Biofuels Policies in Asia: Trade effects on World Agricultural and Biofuels Trade

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I. Chinese bio-ethanol Program

- The number of automobile in China is increasing

<10^3 Cars>

Source: China Statistical Yearbook 2005
Chinese petroleum consumption is increasing and its import of crude oil and oil products are rising too.

Source: China Statistical Yearbook 2005

<10^3 tons>
• The increase in petroleum consumption is causing serious air pollution problems

• In order to deal with energy security and the air pollution problem, the Chinese government is strongly promoting the National Fuel-ethanol program

• In June 2002, the government started to make the use of fuel-ethanol blended gasoline mandatory
Chinese Fuel-Ethanol Program

- Motorization
  - Increasing petroleum consumption
  - Surging gasoline price
  - Concern for Energy Security

- High Economic Growth
- Promoting Industrialization
- Concern for Environment

Fuel-Ethanol Program (2002~)

Demand

Inferior Corn
The Chinese Fuel-Ethanol Program

- In 2004, the government introduced the compulsory use of a 10% ethanol blended in gasoline (E10) in provinces of Heilongjiang, Jilin, Liaoning, Henan, and Anhui

- The government expands the E10 program to 27 cities in the provinces of Shandong, Jiangsu, Hebei, and Hubei in 2006
### Current and Future Fuel-Ethanol Production (1)

<table>
<thead>
<tr>
<th>Province</th>
<th>Company Name</th>
<th>Raw material</th>
<th>2005 production (MT/Year)</th>
<th>2007 production capacity (MT/Year)</th>
<th>Supply location</th>
<th>Supply volume (MT/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heilongjiang</td>
<td>China Resources Alcohol Co.</td>
<td>Corn</td>
<td>100,000</td>
<td>100,000</td>
<td>Heilongjiang</td>
<td>100,000</td>
</tr>
<tr>
<td>Jilin</td>
<td>Jilin Fuel Ethanol Co.</td>
<td>Corn</td>
<td>300,000</td>
<td>600,000</td>
<td>Jilin</td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Liaoning</td>
<td>200,000</td>
</tr>
<tr>
<td>Henan</td>
<td>Henan Tian Guan Fuel-Ethanol Co.</td>
<td>Wheat</td>
<td>200,000</td>
<td>200,000</td>
<td>Henan</td>
<td>86,842</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hubei (9 cities)</td>
<td>113,158</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hebei (4 cities)</td>
<td></td>
</tr>
<tr>
<td>Anhui</td>
<td>Anhui BBCA Biochemical Co.</td>
<td>Corn</td>
<td>320,000</td>
<td>320,000</td>
<td>Anhui</td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Shandong (7 cities)</td>
<td>220,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Jiangsu (5 cities)</td>
<td></td>
</tr>
<tr>
<td>Guangxi</td>
<td>China Resources Alcohol Co.</td>
<td>Cassava</td>
<td>0</td>
<td>110,000</td>
<td>Guangxi</td>
<td>110,000</td>
</tr>
<tr>
<td>Hebei</td>
<td>China Resources Alcohol Co.</td>
<td>Sweet potato, corn etc</td>
<td>0</td>
<td>230,000</td>
<td>Hebei</td>
<td>230,000</td>
</tr>
<tr>
<td>Hubei</td>
<td>Tian Guan Fuel-Ethanol Co.</td>
<td>Grains</td>
<td>0</td>
<td>100,000</td>
<td>Hubei</td>
<td>100,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>920,000</strong></td>
<td><strong>1,660,000</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fuel-Ethanol Production Sites**

- China Resources Alcohol Co, Heilongjiang (Corn)
- Jilin Fuel Ethanol Co, Jilin (Corn)
- Anhui BBCA Biochemical Co. (Corn)
- Henan Tian Guan Fuel-Ethanol Co, Henan (Wheat)
- China Resources Alcohol Co, Guangxi (From 2007, Cassava)
- China Resources Alcohol Co, Hebei (From 2007: Sweat potato, corn etc)
- Tian Guan Fuel-Ethanol Co, Hubei (From 2007, Grains)

Corn is the major source of fuel-ethanol in China

1) Corn
   • 80% of fuel-ethanol is made from corn in China
   • Ethanol facilities in Heilongjiang, Jilin, and Anhui use corn

2) Wheat
   • Wheat is used in Henan

3) Cassava
   • The Guangxi Zhuang autonomous region plans to build a fuel-ethanol plant
   • The plant is scheduled to begin operations in October of 2007 at a production capacity of 110,000 MT

4) Others
   • Potato, sorghum, rice, sugar, and lignocellulose are on experimental stage for fuel-ethanol production
• Chinese fuel-ethanol production cost and agricultural production

Note: Production data is derived from FAS, USDA, PS&D (2006)

Production cost is derived from the Chinese National Development and Reform Commission
Chinese ethanol production cost is higher than other producers

Corn use for Fuel-Ethanol production

- Although Chinese central government ordered to use inferior corn for fuel-ethanol production, facilities in Heilongjiang and Jilin use normal corn.

- If China continues to expand corn-based fuel-ethanol production, corn utilization ratio for ethanol will increase.

- Chinese central government stated to regulate corn-based fuel-ethanol production (Statement from National Development and Reform Commission in 21/12/2006).
- Chinese corn production, consumption and ending stocks

If China expands ethanol production from cassava, China will have to rely on imported cassava.

Summary (Chinese Bio-Ethanol Program)

• 80% of fuel-ethanol was made from corn in China in 2005

• Chinese central government wants to regulate corn-based ethanol production

• Chinese government wants to diversify the sources of fuel-ethanol production, especially to cassava

• Technological innovation is required for developing cassava-based fuel-ethanol production
Ⅱ. Malaysian Biodiesel Program
• Malaysian petroleum consumption has increased rapidly since 1990

Malaysia is the second largest producer of palm oil

Malaysia is the world largest exporter of palm oil

Source: FAS, USDA, PS&D (2007)
International palm oil prices are unstable

Note: Palm Okein RBD, Mal. cif. Rotterdam

Malaysia is promoting National Biofuel Policy

- Escalating petroleum prices
- Depletion of fossil fuel
- Unstable palm oil price
- Biodiesel boom in EU
- Environmental Concern

Agricultural Development

National Biofuel Policy (August 2005)
National Biofuel Policy (Objectives)

- Supplementing the depleting supply of fossil fuels with renewable resources
- Mobilizing local resources
- Exploiting local technology to generate energy for the transportation and industrial sectors
- Enhancing exports of biofuels
- Benefiting from the spin-off effect of more stable prices of palm oil
National Biofuel Policy (Implementation Plan)

Short term

- Malaysian standard specifications of B5 (5 percent processed palm oil and 95 percent diesel) will be established
- Selected government departments with their fleets of diesel vehicles will participate in trials for using B5 diesel
- B5 diesel pumps for the public will be established at selected stations
National Biofuel Policy (Implementation Plan)

○ Medium Term
  • Malaysian standard specifications of palm-oil-based biodiesel for domestic use and export will be established
  • Legislation to mandate the use of B5 diesel will be passed and enforced

○ Long Term
  • The proportion of processed palm oil in the diesel blend will be gradually increased
  • Greater uptake of biofuels technology by Malaysian companies and foreign companies abroad
Biodiesel production in Malaysia

- Biodiesel production in Malaysia is estimated 158 thousand tons in 2006 and 1.3 million tons in 2007
  (PECC, “Pacific Food System Outlook 2006-2007”)

- Government has granted licenses to 32 biodiesel plants, with potential annual capacity of 2.6 million tons
  (PECC, “Pacific Food System Outlook 2006-2007”)

- If Malaysia promotes B5 program in all regions, 500 thousand tons of biodiesel will be newly required

- Malaysia may export biodiesel to European markets at the range of 300-350 thousand tons by 2010
  (Asian Palm Oil for Euro Biodiesel, 2005).
Main Biodiesel Projects in Malaysia (2006)

- MPOB, Golden Hope Plantation Bhd (60,000t)
- MPOB, JC Cjang Joho (60,000t)
- Golden Hope Plantations Bhd (30,000t)

Biodiesel Production costs in Malaysia

- Raw material cost contributes about 80 percent of total production cost

<table>
<thead>
<tr>
<th>Raw material</th>
<th>$/Liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude Palm Oil (CPO)</td>
<td>0.39</td>
</tr>
<tr>
<td>Methanol</td>
<td>0.02</td>
</tr>
<tr>
<td>Conversion from CPO to Biodiesel</td>
<td></td>
</tr>
<tr>
<td>Capital Cost</td>
<td>0.07</td>
</tr>
<tr>
<td>Variable Cost</td>
<td>0.05</td>
</tr>
<tr>
<td>Total</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Note: Based on data from Japan Petroleum Energy Center (2004).
• Production Costs (International comparison)

Note: Malaysian costs is based on data from Japan Petroleum Energy Center (2006).
Brazilian cost is derived from Biodiesel in Brazil (2005)
Japanese cost is derived from Japan’s Ministry of Agriculture, Forestry and Fisheries
Palm Oil production in Malaysia

- Malaysian palm oil production will expand to the future
- Particularly in Sarawak, East Malaysia

Source: MPOB (2005)
• Malaysia’s potential for palm area expansion is estimated to be about 2.0 million ha, which can produce 10 million ton of CPO

○ CPO Production in Malaysia

<table>
<thead>
<tr>
<th>Current palm Area</th>
<th>3.6 million ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential area expansion</td>
<td>About 2.0 million ha</td>
</tr>
<tr>
<td>Total national land area</td>
<td>33.0 million ha</td>
</tr>
<tr>
<td>Current production</td>
<td>12.1 million t/year</td>
</tr>
<tr>
<td>Production prospect</td>
<td>14 million ton in 2005</td>
</tr>
<tr>
<td></td>
<td>19 million ton in 2020</td>
</tr>
</tbody>
</table>

Malaysian biodiesel export

- Malaysia wants to export biodiesel to European market

- Malaysian palm oil may become a raw material of European biodiesel production

- Whether European market chooses CPO or biodiesel from Malaysia is uncertain. It depends on the quality and cost of biodiesel
Benefits for Malaysia

- New demand for palm oil
- Mutual beneficial effects on petroleum and palm oil sectors
- Efficient utilization of raw materials
- Mitigating the effects of petroleum price escalation
- Savings in foreign exchange
- Environment-friendly source of energy
- Achieving socio-economic safety net
Concerns for biodiesel expansion

- Expansion of palm oil production is possible in Malaysia

- 1.0% of palm oil production is used for biodiesel in 2006, and 7.9% of palm oil production will be used for biodiesel in 2007

- The expansion may cause a high international palm oil price
• In Malaysia, 11% of the total land area is already devoted to palm oil (F.O.Licht 2006)

• “Between 1985 and 2000, the development of palm oil plantations was responsible for an estimated 87% of deforestation in Malaysia” (Friends of the Earth 2005)

• Sustainability of palm oil production and biodiversity are main concern for expanding bio-diesel production
Summary (Malaysian Biodiesel Program)

- Malaysia will expand biodiesel production from palm oil

- Malaysia may meet both domestic and international demand

- Malaysian biodiesel programs can contribute to mitigate energy in security and be beneficial for palm oil producers

- However, this program may cause to increase international palm oil price

- This program can damage for sustainability of palm oil production and biodiversities in Malaysia
III Japanese Bio-Ethanol program

- Preventing global warming
- Development of strategic industries
- Vitalization of rural and farming communities
- Biomass Nippon Strategy was formulated in December 2002
Revised Biomass Nippon Strategy

- Kyoto Protocol was put into effect in February 2005
- Revised Biomass Nippon Strategy was formulated in March 2006
- Promotion of utilization of biomass for transportation fuel, particularly of domestic biomass
Current Bio-Ethanol Production

- Japanese bio-ethanol production is at an experimental stage
- Current production level is 30 kl (April 2006)
For Further Promotion of Domestic Bio-Ethanol

• The abandoned arable land can be used to grow crops for bio-ethanol production

• Farmland planted with crops may be used to provide raw materials for bio-ethanol

• Technological innovation is the key
Expected Result

Food and Agriculture

- Reinforcement of international competitiveness to agriculture
- Improvement and maintenance of food supplying capability

Environment

- Contribution to fulfillment of the target dedicated by the Kyoto Protocol
- Actions in consideration of Post-Protocol situation

Energy

- Action to cope with rising crude oil price
- Diversification of energy sources (energy security)
• Production cost and fuel-tax need to be reduced to expand bio-ethanol production in Japan
Summary (Japanese Bio-Ethanol Program)

- Japanese government promotes bio-ethanol production and utilization for automobile

- Securing raw materials for bio-ethanol, reduction of production cost, tax reduction for bio-ethanol are needed to expand bio-ethanol production in Japan

- Further technical innovation is the key factor to promote domestic bio-ethanol production
Concluding Remarks

• The governments in Asian countries are promoting bio-fuel programs

• Their raw materials for bio-fuels have various sources

• Increasing bio-fuel consumption would compete with food and feed

• The governments in Asian countries are working for bio-fuel programs, which will not conflict with food security
Thank you for your attention !!