmer

- One time reimbursement for reforestation: $10/person
- Annual cash subsidy: $4/person
- North China: 140 kg grain/person (or $29/person/year)
- South China: 210 kg grain/person (or $43/person/year)
Results

◆ Program covers 25 provinces
  • converted: 9.3 million ha farm land
  • planted: 14 million ha barren land

◆ 124 million farmers involved (total 850 million farmer)

◆ Total investment:
  • 63 billion USD
Overview of Beijing

- Total area: **16,400 km²**, mountainous area: 61.4%
- 2008, registered residents: **17 million**.
- Average annual rainfall: **585mm (~23 inches)**
- Primary vegetation is mixed deciduous forest of the warm temperate zone.
- 2007, forest coverage, **36%**, 1949, forest coverage, **1.3%**
Forest Classification

- 85% ecological forest
- 13% economic forest
- 2% commercial forest

Forest Ownership

- 90% collective-owned
- 10% state-owned
Beijing is a large city, suffering from serious water shortage, with water resource share below 300 m$^3$ per capita.

http://earthtrends.wri.org/searchable_db/index.php
Miyun Reservoir

- Responsible for 70% of the water supply for Beijing’s 17 million residents.
- Established in 1960, capacity: 4400 million m³
- Since 2000, only have about 1000 million m³
The total watershed area is 13,800 km²
1/3 in Beijing, 2/3 in Hebei
Policies to Protect Watershed

❖ **Ban of logging:**
  - 85% ecological forest + 13% economic forest

❖ **Ban of grazing:**
  - Since 2003, ban of 120,000 households raising livestock

❖ **Ban of mining**
  - By 2007, only 15% companies left of 851 mining companies

❖ **Move the big industry company**
  - 2007, Beijing Steel Corporation moved to Hebei, 60,000 workers were laid off
Annual Income of Residence in Miyun Watershed in 2008 (USD)

- **Beijing**: 3636 USD
- **Chengde**: 1580 USD
- **Zhangjiakou**: 1500 USD
- **City**: 838 USD
- **Rural Area**: 483 USD
Landscapes & Livelihoods

- Natural resources use limit the locals’ livelihood
- Widening the income gap between urban and rural areas

2008, Beijing, Bird Nest

2008, Beijing Shower room
Measure 1: Farmland Conversion Program

- 294,000 farmers of 207,000 households.
- 70,000 hectares
- Compensation
  (1st phase 2000-2008, 2nd phase 2008-2016)
  - Grain: 1500 kg/ha/year
  - Cash: 300 Yuan/ha/year ($45)
  - Total investment: 420 million RMB (62 million USD)
Measure 2: Ecological Migration

- 2000 ~ 2004: 2480 people
  10,000 Yuan/person ($1470/person)
- 2005 ~ 2007: 11,340 people
  14500 Yuan/person ($2130/person)
- Still have 100,000 people in the protection zones
Measure 3: Job Opportunities: Forest Warden

- 46,908 farmers were hired as forest warden till 2007
- 400 Yuan/month ($60/month)
- Patrol the forest land of 674,000 ha
  - Forest fire control
  - Pest and disease control
Measure 3: Job Opportunities: Water Warden

- **Forest warden**
- **Water warden**
  - In 2006, 10,800 water warden were hired
  - 500 Yuan/month ($74/month)
  - Patrol of riparian zone and water bodies
  - Manage wells
Measure 4: Cross Border Cooperation

- On October 11th, 2006, governments of Beijing and Hebei signed MOU in Beijing.
Measure 4: Cross Border Cooperation

- Restore 59,700 ha watershed
- Beijing government will invest 7500 Yuan/ha ($1100/ha)
- Total investment: 100 Million Yuan ($15 million)
Measure 4: Cross Border Cooperation

- Convert 12,200 ha rice plantation to corn in Hebei
- Beijing government will compensate Hebei farmers by 550 yuan/mu/year ($1200/ha/year)
  - Saved water = 900 m$^3$/mu (13500 m$^3$/ha)
  - Totally saved water = 64 million m$^3$
  - Reduce fertilizer use = 11,000 tons
  - Reduce pesticide use = 71 tons
  - Reduce herbicide use = 18 tons
The main problems of current eco-compensation Policy and Practice

- Compensation standard lacks scientific basis and flexibility.
- Eco-compensation mechanism mainly relies on the projects, lacks stability.
- Stakeholders didn’t have enough chance to be involved
- Funding channel was single, and there was a lack of using marketing measures
- Lack of monitoring and evaluating system for the ecological function of the restoration
- Vulnerable groups are involved in the programs
Common Challenges in China and the US

- Lack of cooperation among different agencies
- Lack of trans-boundary cooperation
- It is difficult to monetize ecosystem services
- It is difficult to identify buyers
- The evaluation is complex, and make the transaction cost high
- It takes time to set up a market to trade ecosystem services
Advantages in China

• Chinese government has taken the leading role to organize the Payment for Ecosystem Services

• Government has lots of resources

• It is more efficient to rescue threatened ecosystems
Advantages in the US

• Less population, less pressure on the ecosystem services

• Non-profit organizations are more active
e.g. Ecotrust, Willamette Partnership

• Tax system encourages donors to contribute to conservation

• Market-based system

• More public and stakeholder participation,
e.g. conservation easement
Harmonious Society!
Thank you for your attention!

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