Biofuel Programs in China, Malaysia, and Japan. [Abstract]

Tatsuji Koizumi[1], Keiji Ohga[2]

1. Chinese Bio-ethanol Program

As a result of high economic growth in the 1990s, Chinese petroleum consumption is rapidly increasing and imports of crude oil are also rising. The increase in petroleum consumption is causing a serious air pollution problem. To deal with energy security and the air pollution problem, the Chinese government has strongly promoted the National Fuel Ethanol Program. In June 2002, the Chinese government began mandating the use of bio-ethanol blend gasoline. In October 2004, the government introduced the compulsory use of a 10 percent blend of bio-ethanol to gasoline (E10) in all areas of Heilongjiang, Jilin, Liaoning, Hernan, and Anhui. The government plans to expand the E10 program to 27 cities within Shandong, Jiangsu, Hebei, and Hubei from 2006. Ethanol facilities in Heilongjiang, Jilin, and Anhui use corn, while the facility in Henan uses wheat. The Guagxi Xhuang autonomous region plans to build a fuel plant that will use cassava. The plant is scheduled to begin operations in October of 2007. The use of potato, sorghum, rice, and lignocelluloses for bio-ethanol production are in the experimental stages.

Corn has been allocated as the major raw material for producing bio-ethanol. Corn consumption has been increasing and the domestic corn price is at a high level. Corn consumption for bio-ethanol is now competing with corn consumption for animal feed, food, and other industries. The National Development and Reform Commission stated to regulate corn-based bio-ethanol expansion in December 2006. The Chinese central government wants to expand bio-ethanol production, especially that from cassava, instead of expanding corn-based bio-ethanol production. Technological innovation is a crucial issue for developing cassava-based bio-ethanol production in China.

(Appendix)

Impact of the Chinese Bio-Ethanol Program on the World Corn Market: An Econometric Simulation Approach.

This study examines the impacts that the Chinese bio-ethanol program would have on domestic and international corn markets, by applying a newly developed Chinese corn market model. The model consists of eleven major corn-trade countries, and the

[1] Economist, Policy Research Institute, The Ministry of Agriculture, Forestry and Fisheries of Japan: koizu@affrc.go.jp.
[2] Professor, College of Bio-resource Sciences, Nihon University of Japan.

corn markets in each country consist of production, consumption, exports, imports, ending stocks, and price activities, which are projected up to the year 2014/15. In the baseline projection, we assume that current agricultural policies and normal weather will continue throughout the projection period. We assume that the government will maintain and proceed with the E10 program in Heilongjiang, Jilin, Liaoning, Hernan, and Anhui. It is expected that the E10 program will be started in 27 cities in Shandong, Jiangsu, Hebei, and Hubei in 2006. World corn consumption and production are projected to increase by 2.0% per annum from 2004/2005 to 2014/2015. (World feed corn consumption is projected to increase by 1.8%.) World corn exports and imports are projected to increase by 2.7% per annum during this period.

As an alternative scenario to this study, we assume that the Chinese Government will start the E10 program in four provinces: Shandong, Jiangsu, Hebei, and Hubei. As a result of this new program, nine provinces are expected to promote the bio-ethanol program on a provincial level starting in 2007/08. As a result of the E10 program in nine provinces, Chinese corn imports are predicted to increase by 92.4% in 2014/15. World corn exports and imports are predicted to increase by 3.2% in 2014/15, and world corn production and consumption are predicted to increase by 0.4% in 2014/15. (World feed corn consumption is predicted to decrease by 0.3 %.) As a result, the world corn price (Corn No.2 Yellow, Chicago) is predicted to increase by 1.6% in 2014/15. As a result of our analysis using the econometric model, we conclude that the expansion of the program is predicted to impact world corn markets.

2. Malaysian Bio-diesel Program

Malaysia is the world's largest palm oil exporter and the second largest palm oil producer. To deal with an unstable palm oil price and the fast depletion of fossil fuels, the Malaysian government formulated the National Biofuel Policy in August 2005. The National Biofuel Policy spurs the Malaysian bio-diesel industry. Bio-diesel production in Malaysia is 158 thousands tones (200 million liters) in 2006 and 1.3 million tones (1.7 billion liters) in 2007. The government has granted licenses for 32 bio-diesel plants with a potential annual capacity of 2.6 million tones (3.3 billion liters). In 2007, Malaysia will become the world's main bio-diesel producer.

Over the past decade, Malaysia has mainly concentrated on consolidating its export market in CPO (Crude Palm Oil). This has, in turn, spurred the need to bring diversity into bio-diesel. Malaysia's future success in the global bio-diesel market will be driven primarily by cost and quality. The raw material cost dominates about 80 percent of the total cost in Malaysia, which means that the total cost is variable and can be increased

because of the increasing demand of palm oil utilized for bio-diesel. In the global scene, especially in the EU, the use of bio-diesel has achieved widespread acceptance. Malaysia's government is interested in the boom in bio-diesel demand in Europe. Malaysian palm oil may become a major raw material of European bio-diesel projects and Malaysia wants to export palm oil based bio-diesel to European markets. These could lead to increased exports of CPO or palm oil-based bio-diesel to European markets. These expansions will increase the international palm oil price. Palm oil is widely used not only in developed countries, but also in developing countries. Palm oil is necessary for life in many Asian countries, especially in Malaysia and Indonesia. A higher palm oil price would increase the consumer price of food and may damage food security in developing countries, including Malaysia and Indonesia. In addition, the development of palm oil plantations may be responsible for deforestation in Malaysia. The expansion of palm oil production can damage sustainability and biodiversity. The main concerns for expanding bio-diesel production in Malaysia are sustainability and biodiversity.

3 . Japanese Bio-ethanol Program

Biomass Nippon (Japan) Strategy was formulated in December 2002 for the prevention of global warming, the formulation of a recycling-oriented society, the development of strategic industries, and the vitalization of rural and farming communities. Kyoto Protocol put this into effect in February 2005, and the Revised Biomass Nippon Strategy was formulated in March 2006. In the new strategy, Japan promotes the utilization of biomass for transportation fuel. Japanese bio-ethanol production is in an experimental stage, and the current production level is 30 KL (April 2006). Molasses from sugarcane, wheat unsuited for food use, corn unsuited for food use, sorghum, and wasted woods are raw materials for bio-ethanol production. For further promotion of domestic bio-ethanol, farmland should be put to maximum use as farmland, all-out efforts should be made to plant crops in abandoned arable land and every possible arable land in the country, and farmland planted with crops should be used to provide raw materials for bio-ethanol.

Securing raw materials for bio-ethanol, reducing production costs, and reducing taxes on bio-ethanol are urgently needed to expand bio-ethanol production in Japan. The most crucial factor for expanding bio-ethanol markets is technological innovation: the technology to efficiently produce bio-ethanol from wooden biomass or rice straw, or the development of crops that can produce bio-ethanol in large quantities.

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Impacts of the Japanese Bio-ethanol Import Expansion on the Brazilian Sugar and World Sugar Markets: An Econometric Simulation Approach.

This study examines the impacts that the Japanese bio-ethanol import expansion would have on Brazilian and international sugar markets by applying a newly developed world sugar model. The model consists of twelve major sugar-trade countries. In the project, the sugar markets in each country consist of production, consumption, exports, imports, ending stocks, and price activities up to the year 2015. In the baseline projection, we assume that the current agricultural and bio-ethanol policies and normal weather will continue throughout the projection period. World sugar production and consumption are projected to increase by 1.7% per annum from 2004 to 2015. World sugar exports and imports are projected to increase by 1.4% per annum during this period.

As a first alternative scenario to this study (Scenario1), we hypothesize that Japan will start the E3 (3 percent blend of bio-ethanol to gasoline) program in all regions in 2012 and will depend on imported bio-ethanol from Brazil. As a second alternative scenario (Scenario2), we hypothesize that Japan will import 3 million KL of Brazilian bio-ethanol starting in 2010. As a result of the E3 program in all regions from 2012 (Scenario1), the Brazilian sugar price (Domestic crystal sugar price) is predicted to increase by 1.5% and the world raw sugar price (New York No.11) is predicted to increase by 1.4% in 2015. As a result of the 3 million KL of bio-ethanol import from Japan to Brazil (Scenario2), the Brazilian sugar price is predicted to increase by 4.4% and the world raw sugar price is predicted to increase by 3.1% in 2015. As a result of our analysis using the econometric model, we conclude that the expansion of Japanese bio-ethanol import from Brazil is predicted to impact not only the Brazilian sugar market, but also the world sugar markets.