Production and Distribution of Non-GM Grains: Implications for Japan-US Food System

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1. Background and Objective

Post-war development of Japanese agriculture and food system cannot be explained without considering the relationships with US agricultural development. The Japanese agriculture and food system have been playing a role as a major consumer of the US Fordist agriculture. This means that Japanese agriculture was pursued under the condition that its development is consistent with the US Fordist agriculture. Concentration and expansion of farm size have been observed in the US, and bulk grains have been imported to Japan, which are provided for intensive livestock production and food processing industries. As far as bulk grains are concerned, we argue that the US-Japanese food system has been established as a very efficient system, which enables Japanese end-users to enjoy the least expensive sources of major grains.

Today, US agriculture is going through industrialization (R. Welsh). As an effective response to end-users' needs is a key to the industrialization of agriculture, its tends to be pursued along with improving food quality with advanced technologies. We argue the industrialization of agriculture would therefore have much more strong responsiveness to the consumer market, domestically or abroad. And sometimes this responsiveness works as a vulnerability of the food system when unexpected shifts of consumer attitudes to food occur.

One of the best examples is the case of genetically modified (GM) food. Vulnerability was most clearly recognized by US farmers, who were suddenly faced with the difficulty of finding an export market for their GM crops. Japanese importers also recognized this vulnerability, and food processors that need to procure non-GM crops through establishing identity preserved handling. Identity preserved (IP) handling of non-GM crops presents various challenges for Japanese traders who have never experienced such a procurement system.

I argue that Japanese traders' procurement of non-GM crops will call for further industrialization of US agriculture. Massive shift of consumer markets from conventional GM crops to non-GM crops in Japan will create opportunities for production contracts for growers in the US. In this book, I illustrate the current reorganization of commodity networks, referring to the example of (non-) GM crops, and show how agricultural industrialization poses complex effects on both sides of the food system; the US and Japan.

2. Non-GMO Procurement and Food System Change

In August 1999, the Japanese government decided to introduce mandatory labeling for GM food starting from April 2001. Under this labeling system, various food products derived from GM crops are required to be labeled as such. But certain types of highly processed food, such as oil and sweeteners from corn, are exempted from labeling, since scientific verification tests detecting GM ingredient cannot be applied persuasively.

The result of the introduction of the mandatory labeling system was the opposite of the expectation of the Japanese government. In other words, the shift from conventional grain, which might contain GM crops, to non-GM grains has been observed very rapidly among various actors in the US-Japanese food system.

The establishment of the IP handling system has raised various socio-economic issues, such as the distribution of additional costs among actors, further coordination among trading partners for the procurement of non-GM crops, liability issues for certification, accidental mingling of GMO, and so on.

In this research, I focus on two major crops, soybean and corn, which represent strong relationships between the US-Japanese food system and, at the same time, these two crops are typical GM crops in the US.

3. Implications

The following are the implications that I learned from the Japanese case of the non-GMO shift.

(1) The shift to non-GMO forces all actors participating in the food system to engage in IP handling, and vertical coordination will be much more typical among them as they move to procure non-GM grains. This means that the US-Japanese food system interplay will occur in a more coordinated fashion even in the area of bulk-commodity trade.

(2) The additional costs generated from the IP handling are not always passed over to consumer prices, or borne equally by each participants of the food system. As in the cases of tofu and corn starch, it depends on many factors, such as industrial organization, buying power of retailers, technical complexity of manufacturing plant, and so on. These implications are summarized in the Table 1.

(3) We argue that the broad establishment of the IP handling system will pave the way for

the future distribution system, where differentiated, value-added products can be handled in a proper fashion. As agricultural industrialization advances in the future, demands of end-users will be incorporated into the development and delivery of food. And if various quality traits are introduced to develop value-added crops, these value-added products need to be handled through IP. As US agriculture continuously pursues this direction through industrialization, we will find some day in the future that the current changes responding to the demand of IP handling constitute one of the greatest turning points for the US-Japanese food system.

Table 1. IP Costs: Who Bears and Why?

Products		Technology	Institutions	Industrial Structure	Who Bears the IP Cost
Soybeans	Natto (fermented soybean)	Easy and low cost detection methods are available for soybeans. Natto soybeans were procured through identity-preservation and containerized long before the mandatory GM labeling was introduced.	•Mandatory labeling is applied to Natto. •Threshold level is 5%. •However, the current IP system can achieve more stringent level for adventitious presence.	Large-scale Natto manufacturers compete each other. Retail price of Natto tends to decline.	Basically, there is no major change for the current food system. Additional cost to procure non-GM crops seems to be negligible.
	Tofu(Bean Curd)	Easy and low cost detection method is available for soybeans. This situation leads to demand for more stringent level of adventitious presence of GM crops.	•Mandatory labeling is applied to Tofu. •Threshold level is 5%. •However, more stringent level (2%) tends to be common among business.	Small scale manufacturers are dominant for Tofu processing. Weak bargaining power against retailers.	•Total shift to non-GM crops. •The IP cost tends to be borne by manufacturers, and the cost was not transferred to retail prices.
Corn	Corn grits	More complicated detection test for corn. Because of lower level of processing GM crops can be detectable in final products. StarLink problem tends to be a critical issue for corn snacks.	•Mandatory labeling is applied to corn grits. (Threshold is 5%). •StarLink detection constitutes violation of the Food Hygine Law, therefore, manufacturers demand most stringent IP for non-GMO procurement.	Major Users of grits are breweries and snack manufacturers. Few keiretsu-type relations can be found between grits processors and snack manufacturers.	•Total shift to non-GM crops. •Increase of importing final grit products. Decrease of demand for domestically processed grits. •This situation makes it difficult to transfer additional cost to final grit products.
	Corn starch	More complicated detection test for corn. Because of higher level of processing GM crops are only detectable in final products using PCR. Manufacturing plant produces various co-products which are out of labeling regime, therefore, it is costly to make a complete shift to non-GM crops.	•Mandatory labeling is applied to corn grits. Threshold is 5%. •Co-products, such as sweetners, are exempted from labeling regime. However, shift to non-GM crops for these co-products can be observed to some extent.	Major users of starch are breweries. Keiretsu-type relations can be found between starch companies and breweries.	•Total shift to non-GM crops is difficult and technically inefficient. •Some additional cost to procure non-GM crops was transferred to breweries.
	Animal feed	More complicated detection test for corn. Because of lower level of processing GM crops can be detectable in final feed products. However, feed is exempted from the labeling regime, and demand for non-GM feed is limited.	Feed is exempted from the labeling regime. Voluntary labeling is possible.	Non-GM crops are procured through agricultural cooperatives and trading houses. Major demand for non-GM feed comes from dairy farms under contract with consumers' cooperatives. Non-GM milk is value-added product and, therefore, additional costs are transferred to final products.	Additional cost from IP system to procure non-GM feed was transferred to the price of final products.

Sorce: Based on various interviews