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Assessment of Biotechnology Policies and International Trade in Key Markets for U.S. Agriculture

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The United States leads the world in agricultural biotechnology research, adoption, commercialization, and exports. Our biotech commodities are highly dependent on international markets. Thus, any biotech policy changes by key importing countries may affect U.S. agricultural biotech product exports. This article identifies key markets for U.S. agricultural exports including biotech commodities and discusses current and proposed biotech policies in key markets for U.S. agricultural exports focusing on Canada, Mexico, Japan, the European Union (EU), and China. Among these markets, labeling of biotech products is voluntary in Canada and Mexico but is mandatory in Japan, the EU, and, most recently, in China. For the EU, U.S. corn exports were almost completely shut out, while U.S. soybean exports also declined because of the EU's biotech policies. The World Trade Organization dispute filed by the United States has yet to be finalized. China's biotech regulations raised concern by U.S. agricultural exporters. However, through U.S. Department of Agriculture education programs, U.S.–China negotiations, and China's domestic soybean shortage, China's biotech regulations do not appear to have had long-run impacts on U.S. soybean exports to China.

Key Words: biotechnology, biotech policy, corn, cotton, international trade, soybeans, U.S. agricultural exports

JEL Classifications: Q13, Q17, Q16, Q18

Around the world, scientists are working to develop new varieties of crops that can resist pests, use less water and generally thrive in less than optimal growing conditions. Hand-in-hand with scientific research, countries must adopt policies that allow their farmers to take advantage of new products being developed through research. Government policies should encourage the safe use of new technologies, not cause farmers and consumers to fear it.

—U.S. Secretary of Agriculture
Ann M. Veneman, 2001–2004

Agricultural biotechnology has been advancing and spreading rapidly throughout the world. In 2004, the global area of biotech crops continued to grow for the ninth consecutive year at a double-digit growth rate of 20% (James). In 2004, the estimated global area of biotech crops was 200 million acres, farmed by approximately 8.25 million farmers in 17 countries. Among these countries, the United

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Table 1. Main U.S. Biotech Varieties (Percent of Planted Acreage)

Commodity	2000	2001	2002	2003	2004
Soybeans	54	68	75	81	85
Cotton	61	69	71	73	76
Corn	25	26	34	40	45

Source: USDA-ERS 2004a.

States produced biotech crops on 118 million acres, accounting for 59% of this global total. The main U.S. biotech varieties include soybeans, cotton, and corn. In 2004, 85% of soybeans, 76% of cotton, and 45% of corn planted in the United States were biotech varieties as shown in Table 1 (U.S. Department of Agriculture, Economic Research Service [USDA-ERS 2004a]).

The United States leads the world in agricultural biotechnology research, adoption, commercialization, and exports of biotech products. Since 2000, soybeans have been the number one commodity for U.S. agricultural bulk exports. In 2003, U.S. soybean exports totaled 31 million metric tons, accounting for 46% of U.S. soybean production (U.S. Department of Agriculture, Foreign Agricultural Service [USDA-FAS 2005a]). For corn, the United States exported 43 million metric tons, 17% of corn production; and for cotton, U.S. exports totaled 3 million metric tons, 67% of cotton production.

In this article, our research (1) provides an overview of global export markets, (2) identifies key biotech commodities and their leading export markets for U.S. agriculture, (3) discusses biotech polices in key U.S. export markets, and (4) assesses the impacts of these biotech policies on U.S. agricultural exports.

Outlook of U.S. Agricultural Exports

Global—Top Agricultural Exports by Country

In 2003, U.S. agricultural exports reached $62 billion, accounting for 12% of world agricultural exports, which totaled $522 billion (Food and Agricultural Organization of the United Nations [FAO]). Globally, the United States

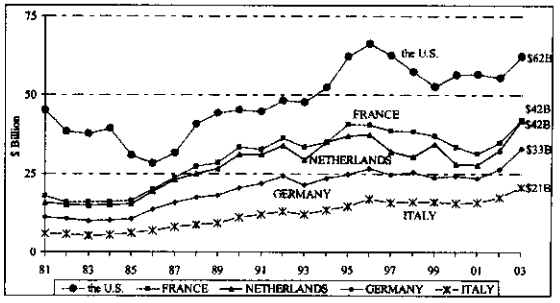

Figure 1. Top Agricultural Export Countries in the World (FAO 2005)

leads all other countries as the number one agricultural exporter, followed by France, the Netherlands, Germany, and Italy as shown in Figure 1.

Although the United States leads global agricultural export markets, its market share declined annually from 19% in 1981 to 12% in 2003 as shown in Figure 2 (FAO). Figure 2 indicates that world agricultural exports increased over this time period, while U.S. agricultural exports remained stable, especially in the last two decades. This implies that other countries entered the global agricultural market and effectively competed with the United States.

Destinations—Top U.S. Agricultural Export Markets by Country

Since 2002, Canada has become the number one market for U.S. agricultural exports, surpassing the historic leaders of Japan and the European Union (EU; USDA-FAS 2005b). Thus, the current top five U.S. agricultural ex-

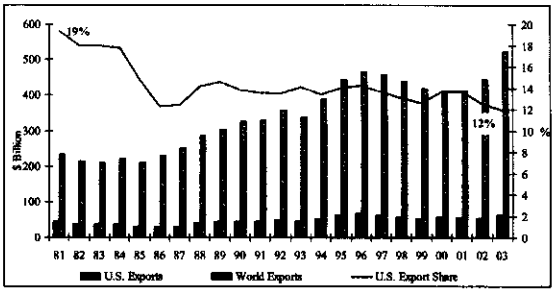

Figure 2. U.S. Agricultural Export Share in the World Market (FAO 2005)

Table 2. Top Markets for Leading U.S. Agricultural Biotech Commodities in 2003

Commodity	Top Export Markets	Market Share by Destination (% of U.S. Total Exports)
Soybeans	China, EU, Mexico, and Japan	74
Corn	Japan, Mexico, Canada, and Eygpt	62
Cotton	China, Turkey, and Mexico	48

Source: USDA-FAS, *Online U.S. Trade Internet System,* accessed February 2005.

port markets include Canada, Japan, Mexico, the EU, and China. Among these markets, U.S. agricultural exports to Canada and Mexico grew, and continue to grow, rapidly beginning in 1990, while similar growth occurred in China beginning in 1999. In contrast, the volume of U.S. agricultural exports to Japan and the EU remains large and stable.

Destinations—Top Markets for U.S. Biotech Commodities

Table 2 shows the top export markets for U.S. agricultural biotech products. In 2003, leading U.S. soybean importers were China (36%), the EU (14%), Mexico (13%), and Japan (11%), and these four importers accounted for 74% of U.S. soybean exports, both biotech and non-biotech soybeans (USDA-FAS 2005a). Japan (33%), Mexico (13%), Canada (8%), and Egypt (8%) were the four top U.S. corn importers, importing 62% of U.S. corn in 2003. U.S. cotton markets included China (21%), Turkey (14%), and Mexico (13%). These four countries purchased 48% of U.S. cotton.

Overview of Biotech Policies in Key U.S. Agricultural Export Markets

Exports are very important for U.S. agriculture, generating 20%–30% of U.S. farm income over the past 30 years (Jolly, Jefferson, and Traxler; USDA-ERS 2004b), whereby competitiveness of U.S. agriculture in a global marketplace determines the United States' level of exports (Wailes). Since top U.S. agricultural export commodities include biotech soybeans, corn, and cotton, any biotech policy change by countries that import these commodities may affect U.S. agricultural competitiveness. Thus, it is crucial to understand the development and evolution of biotech policies in these importing countries.

Given food-safety concerns, global controversy exists over biotech commodities. In the United States, biotech products, including soybeans, corn, and cotton, have been tested and commercially produced and marketed (Anderson and Jackson; USDA-ERS 2004a). Although in the United States biotech varieties expanded quickly, the United States is facing some disputes with its export markets. Many countries, including the EU, Japan, and China, have implemented regulations to restrict the adoption, importation, and consumption of biotech food products, e.g., biotech soybeans and corn (Marchant, Fang, and Song). In the following section, these regulations and their effects on trade between the United States and our top export markets will be introduced and assessed.

Canada's Biotech Policies

Canada is the number one market for U.S. agricultural exports, having surpassed Japan in 2002. On January 11, 1993, the Canadian federal regulatory departments agreed on principle for a more efficient and effective regulatory framework for biotechnology (Canadian Food Inspection Agency, Science Branch Office of Biotechnology). The goal of this regulatory framework was "to minimize environmental risks while fostering competitiveness through the timely introduction of biotechnology products to the marketplace." In November 1999, "the Canadian Council of Grocery Distributors, which represents about 80% of

the major food retailers in Canada, and the Canadian General Standards Board launched a Standards Committee" (USDA-FAS 1999). This committee was charged with developing a voluntary labeling standard for foods derived from biotech materials. The voluntary labeling project was supported by the federal government's Agri-Food Trade 2000 fund as part of its mandate to provide safe food choices for consumers. Because the labeling standards are voluntary, their use is generally a marketing decision made by food manufacturers. For the first time, Bill C-287, which required mandatory labeling of biotech foods in Canada, was introduced into the Canadian Parliament in 2001 and later defeated (USDA-FAS 2001b). Labeling discussions continued among interest groups.

In December 2003, interested parties came to a consensus and a voluntary labeling standard was issued in April 2004, which included three key points: (1) "for the purposes of the voluntary standard, biotech product, such as canola oil, is defined as containing a protein that would otherwise not be in a product"; (2) "products, where there are no biotech varieties, such as apples or oranges, are not allowed to be labeled as free from biotech proteins, nor will producers with multi-ingredient products be able to highlight one ingredient as not being biotech"; and (3) "every label must also display a website or toll free number where consumers can obtain more information" (Canadian General Standards Board; FoodNavigator-USA.com). Jeanne Cruikshank, vice president of the Canadian Council of Grocery Distributors, one of the leading organizations on this issue, states "it is unlikely that the labeling of genetically engineered foods will ever become compulsory, particularly because Canada does not have segregated crops" (FoodNavigator-USA.com).

Mexico's Biotech Policies

In 1999, the interministerial Commission on Biosafety and Genetically Modified Organisms (CIBIOGEM) was established in Mexico. This national authority oversees the import/export, testing, and release of biotech products. In late 2000, the Mexican Senate approved mandatory labeling of biotech products, whereby any foods containing biotech ingredients must be labeled as "food made with biotech products." However, a consortium of biotech companies, AgroBIO Mexico A.C., opposed this legislation. In addition, at the request of U.S. agribusinesses, the U.S. trade representative also requested that Mexico not implement mandatory labeling of biotech foods (Vazquez 2002). Under pressure from both domestic agribusinesses and the U.S. government, the Mexican government has yet to enforce these labeling regulations.

Genetic contamination of native corn from imported varieties has become a main concern. CIBIOGEM stated that up to 10% of native corn varieties in the states of Oaxaca and Puebla had been contaminated with DNA from biotech corn in 2001 (Vazquez 2003). Mexican scientists and politicians called for a ban on imports of U.S. corn. As of this writing, the Mexican government has not taken action on this issue, except for signing the Cartagena Protocol on Biosafety of the Convention on Biological Diversity, which requires exporters to inform importing countries of genetically engineered commodities before their shipment (USDA-FAS 2003b). On October 28, 2003, Mexican Secretariat of Foreign Relationships published in the *Diario Oficial* (Mexico's "Federal Register") a decree promulgating the Cartagena Protocol, and through this decree, the Cartagena Protocol enters into force in Mexico as law (USDA-FAS 2003b).

On February 15, 2005, the Mexican Senate approved a bill for evaluating the safety of biotech products, including imports and exports. Although this bill does not grant immediate approval for any biotech commodities, it provides a regulatory framework and requires manufacturers to label food containing biotech ingredients. President Vicente Fox's spokesman, Agustín Gutiérrez, said that the president planned to sign this bill but did not indicate when this would occur (Lee). If signed, all U.S. corn exported to Mexico must be labeled.

Japan's Biotech Policies

Japan, the number two importer of U.S. agricultural products, is also the largest importer

of U.S. corn, importing 33% of total U.S. corn exports in 2003 (USDA-FAS 2005b). Since the mid-1990s, Japanese consumers have expressed their increasing concerns regarding the safety of biotech products (USDA-FAS 2000). On May 1, 2000, the Japanese Ministry of Agriculture, Forestry, and Fisheries (MAFF) released its biotech food labeling regulation "Mandatory Labeling of Genetically Modified Foods and Foods Containing Allergens." This regulation includes two key points: (1) "importation and sale of these foods are legally prohibited if they have not been assessed for safety by the national government" (administered by the Japanese MAFF) and (2) "labeling is legally required as well as safety assessment" (Japanese Ministry of Health, Labor, and Welfare). This bill requires 24 foods made from corn and soybeans to be labeled for their biotech ingredients (USDA-FAS 2000, 2001a).

On February 22, 2002, the Japanese MAFF announced further revision of its biotechnology labeling regulation to include biotech potato products (USDA-FAS 2001c). The Japanese MAFF also set 5% as an unofficial tolerance level for biotech content. As of December 2002, the Japanese Ministry of Health, Labor, and Welfare had approved 44 biotech varieties for food use (USDA-FAS 2003a).

"On April 1, 2003, new legislation went into effect making a *feed safety* assessment mandatory. As part of this regulation, MAFF has set a 1% tolerance level for the unintentional commingling of biotech varieties in feed which are approved in other countries but not yet approved in Japan. In addition, the exporting country must be recognized by the MAFF Minister as having a safety assessment program that is at equivalent to or stricter than that of Japan" (USDA-FAS 2003a).

EU's Biotech Policies and Their Impacts on U.S. Agricultural Exports

As shown in Figure 3 (USDA-FAS 2003c, d, 2004a), the EU began to consider agricultural biotechnology regulations in the early 1990s. At that time, the EU had already approved nine biotech varieties, including corn, soybeans, and oilseeds. However, the approval process became progressively more difficult and politicized. Since the late 1990s, the EU's agricultural policies have begun to undermine agricultural biotechnology development and trade. Six EU member nations (Austria, France, Germany, Greece, Italy, and Luxembourg) have banned imports of biotech corn and rapeseed that had been approved by the EU. In addition, the EU Commission refused to challenge these illegal bans (USDA-FAS 2003c).

In 1998, EU member states began blocking new applications for biotech products. According to the U.S. Department of State, "This approval moratorium is causing a growing portion of U.S. agricultural exports to be excluded from EU markets." In late 1998, the European Union imposed a five-year de facto moratorium on approving new biotech varieties, which effectively prohibited most U.S. corn exports into Europe (USDA-FAS 2003d).

Figure 4 shows that the EU's biotech polices had significant effects on U.S. exports of biotech commodities, especially for corn. In the early 1990s, the EU imported a large volume of U.S. corn (USDA-FAS 2005b). In 1995, U.S. corn exports to the EU reached almost 4 million metric tons. However, after some EU states launched biotechnology restrictions, U.S. corn exports to the EU dropped dramatically from 1.74 million metric tons in 1997 to only 0.33 million metric tons in 1998, a more than 80% decline (USDA-ERS 2000). In 2003, U.S. corn exports to the EU further dropped to 0.09 million metric tons; the United States almost lost the EU corn market. For soybeans, the situation was somewhat better, although U.S. soybean exports to the EU also declined since 1998 (USDA-FAS 2005b). In 2003, U.S. soybean exports to the EU were only 4.35 million metric tons, about 52% of the 1997 export volume.

By contrast, since 1998, Argentina, another leading corn producer, has replaced the United States as the EU's primary corn supplier, and the EU has approved Argentina's biotech corn varieties. Similarly for soybeans, Brazil, another leading soybean producer, has become the EU's preferred soybean supplier since

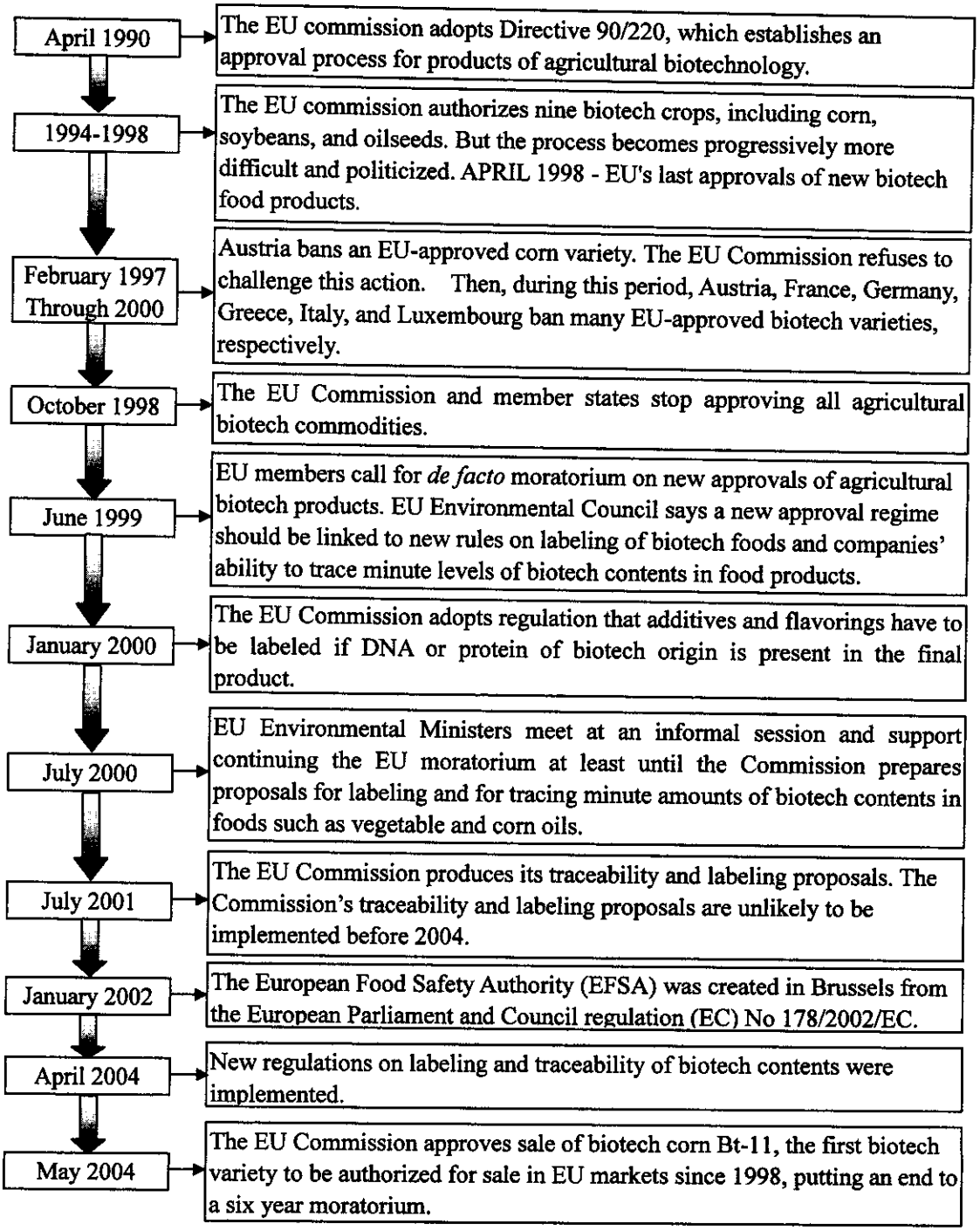

Figure 3. History of the European Union's Biotech Policies

1998, despite the fact that 10%–20% of the Brazilian soybean crop (70% in southern Brazil) has been estimated to contain biotech varieties (Anderson and Jackson).

In May 2003, the United States, Argentina, and Canada filed a World Trade Organization (WTO) dispute against the EU over its moratorium. "The first step in a WTO dispute is to request and conduct consultations during the next 60 days. WTO procedures were designed

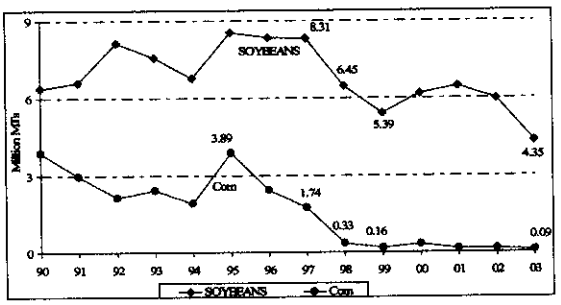

Figure 4. U.S. Exports of Biotech Commodities into the EU (USDA-FAS 2005b)

to encourage parties to resolve their differences" (USDA-FAS 2003c). However, after consultations, in August 2003, the United States took the next step by requesting a dispute settlement panel to hear arguments in its WTO challenge to the EU's biotech moratorium. "Dispute settlement procedures, including appeal, typically take a total of 18 months" (USDA-FAS 2003c).

"On April 18, 2004 the EU implemented its new regulations on the labeling and traceability of biotech products. Previously, many member states argued that such regulations were needed to protect consumer and environmental interests. Commissioner Byrne has adamantly insisted that these concerns have now been met and that it is time for the member states to move on and begin to approve the products" (USDA-FAS 2004a).

In May 2004, the EU Commission approved a biotech corn variety *Bacillus thuringiensis* (*Bt*-11), the first biotech variety allowed for sale in EU markets since 1998 (Smith). This approval of *Bt*-11 by the EU Commission appears to have put an end to its six-year moratorium, challenged by the United States and other countries through the WTO. However, this approval solely applies to the sale of *Bt*-11 corn, not for production in the EU, whereby *Bt*-11 corn has been produced in the United States, Canada, Argentina, and Japan. Although the EU Commission gave the green light for this new biotech variety, the WTO dispute filed by the United States and other countries against the EU's moratorium has not been finalized as of this writing.

China's Biotech Policies

China, one of the world's largest producers of agricultural commodities, produced 31% of world rice, 27% of rapeseed, 19% of corn, 27% of cotton, 16% of wheat, and 9% of soybeans in 2004 (FAO). China is also a large player in international grain and oilseed markets, exporting almost 4 million metric tons of corn and importing 22 million metric tons of soybeans in 2004 (USDA-FAS 2005a). With only about 7% of the world's arable land feeding more than 20% of the world's population, the Chinese government is being challenged by this great demand for food. Therefore, agricultural biotechnology has become an important tool to achieve food security.

Since 1986, China has invested heavily in biotech research, ranking second only to the United States (Huang and Wang, Marchant and Tuan). By 2001, more than 130 species were obtained, including insect-, bacterial-, fungus-, and virus-resistant; salt-tolerant; drought-resistant; nutritionally enriched; and quality-improved species, and the production of edible oral vaccines and recombinant pharmaceuticals was achieved (Chen and Qu). However, only *Bt* cotton, delayed ripening tomatoes, cucumber mosaic virus (CMV)-resistant sweet peppers, and color-altered petunias were approved for production within China. By far, *Bt* cotton is the dominant biotech commodity in China, and no other food commodities have been approved for production (Huang et al.).

Field tests, environmental releases, and commercialization of biotech plants are regulated in China as shown in Figure 5. In November 1993, the State Science and Technology Commission of China issued its "Biosafety Administration Regulations on Genetic Engineering," which was the first biosafety law in China (Marchant, Fang, and Song). Three years later, "Biosafety Administration Implementation Regulations on Agricultural Genetic Engineering" was issued by the Ministry of Agriculture (MOA) of China, and took effect on the same date, July 10, 1996 (Chinese MOA 1996).

Before China's accession into the WTO on

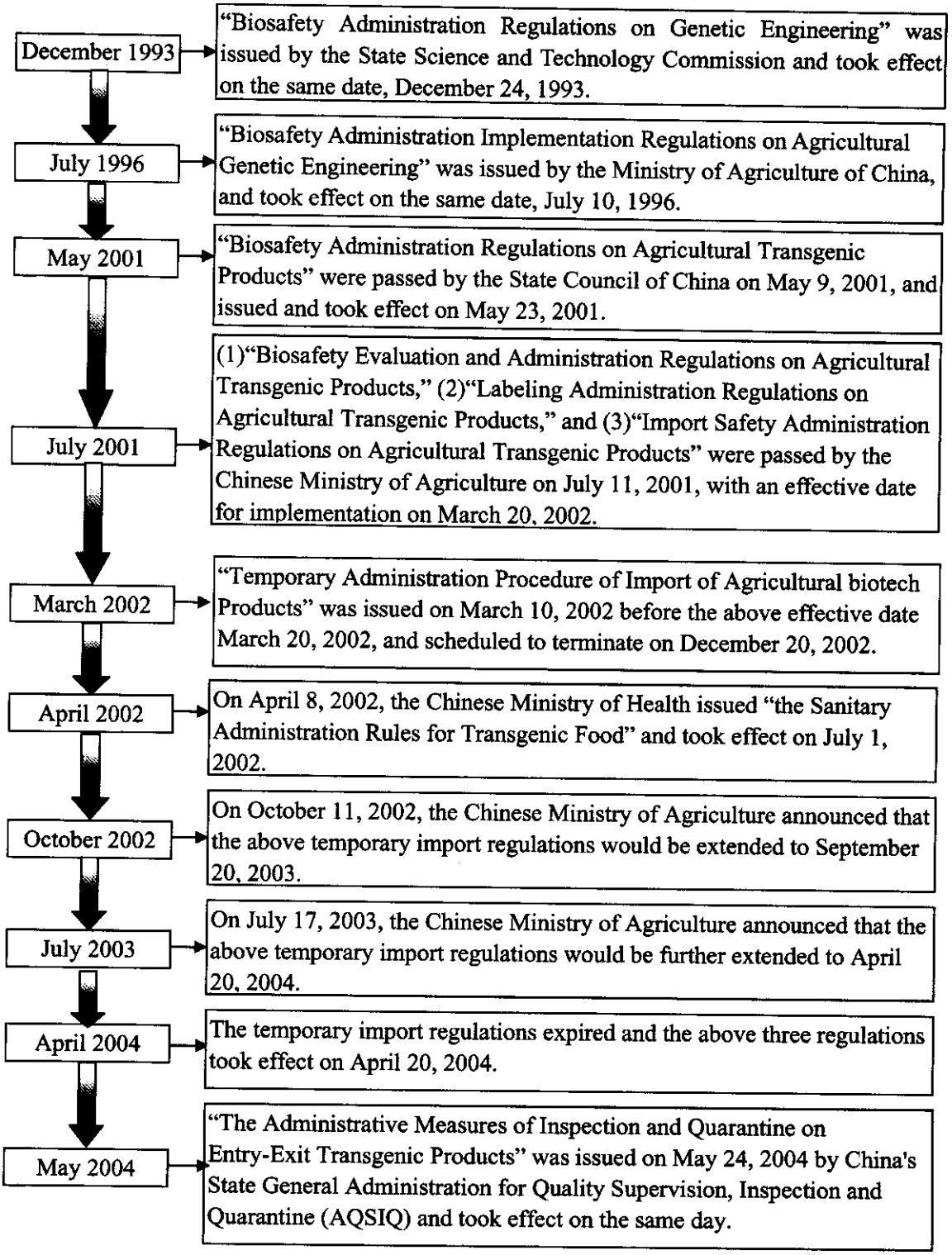

Figure 5. History of China's Biotech Regulations

December 11, 2001, the Chinese government passed its *Biosafety Administration Regulations on Agricultural Biotech Products,* which were issued and took effect on May 23, 2001 (Chinese MOA 2001a). These regulations provided general guidelines for biotech agricultural products. On January 5, 2002, the Chinese MOA issued three separate implementing regulations for these guidelines: (1) *Biosafety Evaluation and Administration Regulations on Agricultural Biotech Products,* (2) *Import Safety Administration Regulations on Agricultural Biotech Products,* and (3) *Labeling Administration Regulations on Agricultural Biotech Products* (Chinese MOA 2001b). These new regulations placed restrictions on Chinese imports of biotech products, including those imported from the United States, e.g., biotech soybeans. The effective date for implementation of these three regulations was originally set for March 20, 2002.

Specific rules on imports of biotech products from these regulations include: (1) Biotech products imported into China require test results or data obtained from in-country field experiments within the exporting country (or a third country) to prove products are safe for human consumption and do not impose biosafety risks to other plants, animals, or the environment. (2) The MOA's approval process can take up to 270 days to grant safety certificates required for imported biotech products. (3) Each shipment of biotech products imported into China needs a single or separate safety certificate accompanying each shipment. (4) There is a "zero" threshold level (based on qualitative test results) for biotech content in foods. (5) Decision making should be based on demonstrated risks (biohazards) from scientific data, whereby the expert panel should play an important role in the decision-making process.

Rules on labeling of biotech products include: (1) all products containing biotech content should be labeled correctly; otherwise, products are not allowed to enter unless relabeled; (2) labeling rules are applied to the following imported biotech products: soybean seeds, soybeans, soybean flour, soy meal, soy oil, corn seeds, corn, corn oil, cornmeal, rapeseed seeds, rapeseeds, rapeseed oil, rapeseed meal, cotton seeds, tomato seeds, fresh tomatoes, and tomato ketchup (tomato jam).

To enhance U.S. exports, USDA-FAS provides technical assistance, education, and outreach programs for developing countries, including China. These programs give foreign officials, policy makers, researchers, and others a better understanding of agricultural biotechnology in the United States (USDA-FAS 2003e). After China's announcement of its regulations on imports in late 2001, U.S. trade delegations negotiated with the Chinese government. These educational programs, mutual visits, and negotiations played an important role in removing obstacles for U.S exports of agricultural biotech products.

The Chinese government delayed the effective date to implement these three biotech product regulations (Chinese MOA 2003). Instead, the Chinese MOA issued a temporary measure, *Temporary Administration Procedure of Import of Agricultural Biotech Products,* which allowed exporters to ship biotech soybeans into China using temporary import certificates through December 20, 2002. Each temporary import certificate granted by the MOA was good for 10 shipments (Chinese MOA 2002). After three extensions of this temporary measure, the three regulations finally took effect on April 20, 2004 (USDA-FAS 2004b).

Immediately after the effective date of these three regulations, China's State General Administration for Quality Supervision, Inspection, and Quarantine (AQSIQ) announced a new regulation related to the administration of biotech products, *"The Administrative Measures of Inspection and Quarantine on Entry-Exit of Biotech Products,"* on May 24, 2004 (Chinese AQSIQ; USDA-FAS 2004b). Not only do these measures apply to the inspection and quarantine of biotech imports and exports but they also apply to processing of biotech products, including soybeans. These measures authorize the AQSIQ to conduct random biotech tests, even of nonbiotech products. For biotech products, the importers shall provide relevant documents, including a safety certificate for agricultural biotech products and

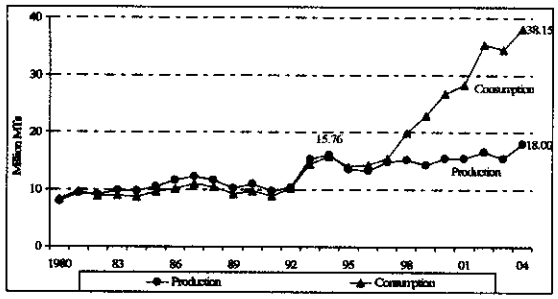

Figure 6. China's Soybean Production and Consumption (Source: USDA-FAS 2005a)

the review and approval documents for labeling agricultural biotech products.

China's biotech regulations and policies did raise concern by U.S. agricultural exporters and policy makers as well as Chinese agricultural importers. Requiring safety certificates caused additional costs and shipment delays when these new regulations were first implemented, especially in early 2001. However, on examining U.S. soybean exports to China since 2002, these Chinese biotech regulations and policies do not appear to have had long-run effects on U.S. soybean exports to China.

Figure 6 shows that after 1997 China's domestic soybean demand increased dramatically, while domestic production increased slowly, creating a significant soybean shortage in China. In 2004, this soybean shortage (domestic consumption minus production) reached 20 million metric tons (USDA-FAS 2005a). If the Chinese government chooses to control soybean imports through biotech policies, it might dramatically increase China's domestic soybean prices, which could eventually hurt Chinese crushers and consumers. Other factors, including food safety considerations, protection of China's domestic producers, consumers and crusher's demand for soybeans, WTO commitments, and political reasons also play important roles in the Chinese government's stance on biotech products (Zhong et al.).

At present, the Chinese government is struggling with issues of consumer safety and public acceptance, most recently over the adoption and commercialization of biotech rice. China's agricultural researchers state that biotechnologies for rice are mature and ready for adoption and commercialization. An official from MOA said that they have already accepted applications for safety evaluations to obtain safety certificates for biotech rice varieties (Cheng and Peng). The official also mentioned that accepting the safety evaluation does not mean that the government will approve the adoption and commercialization of biotech rice varieties. Before commercialization of biotech rice, a series of field experiments, production experiments, and other related experiments are required. The Chinese government will be very cautious about the adoption and commercialization of biotech rice, since currently there are no other countries that have approved biotech rice for large scale commercialization. Therefore, China's future policies regarding biotech rice is still unclear.

Summary and Conclusions

On examining the biotech policies in leading U.S. agricultural export markets, biotech policies in Canada and Mexico appear relatively similar to U.S. biotech policies. Labeling of biotech foods is voluntary. Therefore, polices in Canada and Mexico do not significantly affect U.S. agricultural exports to these markets.

In contrast, Japan and the EU's biotech policies are strict. Japan is the number one importer of U.S. corn with a stable import volume. The EU is also an important market for U.S. agriculture. Labeling of biotech products is mandatory for both Japan and the EU. The EU Commission's moratorium on biotech products nearly shut out exports of U.S. biotech corn to the EU. For soybeans, U.S. exports to the EU also dropped but to a lesser extent than for corn. Most recently, the EU approved sale of *Bt*-11 corn. However, the WTO dispute filed by the United States has yet to be finalized.

China is one of the world's large producers of major agricultural commodities and has been a critical player in the international food market. China has invested heavily in biotechnology research and development. China's biotech policies did cause a decline in U.S.

soybean exports to China in early 2001. However, through USDA educational programs and negotiations between the United States and China, and by taking into account China's domestic soybean shortage, China's biotech regulations do not appear to have had long-run impacts on U.S. soybean exports to China. China's future position toward biotech research and adoption, as well as biotech product commercialization, exportation, importation, and consumption, is still a main concern for U.S. agricultural exporters. Several important factors affecting China's future stance on biotech policies include food safety, protecting China's domestic farmers, and environmental protection concerns.

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