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Policy Paper 17: Regional Economic Cooperation: The Role of Agricultural Production and Trade in Northeast Asia

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REGIONAL ECONOMIC COOPERATION: THE ROLE OF AGRICULTURAL PRODUCTION AND TRADE IN NORTHEAST ASIA

Introduction

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The role of agriculture in Northeast Asian cooperation has been important for many years. However, the end of the cold war and the recent security concerns in Northeast Asia have made this issue more urgent. In addition, recent developments in international agricultural relations have changed the context in which nations of the region are now making agricultural and food-related policy. These broader issues provide the context for this paper.

It has long been understood that food and agriculture are vital to the security of any nation or region. However, the nature of this relationship is sometimes misunderstood: it is easy to overlook the fact that a goal of food and agricultural security is consistent with a goal of economic progress and overall economic security. It is now more widely accepted that liberalized trade and privatization of agriculture are critically important for economic development and income growth, whereas restricted trade and food self-sufficiency objectives diminish economic growth and security. This theme underlies the argument of the present paper.

Table 1 provides basic comparative statistics on agriculture for Northeast Asia. China has more arable land per capita than other countries in the region. However, China also has a much larger population to feed and thus it attaches a lot of weight to food security. It is also interesting to observe that per capita income figures are inversely related to the relative size of the country's agricultural population. Japan, with the highest per capita income, has five percent of its population in agriculture while China, with the lowest income, has 78 percent of the population in agriculture.¹

Table 1: Basic Comparative Statistics

	China	Japan	S. Korea	N. Korea
GDP per capita (1990 \$US)	434	25,072	6,966	935
Population (million)	1,185	125	44	23
Farm population (%)	78%	5%	14%	31%
Arable land (1,000 hectares)	95,650	4,092	2,070	1,710
Arable land per capita (ha)	0.08	0.03	0.05	0.07
Number of farms (1000)	228,490	3,834	1,702	n/a

Source: *Asia and Pacific Rim*. ERS, 1994

¹ Some of the statistics reported in this paper may differ from official statistics from the home country. Many of our figures were obtained from one source, the US Department of Agriculture (USDA). Other data sources are cited as they appear.

The overall objective of this paper is to describe the current agricultural situation in North Korea, South Korea, China, and Japan with reference to the issues of food security and agricultural cooperation. The paper will succinctly describe trends in agricultural supply, demand, and trade for each of the four countries. In addition, where important for understanding supply and demand trends, there will be a brief explanation of the impact of recent developments in domestic agricultural policy. A discussion of future subregional cooperative possibilities concludes the paper.

Dimensions of the Food Situation in Selected Northeast Asian Countries

CHINA

Basic characteristics of the agricultural sector

Largely because of major economic reforms that were introduced in 1978, China's overall economy, in real terms, is four times as large as it was in 1978, and the agricultural sector is two and one-half times as large as it was then.² These reforms notwithstanding, China's agricultural sector continues to be taxed by pricing policies to support industrialization, which means that economic policies remain biased against agriculture, as reflected in the domestic terms of trade. This biased policy is manifested in low incomes for farmers and negative investment in the agricultural sector. On average, urban incomes are more than twice the size of rural incomes (see Table 1) and there are large regional income inequalities. The gap between urban and rural incomes is much wider than elsewhere in Asia (Lardy). More than 70 percent of China's population lives in rural areas and the rural economy is not well integrated with the urban economy. A typical farm is only about one-half hectare in size, fragmented into about four separate fields.

Agriculture's role in China is to supply a cheap and stable quantity of food. Some of the major issues

facing further development of China's agricultural sector are:

- the apparent slowdown of agricultural productivity growth;
- the lack of properly functioning markets for farm products and farm inputs;
- low labor productivity in agriculture and the rising gap between rural and urban incomes;
- the slowdown of rural light industry's absorption of rural labor.

Trends in supply, demand, and trade

Table 2 reports average annual growth rates for the gross value of agricultural output and its five main components (cropping, forestry, animal husbandry, sideline production, and fisheries) since the reforms. Modern China has stressed self-sufficiency in food production, with grains being the most important component of production and consumption. China is the world's largest producer and consumer of grains and has been a major participant in the international market, both as an importer and an exporter. However, as a proportion of the total value of agricultural output, grains are declining in importance. Direct human consumption of grains is growing at a much slower rate than indirect consumption (through meat).

In order to feed 1.2 billion people, China devotes more than 70 percent of its cultivated land and 30 percent of its labor force to grain. Yields were maximized by using high levels of inputs and by increasing the number of crops harvested per unit of cultivated land. Substantial technological advances have been made in China's grain production. Table 3 reports annual grain output, sown area, and yields since the reform.

In China, grain production is relatively land intensive compared to many other agricultural products (e.g., cotton, fruits and vegetables), which

² See Lardy for a discussion of the problems associated with measuring the size of China's economy in internationally comparable terms. Converting China's GDP from yuan to U.S. dollars, using the official exchange rate, yields a low figure of about \$400 per capita. However, this underestimates the real purchasing power of incomes in China. Lardy reports that alternative estimates, using the purchasing power parity (PPP) approach, range from \$1,000 to \$2,600 (\$US) per capita. He suggests that a "prudent" estimate (for 1990) is approximately \$1,100 per capita, which is about three times the estimate based on the official exchange rate. Measured on a PPP basis, China's economy would rank third in the world, behind the U.S. and Japan.

Table 2: Real Growth Rates (%) of Gross Value of Agricultural Output, 1979–93

	GOVA	Cropping	Forestry	Animal Husbandry	Sideline Production	Fisheries
1979	7.5	7.2	1.4	14.6	-3.5	-3.4
1980	1.4	-0.5	2.2	7.0	6.1	7.7
1981	5.8	5.9	4.1	5.9	24.0	4.4
1982	11.3	10.3	9.5	13.2	21.9	12.3
1983	7.8	8.3	10.2	3.9	11.6	8.6
1984	12.3	9.9	19.0	13.4	33.0	17.6
1985	3.4	-2.0	4.5	17.2	20.6	18.9
1986	3.4	0.9	-3.6	5.5	20.0	20.5
1987	5.8	5.3	-0.3	3.2	15.4	18.1
1988	3.9	-0.2	2.3	12.7	12.6	11.6
1989	3.1	1.8	0.4	5.6	6.0	7.2
1990	7.6	8.6	3.1	7.0	3.8	10.0
1991	3.7	1.0	8.0	8.9	0.3	7.6
1992	6.4	3.5	7.7	8.8	11.2	15.3
1993	7.8	5.2	8.0	10.8	n/a	18.4
Average % growth 1979–93	6.1	4.3	5.1	9.2	13.1	11.7

Source: State Statistical Bureau. *China Statistical Yearbook*. Beijing: 1993 and 1994.

Table 3: Grain Production in China, 1978–94

	Grain Output (mmt)	Grain Sown Area (m. ha.)	Grain Yield (kg/ha)
1978	304.8	120.6	2596.0
1979	332.1	119.3	2784.8
1980	320.6	117.2	2734.5
1981	325.0	115.0	2827.5
1982	354.5	113.5	3124.4
1983	387.3	114.0	3396.0
1984	407.3	112.9	3608.3
1985	379.1	108.8	3483.2
1986	391.5	110.9	3529.3
1987	403.0	111.3	3622.0
1988	394.1	110.1	3578.6
1989	407.6	112.2	3632.4
1990	446.2	113.5	3933.0
1991	435.3	112.3	3875.8
1992	442.7	110.6	4003.8
1993	456.4	110.5	4130.8
Average % growth 1978–84	4.8	-1.1	5.5
Average % growth 1985–93	2.3	0.2	2.1

Source: *Statistical Yearbook of China 1994*.

are more labor intensive.³ In the long run, China will most likely develop a growing grain deficit because of rising domestic incomes, a growing population (China's population is expected to reach 1.6 billion by the middle of the 21st century), and a declining agricultural land base. The balance of long-term supply and demand for grains within China is very uncertain and is a politically sensitive issue in China. At one extreme range of the estimates, Lester Brown et al. (p.19) estimated that China may need to import 216 million metric tons of grain by 2030, an amount greater than current world trade figures. Frederick Crook provides a convincing critique of this projection, arguing that China will not come to depend on huge grain and meat imports. We find Crook's arguments to be more plausible because Brown predicts a large drop in China's grain production (about 20 percent) with little justification.

China was a net grain exporter during the 1950s. However, the sharp decline in grain production during the "Great Leap Forward" turned China into a net grain importer (Carter and Zhong). Wheat has been the major grain imported since 1961, accounting for about 90 percent of total grain imports. Canada, the United States, Australia, and Argentina are major suppliers of China's wheat imports. After 1984, following large increases in production combined with reduced on-farm wastage, annual net grain imports declined and China actually became a net exporter of grain for a few years. Corn was the largest component in China's grain exports in the 1980s and early 1990s, with major destinations being Hong Kong, Japan, Southeast Asia, and the USSR.

In the future, the dominant position of wheat in grain imports may be challenged by feed grains, as more and more meat and dairy products will be demanded by consumers, following income growth. China was both a large rice exporter and importer over the last decade, but an exporter on a net basis. Recent events suggest that China's status as a net rice exporter may be changing as well. Unofficial reports of large recent imports from Vietnam indicate a shortfall of production in China.

In 1994, the central government imposed a moratorium on grain exports in an effort to control rising domestic food prices. The blockade on exports indicates that China's regional grain markets are not well integrated and reflect the central government's

attempt to force provincial governments to sell on the domestic market, rather than export.

Recent policy developments

The growth of China's agricultural economy over the past 15 years reflects the following major policy changes:

- the privatization of farming through the household responsibility system (HRS);
- the support of rural industrial development to enhance the overall rural economy;
- the reform of mandatory procurement quotas and prices for agricultural commodities.

The first liberalization wave took place in the late 1970s with the dismantling of the commune system, introduction of the HRS, and the encouragement of rural light industry. The second wave came in the mid-1980s through liberalization of the unified procurement system and the reduction of contracted purchasing. Finally, the third wave came in the early 1990s and was aimed at liberalization of prices and financial markets. Following the first wave of reforms, China's agricultural production growth was abnormally high for a few years because of one-time productivity gains from improved incentives. However, subsequent agricultural development during the second and third wave of reforms in the 1980s and early 1990s has experienced problems. The second and third wave of reforms were not successful in liberalizing the markets for grains and cotton. The government began a policy retrenchment program for grains and cotton in 1989 that continues today. These commodities were brought back under tighter state control and fixed procurement quota prices were reintroduced in 1994 against farmers' wishes, accompanied by retail price ceilings in urban areas.

Future issues

It is doubtful that China's agricultural policies will follow those of Japan, South Korea, or Taiwan and shift from taxation to subsidization. China's developing grain deficit is a significant issue. The size of the deficit will depend on policy developments related to the rural economic structure, investment in agriculture, and exogenous changes in the international grain market.⁴ The role of agriculture and the rural economy is critical to the overall probability of success of China's transition from that

³ Relative to cash crops, grain is more land intensive because, per unit of land, the production of grain requires fewer units of labor than the production of cash crops.

⁴ See Johnson for a recent discussion of China's grain policies and supply and demand fundamentals.

of a lower middle-income country to an upper middle-income country.

The major policy objective of China's market reforms was to hasten economic growth through improved incentives and better resource allocation. However, industrialization still forms the core of the central government's development strategy, and compulsory procurement of major agricultural products is still used as the key policy instrument to achieve the industrialization goal. The government continues to extract agricultural surplus through the procurement system and relies on political and administrative measures to a large extent to ensure an adequate supply of major farm products.

SOUTH KOREA

Basic characteristics of the agricultural sector

South Korea's farm sector is characterized by small-scale, high-cost, family operations. The country's 1.8 million farms average about 1.2 hectares in size. Farm families make up about 14 percent of a population of 43 million. The farm population has been falling but remains large relative to many developed countries as a proportion of total population.

Rice has long been the predominant crop in South Korea. Rice land accounts for more than one half of total agricultural land. The predominance of rice is sustained by the importance of rice in the diet, the suitability of the rice crop to South Korea's natural resources, the long history of rice cultivation, and government policy which bans rice imports and supports domestic prices (e.g., the price of Japonica rice in California in 1994 was \$136 per metric ton, compared with the South Korean price of \$1600 per metric ton).

South Korea has enjoyed phenomenal economic growth over the past several decades, with per capita income rising from \$521 in 1960 to \$6,685 in 1992. This economic growth has mostly been realized in the export-oriented industrial sector. Coupled with a highly-targeted government policy supporting exporting industries, income disparity between the industrial and agricultural sectors has remained despite rapid economic growth. Unlike Japan or Taiwan, on-farm income is still a major portion of rural household income in South Korea, representing 56 percent of farm household income as compared to 20 percent in Japan and (in 1991) 30 percent in Taiwan.

Trends in supply, demand, and trade

Rice is cultivated on 65 percent of the arable land in the country and accounts for 39 percent of the value of agricultural output (1990). The country consumes around 5.5 million metric tons of rice annually, all of it produced domestically (Table 4). South Korea not only harvests some of the highest rice yields per acre in the world, but also produces high quality Japonica rice which is used for home consumption. However, rice farming in South Korea is not competitive in the world market because of its high production costs. The fast-growing manufacturing sector has bid labor away from farming, and increasing urbanization has put pressure on farmland values.

While rice remains the staple, almost 43 percent of grain consumption comes from non-rice sources. The annual per capita consumption in Korea is 128 kilograms of rice, 43 kilograms of wheat, and 52 kilograms of other grains. South Korea also uses a large quantity of oilseeds, the bulk of which are soybeans (92 percent). About one third of the soybeans are consumed, with most of the rest crushed for oil (Table 5).

Table 4: South Korea's Self-Sufficiency Rate for Selected Grains (%)

	Rice	Barley	Wheat	Corn	Soybeans
1965	100	n/a	27	36	100
1970	93	106	15	19	86
1975	95	92	6	8	86
1980	95	58	5	6	35
1985	103	64	0.4	4	26
1990	108	97	0.05	2	20
1991	102	94	0.02	2	19
1992	98	83	0.02	1	12

Source: Various issues of *Statistical Yearbook of Agriculture Forestry and Fisheries*. MAFF.

Table 5: South Korea: Consumption and Production of Major Grains and Meats

	1979-81 (Mil. tons)	1989-91 (Mil. tons)	2000 projection (Mil. tons)
Rice			
Consumption	5.54	5.48	5.36
Production	4.73	5.63	5.36
Net Imports	1.03		
Wheat			
Consumption	1.98	3.36	3.75
Food	1.97	1.94	2.04
Feed	.01	1.42	1.71
Production	.06	0	0
Net Imports	1.92	3.77	3.76
Coarse Grains			
Consumption	4.11	6.95	10.27
Food	1.81	2.22	2.76
Feed	2.30	4.73	7.52
Production	1.03	0.70	0.47
Net Imports	2.63	6.16	9.82
Soybeans			
Consumption	.76	1.21	1.65
Food	.36	.36	.42
Crush	.37	.84	1.22
Feed	.02	.01	.01
Production	.24	.22	.21
Net Imports	.50	1.06	1.43
Beef			
Consumption	.15	.25	.70
Production	.11	.13	.19
Net Imports	.03	.12	.51
Poultry			
Consumption	.11	.22	.51
Production	.11	.22	.48
Pork			
Consumption	.23	.62	.98
Production	.22	.59	.99

Source: *Asia*. ERS, 1993.

In addition to food use, a large quantity of grain is used to feed livestock. South Korea's annual consumption of meat includes 0.25 million tons of beef, 0.62 million tons of pork, and 0.22 million tons of poultry. Almost all pork and poultry consumption and about one half of beef consumption is supplied from domestic production. This implies that domestic meat production requires nearly 6.8 million tons of feed grains (assuming a 7-to-1 ratio for grain-to-meat conversion). Given recent growth rates of meat consumption ranging from five to ten percent per year, demand for feed grains is expected to increase rapidly unless additional meat is imported from overseas sources.

In contrast to the rice import ban, almost all grain other than rice is supplied by imports. As shown in Table 4, self-sufficiency rates for soybeans and major grains other than rice have continuously declined over the past three decades, with the self-sufficiency rates for wheat and corn approaching zero. Agricultural imports into South Korea are increasing steadily. South Korea is the world's sixth largest net import market for agricultural products and the fourth-largest destination for U.S. agricultural goods. The U.S. is also South Korea's largest trading partner of agricultural goods (Table 6). Consumption figures in Table 5 also show some interesting consumption patterns over time. Per capita rice consumption is slowly declining while the consumption of income-

Table 6: South Korea, Imports of Major Farm Commodities & U.S. Share

	Total Imports (Mil. tons)			U.S. Share (%)		
	1991	1992	1993	1991	1992	1993
Corn	5.4	6.6	6.2	34	25	12
Soybeans	0.97	1.3	1.1	95	94	89
Raw Cotton	0.45	0.38	0.37	54	64	61
Wheat	4.75	3.54	4.94	36	43	28
Beef	0.16	0.17	0.12	28	32	36
Tobacco (1000 tons)	13	16	9	31	31	22

Source: Various USDA publications.

sensitive, high-value food items (such as meat) show fast growth. As the South Korean economy grows, high value food items will become a more important part of the national diet and demand for other high-value products (including fruit and vegetables) is also expected to increase.

Recent policy developments

The two major goals of South Korean agricultural policy have been self-sufficiency for rice and parity between urban and farm incomes. These two goals can reinforce each other but can also conflict. The rice import ban raises the domestic rice price and enables farmers of high-cost rice to stay in business. The South Korean government also supports the rice price by purchasing rice immediately after harvest at a price high enough to cover production costs. It then releases the procured stock at a price below the market price to keep the consumers' price low (this practice was authorized by the Food Grain Control Act in 1967). For example, in 1990, the government purchased 20 percent of the rice production at 112 percent of the domestic wholesale price and subsequently released it at 90 percent of the wholesale price.

Korean rice policy has two main effects: it encourages domestic rice production and transfers income from taxpayers to rice farmers. Policy results are mixed. Self-sufficiency has been achieved but considerable income disparity between the urban and farm sectors still exists—the agricultural sector has comprised 14 percent of the population but generated only nine percent (\$24.5 billion) of South Korean GNP in recent years. However, achieving self-sufficiency for rice has not been without a high cost. In addition to raising the burden on the taxpayer, stressing rice at the expense of other crops has caused other potential economic opportunities in the farm sector to be missed.

The recent Uruguay Round GATT agreement dominates the current agricultural agenda in South

Korea, particularly regarding imports of foreign rice. South Korea, which received developing country status for its agriculture from GATT, has consented to import rice equal to 1–2 percent of domestic consumption from 1995 through 1999, and 2–4 percent from 2000 through 2004. South Korea must renegotiate its special treatment or allow tariffs rather than rice import quotas before the end of 2004 (J. Lee). Under the scenario of less restrictive rice trade in South Korea, likely exporters to South Korea are Australia, California, Manchuria, and the Yellow River area in China. One issue for China is the ability to supply high quality rice.

To prepare for this changing environment, South Korea aims at enhancing production efficiency through farm consolidation. The government is moving toward relaxing the land reform law which limits land ownership to a maximum of three hectares (an extension to 20 hectares is being considered). Small plots of land coupled with the country's hilly terrain have been a major impediment to mechanization of rice farming, although some land consolidation took place informally through farm land leasing arrangements. In 1990, 35 percent of total farm land was operated by tenant farmers, and 63 percent of farmers operating on a farm larger than three hectares were tenant farmers during the period 1985–90.

Future issues

Internationalization is currently the key issue in South Korean agriculture, and it will remain so in the future. Dairy products, such as processed cheese and preparations for infant use, were liberalized in 1995 with a tariff of 40 percent. Fresh apples and grape juice also were liberalized in 1995 and fresh grapes and apple juice are to be liberalized in 1996, with a tariff of 50 percent. How rural South Korea adapts to these changes is crucial. Domestic policy changes are also important to help the rural sector adjust to lower import barriers. To facilitate this transition, the

South Korean government has selected 13 high-value agricultural commodities for targeted support. These commodities are apples, pears, kiwis, persimmons, tangerines, mushrooms, poultry, medicinal herbs, local prunes, fresh vegetables, flowers, swine, and silk worms.

NORTH KOREA

Basic characteristics of the agricultural sector

Agriculture is more important to North Korea than other neighboring countries because North Korea is a closed economy. Farm households account for 35–40 percent of total population, down from about 75 percent in 1948. Rice and corn have been the chief food grains produced and consumed in North Korea. Even though rice traditionally constitutes the major part of the diet, North Korea is less connected to rice cultivation than South Korea or Japan because of geographical and weather conditions. Commercial fishing is a major industry along the east coast, and marine products are an important export. North Korea's food self-sufficiency is around 70–80 percent and recently the nation was experiencing shortages of food.

In the 1950s North Korea collectivized agriculture, mostly into cooperative farms. Each cooperative farm consists of several work teams and each work team comprises an entire village, involving several dozen farmers (H. Lee). By the early 1960s, it became obvious that cooperative farms had not reached production goals because of a lack of work incentives. As a result, North Korea introduced a sub-team management system in 1966, which assigned the sub-team of a small group of farmers permanently to a given area of land (H. Lee). North Korea still maintains this system as its basic farm structure. These sub-team farms are still much larger than the farms in South Korea or Japan.

During the early modernization period of the 1960s and 1970s, substantial capital investment was made in North Korean agriculture. Irrigation for rice paddies was almost completed in the 1960s, when dry fields for corn began to be irrigated. Considerable efforts were made to increase fertilizer applications and mechanization during the 1970s and 1980s. Modernization efforts, however, did not continue throughout the late 1980s and early 1990s as North Korea's economic conditions deteriorated. Recently, North Korea has been having difficulties supplying agricultural inputs such as pesticides, fuel, and spare parts for farm machinery.

Trends in supply, demand and trade

Food distribution in North Korea is controlled by government authorities. Food grains are rationed on a basic formula which has not changed since 1965. According to defectors from North Korea, the daily rations of grain were 100 grams for children up to one year of age, 200 grams for up to age two years, 300 grams for preschoolers and the elderly, 400 grams for middle schoolers, 500 grams for high schoolers, 600 grams for college students and workers, and 700 grams for government officers (Kim et al., July 1994).

Although accurate data are difficult to obtain and verify, food consumption and supply conditions seemed to have reached a balance in the mid-1980s, and sufficient grain stockpiles were reported until 1987. Since then, the situation has reversed. The amount of grain required to feed the population at previous consumption levels is larger than annual production. According to recent reports, this grain deficit has become worse. The loss of socialist trading partners affected farm operations by reducing imports of petroleum and spare parts needed in agricultural chemical plants (Kim et al., December 1994; Kim).

The absence of reliable data makes it difficult to estimate food consumption and agricultural production in North Korea. Since North Korea is a member of the United Nations (UN), it provides the Food and Agricultural Organization (FAO) of the UN with annual production figures that are published in the FAO Statistical Yearbook. However, those figures are generally thought to be inflated and unreliable. We have adopted the methods and figures used by Kim (the Korean Rural Economic Institute/KREI) to estimate consumption and production.

Consumption figures for food grains are constructed based on projected rations⁵ and estimated feed grain usage is based on per capita meat consumption in South Korea during 1960. The total amount of grain consumption is the sum of food grains and feed grains (Table 7). Kim's estimate of production began with basic yield data generated from three years of experiments using rice varieties used in the North. Then North Korean agricultural regions were grouped into similar climate zones to take account of different weather conditions. After weather elements were accounted for, the results were further

⁵ The ration amounts could perhaps be adjusted slightly because the actual rations are probably smaller than the announced amounts and at the same time high-ranking officers are alleged to consume more than their rations. However, in aggregate, these effects are assumed to cancel each other out.

Table 7: Estimates of Food Consumption in North Korea

	Food Use (1000 m. tons)	Feed Use (1000 m. tons)	Seed & Processed (1000 m. tons)	Total
Rice	1344	—	85	1429
Corn	2465	624	448	3537
Beans	106	30	105	241
Potatoes	149	65	213	427
Coarse Grains	417	4	27	448
Total	4481	723	878	6082

Source: Kim Uoonkun, "Estimates of Grain Production in North Korea." KREI report M37, August, 1994.

discounted by 33.5 percent, which accounts for the productivity loss stemming from insufficient incentives in the collective farming system. These production figures, shown in Table 8, can be considered an upper boundary because the experiments which generated the base figures were conducted under South Korea's milder weather and the current shortages of pesticides and machinery parts may also have had dampening effects on production.

Consumption and supply estimates indicate that North Korea has a deficit in food by about 1,923 metric tons. Compared to corn and other coarse grains, a smaller deficit of rice is estimated. Even though different studies indicate slightly different numbers, the prevailing view is that North Korea is experiencing shortfalls of food relative to an adequate diet. These food shortfalls can be, in the short run, handled by increased imports or by tighter food rationing. As a way to deal with the current food deficit, North Korea launched a public campaign advising the consumption two meals a day.⁶

Despite the reported food shortages, food imports were limited, as was overall trade. North Korea's major trading partners are China, Russia, and Japan. Russia was the primary trading partner until 1994, but recently China has taken its place. North Korea has imported substantial amounts of corn and wheat, along with rice. The two most recent years of data indicate that North Korea's rice imports declined substantially from 161,000 metric tons of imports in 1991 to 10,000 metric tons in 1992 (Table 9). In 1991, rice was imported from Vietnam (about 65 percent), Thailand (about 32 percent), and South Korea (about three percent). In 1992, Thailand was virtually the sole supplier of rice.

North Korea has been a net importer of wheat for more than a decade (Table 9). Major wheat suppliers

to North Korea were Australia, Canada, and Russia until 1988. North Korea has been gradually expanding corn imports. Major corn imports began in 1986 and expanded to 586,000 metric tons in 1992. There was limited trade in corn with Thailand in the past, but China became the sole supplier of corn in 1989 (ERS). However, as mentioned above, China has had an official ban on grain exports since 1994.

North Korea's capability to provide manufactured agricultural inputs domestically varies by input (Table 10). North Korea is a net exporter of fertilizer, mostly destined for China. However, North Korea is deficient in pesticides, which it imports from Japan and to some extent from China. A small amount of machinery is also imported from Japan, China, and Russia (Kim et al., December 1994).

Trade between North and South Korea has been increasing since 1991 (Kim et al., December 1994). Though there has been some direct trade recently, a large part of this trade was through intermediary countries, such as China, Hong Kong, Japan, and Singapore. Agricultural and fishery products account for nearly 20 percent of the North's exports to the South, while these items account for only five percent of the South's exports to the North. Bilateral trade totaled \$650 million between 1988 and 1992 according to the Korean Ministry of Unification (Kim et al., December 1994). North Korea has a trade surplus with the South by a large margin, with its imports from the South amounting to less than ten percent of the South's imports from the North (Kim et al., December 1994).

Recent policy developments and future issues

The most immediate agricultural issue faced by North Korea is that of feeding its people. To deal with this issue, its agricultural policy needs to aim at increasing productivity. One possible policy option may be adopting the household responsibility system

⁶ In May 1995, North Korea requested food aid from Japan. This, in part, indicates North Korea's public acknowledgment of the severity of food shortages.

Table 8: Production of Staple Food in North Korea

	Rice	Corn	Beans	Potatoes	Coarse Grains	Total
Acreage (1000 ha)	600	650	200	100	50	1600
Production (1000 tons)	1304	2256	213	281	105	4159

Source: Kim Uoonkun, "Estimates of grain production in North Korea," KREI report M37, August, 1994.

Table 9: North Korea, Estimated Grain and Flour Imports (metric tons)

Rice	1975	1980	1985	1990	1991	1992
China	0	0	0	0	0	16
Hong Kong	0	0	0	0	800	0
S. Korea	0	0	0	0	5000	0
Thailand	0	0	0	0	5,1594	10,000
Vietnam	0	0	0	0	103,606	0
Corn						
China	0	0	0	264,609	216,790	586,577
Yugoslavia	1501	500	0	0	0	0
Thailand	0	0	5000	0	0	0
Barley						
Australia	10,800	0	0	0	0	0
China	0	0	0	0	0	200
Hong Kong	0	0	0	0	515	0
Wheat						
Australia	0	208884	12600	188201	203,963	63,000
Canada	0	0	0	0	454,988	0
China	0	0	0	0	1230*	60,341*
Hong Kong	0	0	0	0	198*	102*
India	0	0	0	0	145,668	0
Turkey	0	0	0	0	0	180,235
EU	0	40*	0	71,781	0	0
USSR	212,162	200,000	0	0	0	0
Yugoslavia	0	0	0	0	75,012	0
Total**	224,463	4094,40	19,958	524,640	1,259,893	923,650

Source: *Asia and Pacific Rim*. ERS, 1994.

* Wheat flour: multiplying by the factor of 1.37 yields the wheat equivalent amount

** Total includes the small amount of non-wheat flour

Table 10: North Korea, Agricultural Input Trade

	1990		1991		1992		1993	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
<i>Fertilizer Trade (\$US million)</i>								
Japan	0	0	0	0	3.5	0	0	0
China	0	1.3	0	5.6	1.4	2.6	0.3	2.8
Russia	0	0	0	0	5.7	0	0	0
<i>Pesticides Trade (\$US million)</i>								
Japan	1.77		4.67		5.26		1.48	
China	1.94		0.13		1.73		0	

Source: Kim et al., KREI report R309, December 1994.

pursued in China, even though North Korea's attempt to do this in the early 1990s resulted in failure. This failure was due to political struggles between the reformers and the old school, which viewed the new household-based system as a challenge to the existing collectivized state farm system. It is important to understand that North Korea's food shortages are not simply agricultural problems. Even though the recent unusually cool weather has worsened the food situation, the problem North Korea is facing is that of economic policy and not agriculture. In order to improve food production, North Korea must learn how to adapt its economic system based on international experience.

JAPAN

Basic characteristics of the agricultural sector

Despite the fact that the government of Japan insulates many domestic agricultural markets from full world competition, Japan is the world's largest

importer of food. The stated goals of Japan's food policy are to enhance food security and raise farm incomes. The key commodities protected include rice, wheat, dairy products, beef, and pork. Soybeans and corn are imported free of trade barriers to encourage domestic meat production. Table 11 reports Japan's level of self-sufficiency for various food items.

Most Japanese farmers are part-time workers (off-farm income is a large share of household income) and rural family incomes are, on average, well above urban incomes. In most of the country, very small scale, part-time family farms are the basic unit of agricultural production. Since the 1946-50 land reform, the distribution of small scale family farms (with the average size of 1.4 hectares) has remained unchanged.

About 14 percent of the population still is engaged in some farm production. Japan's agriculture produces substantial amounts of rice, beef, pork, broilers, eggs, vegetables, and fruits. The Japanese diet is traditionally based on rice and fish. In 1990,

Table 11: Japan's Self-Sufficiency Rate for Selected Commodities

	1960	1975	1985	1991	1992	1993
Grains	83	43	34			
Food Grains	91	76	74			
Rice	102	110	107	98	99	76
Wheat	39	4	14	12	13	9
Coarse Grains	66	2	2	1	1	1
Pulses	44	9	8			
Vegetables	100	99	95			
Fruits	100	84	76			
Dairy Products	89	82	89			
Eggs	101	97	98			
Meat	91	77	81	75	82	

Sources: Hayami and various other sources.

rice production accounted for 28 percent of gross agricultural output, livestock accounted for 27 percent, and fruits, vegetables, and floriculture accounted for 37 percent. However, rice consumption per person is declining and consumption of meats, dairy products, and fats and oils is growing. Rice policy is the focus of Japanese agricultural policy and rice cultivation affects farm structure and other aspects of rural life. Farming in Japan is constrained by the high cost of labor and land. Japan's high cost rice farming is clearly not competitive internationally (Hayami).

Until recently, Japan's system of food imports used non-tariff barriers such as quotas and licenses, instead of tariffs. Sazanami et al. found that Japan's tariffs on food imports averaged only eight percent, but the (tariff equivalent) quantitative import barriers averaged 272 percent, with the rice tariff equivalent barrier at 737 percent.

Trends in supply, demand, and trade

The Japanese diet has changed over the last several decades. Overall trends are falling rice consumption, slightly increasing wheat consumption, rapidly increasing consumption of feed grains, and sharply increasing consumption of livestock products. To accommodate the nation's changing diet needs, Japanese farmers are responding by increasing their production of beef and milk. However, the majority of increased demand for these products is met by imports. Japan is increasing its imports of beef and feed grains (Table 12).

Japan had a virtual ban on rice imports until the poor harvest of 1993 forced the government to import 20 percent of consumption requirements. These imports were supplied by China, Australia, and the U.S. For other food and feed grains, Japan imports almost all of its requirements. Imports of livestock products, fruits, and vegetables are increasing rapidly as the Japanese diet diversifies and the Japanese yen appreciates in value.

Unlike the case of rice, Japan imports a significant amount of wheat each year and wheat imports are controlled by an annual import quota. Approximately 85 percent of annual wheat consumption is supplied by imports. Import licenses are also used to restrict dairy imports and thus support domestic farm prices for dairy products well above world prices.

Recent policy developments

Japanese agricultural trade policy can be largely described by tariffs and import quotas. Major

instruments of agricultural protection include: border protection, direct supports on farm product prices, and subsidies on agricultural production inputs. This system supports almost all major commodities. The high support price of rice resulted in large stockpiles of rice during the 1960s. To prevent the accumulation of surplus rice, a rice acreage restriction policy was introduced in 1969 and strengthened in the 1980s with rice productivity growth.

Japanese agricultural policy depends heavily on subsidies. Agricultural subsidies amounted to 49 percent of the total agricultural budget in 1960, and increased to 62 percent in 1984 (Hayami). In 1992, subsidies made up more than 70 percent of farm revenue in Japan, according to OECD data. Quasi-governmental bodies operate import and price support regimes and price stabilization schemes. For example, wheat imports are rigidly controlled by the government's Japanese Food Agency.

Japanese agricultural trade is opening gradually and domestic policy is adjusting. Following the recent Uruguay GATT round, Japan's rice market will be partially opened to imports in 1995. To accommodate the recent Uruguay Round of GATT, Japan agreed to import 4–8 percent of domestic rice consumption over the next six years. In addition, important products for which tariffs will be lowered include beef, oranges, grapefruit, corn grits, sugar confectionery, certain dairy products, canned frozen peaches and sweet corn, wine, and vegetable oils. A U.S.–Japan beef market access agreement was signed in 1988, whereby beef import quotas were initially increased and then replaced by tariffs in 1991. In 1992, import quotas on oranges and orange juice were also converted to tariffs.

To adjust to market opening, Japanese policymakers are calling for changes in agricultural policy, especially with regard to rice. Proposed changes include farm size expansion, more efficient mechanized farm production, and less government subsidization. A new Food Law was passed in December 1994 and is expected to be implemented in November 1995, replacing the 1942 legislation. Under the new law some market-oriented principles will be introduced into the rice market and the role of the government will be slightly reduced. However, under the new law, rice and wheat imports will continue to be strictly controlled by the government.

Future issues

Food security often was used as a major justification for limiting trade liberalization in agriculture. As

Table 12: Japan, Consumption and Production of Major Grains and Meats

	1979–81 (Mil. tons)	1989–91 (Mil. tons)	2000 projection (Mil. tons)
Rice			
Consumption	10.28	9.61	9.32
Production	9.70	9.24	9.32
Net Imports	0.05	0.02	
Wheat			
Consumption	6.09	6.17	6.35
Food	5.93	5.78	6.00
Feed	0.16	0.39	0.35
Production	0.57	0.90	0.92
Net Imports	5.67	5.67	5.80
Coarse Grains			
Consumption	19.23	21.75	21.16
Food	3.09	3.76	4.33
Feed	16.15	18.00	17.22
Production	0.41	0.34	0.39
Net Imports	18.69	21.51	21.16
Soybeans			
Consumption	4.44	4.82	5.01
Food	0.79	0.91	0.95
Crush	3.50	3.56	3.69
Feed	0.16	0.36	0.36
Production	0.19	0.23	0.26
Net Imports	4.29	4.51	4.75
Beef			
Consumption	0.60	1.21	1.64
Production	0.43	0.56	0.60
Net Imports	0.18	0.61	0.95
Poultry			
Consumption	1.21	1.76	2.00
Production	1.13	1.45	1.33
Net Imports	0.08	0.31	0.66
Pork			
Consumption	1.63	2.07	2.35
Production	1.43	1.54	1.38
Net Imports	0.20	0.52	0.97

Source: *Asia*, ERS, 1993.

Hayami argues, a crisis arising from food security can be broadly classified into: (1) diminished supplies and higher prices for foods as a result of poor harvests worldwide and (2) a halt to imports because of war or some other catastrophe. In the case of (1), the best domestic policy would be to rely on comparative advantage and practice import diversification, certainly

not protectionism. If a situation such as (2) arises, it would be impossible for agriculture to be self-sufficient because of the county's heavy reliance on imports of agricultural inputs such as oil and feed grains. If food self-sufficiency is promoted despite the international friction it causes, it will only produce a negative economic effect.

The key issue is how long the Japanese government is willing and able to support the current high level of agricultural subsidies. In October 1994, the Japanese government agreed to spend \$61 billion

in an agricultural “package” to assist farmers in adjusting to the Uruguay Round GATT agreement, further indication that Japanese farmers remain politically powerful.

Prospects for Subregional Cooperation

This section describes alternative models of subregional cooperation in agriculture. These are grouped into formal and informal arrangements of trade or cooperative agreements. Each type of arrangement is briefly evaluated in the context of the regional background and a variety of options are raised and discussed.

Formal Trade Agreements

Subregional economic cooperation through formal trading blocs would be of limited value to agriculture in Northeast Asia, especially if it consisted of trade diversion rather than trade expansion. Such cooperative arrangements require consumers to buy low quality products at high prices and encourage producers to enter into arrangements which are not sustainable in the long run. Trade would be diverted away from low cost sources to high costs sources within the trading bloc. All four countries in the region are natural food importers and will continue to be exporters of manufactured goods. Therefore regional security would not be enhanced by encouraging reliance on subregional sources to meet food demand. Such a policy would reduce potential incomes, increase food prices, increase the variability of food supply, and ultimately lead to more food insecurity.

Japan, South Korea, and North Korea are likely to continue to be significant net food importers and will export relatively small quantities of agricultural commodities. China, with its great size and geographical diversity, will likely both import and export many food items. China may remain a major agricultural supplier in the region while being an agricultural importer from outside the region. However, even China is unlikely to be a reliable source of agricultural products as its recent ban on grain exports suggests. In addition, in the near future, China is unlikely to supply reliably high quality food products for direct human consumption as demanded by high income food consumers in Japan and South Korea.

The Uruguay Round GATT agreement is important as a framework for agricultural trade

cooperation within this region as well as globally. It was implemented on January 1, 1995. The reforms are to be phased-in over six years for developed countries (Japan) and over ten years for less developed countries (South Korea). China is attempting to rejoin the World Trade Organization (WTO, which is replacing the GATT). When it does join, China will need to agree to the commitments of the Uruguay Round agreement that were established for less developed countries. The U.S. and other countries have insisted that China abide by the same rules for agricultural trade as applicable to other GATT member countries at similar stages of economic development. The terms of China’s access have not been negotiated yet, but certainly China will be treated as a less developed country under the agricultural agreement of the Uruguay Round. More basic issues deal with openness of trade policy and rules, intellectual property rights, and willingness to commit to basic trading rules. North Korea is not a member of GATT and is unlikely to become a member soon.

The Uruguay Round GATT agreement includes provisions for international agricultural trade reform in the areas of export subsidies, market access, internal supports, and sanitary and phytosanitary measures. Special and differential treatment for developing countries will continue from the previous GATT agreement. This agreement, along with the Asian Pacific Economic Cooperation efforts and other potential regional agreements, are more valuable for agriculture than a small subregional agreement would be.

The recent APEC framework provides a very long-term goal of a free trade agreement in the whole Asia-Pacific region. Such a dialogue has promise. However, the implementation of such an agreement is more than a decade away, its terms remain vague, and several countries (such as Malaysia) have reserved the option of incorporating exceptions for developing countries. The major benefit of current APEC discussions related to agriculture is to simply raise the prospect of more open regional trade so that protected industries may begin to embark on

economic and political transition towards more competition. The next multilateral trade round in agriculture under the WTO will begin in 1999 and is likely to continue towards more open markets. This may make the APEC agreement either irrelevant or increase pressure for more progress.

Agricultural Cooperation Outside Formal Trade Agreements

Cooperation outside the context of trade agreements could include a variety of cooperative activities between individuals and firms, as well as among governments in the subregion. They can have a number of direct and indirect benefits. For example, technological and information exchanges can have positive effects on each country's economic development, as well as on security directly. The biggest hurdle in developing formal arrangements will be the procedure whereby the countries with differing political ideologies and economic organizations rank their priorities on economic cooperation.

The following list of areas for subregional cooperation in agriculture is provided to stimulate discussion. Each of these ideas should be further developed and some may prove useful while others less so.

Technological exchange

Seeds, pesticides, fertilizer, and other inputs will flow naturally across national borders in the subregion if trade barriers are lowered. Trade in these inputs generally includes the exchange of technical information that enhances the productivity of inputs. Given the similarity of farm size in Japan, South Korea, and parts of China, there should be a natural exchange in a number of specific farm inputs and the technology associated with making those inputs profitable. China is less mechanized than its neighbors, but as rural incomes and labor costs rise, China may be in a position to take advantage of technical information from Japan, and especially from South Korea, regarding appropriate technology for small farms.

North Korea is in a position to gain from any opportunity to gather technical information from its neighbors. However, the large farm size and organizational structure of farms in North Korea means that it is not in a position to use the same technology as countries with very high labor input per unit of land. If North Korean agriculture moves away from large capital-intensive state farms, the technology of its neighbors will become more relevant. The other modern inputs used in agriculture

are mainly scale neutral and North Korea can gain from access to improved seed and chemical inputs. North Korea also can gain from examining the experience of agricultural progress and productivity growth in China and South Korea. This will only be valuable if North Korea decides to allow the structure of farming to evolve.

Food processing and marketing information cooperation

As incomes rise in China and North Korea, more of the food items consumed will undergo processing and other marketing services off the farm. In China the food processing industry is still small, but this will change as diets evolve and urbanization proceeds. Japan and (more recently) South Korea have a lot of technical and marketing information to offer. This type of cooperation is most naturally organized and conducted by commercial firms, but governments may play a facilitating role.

Human capital exchange

China and North Korea could learn from Japan and South Korea about extending education and information to farm communities. South Korea and Japan both have agricultural extension services and strong farm cooperatives that provide information and assistance in rural areas. Cooperation in the realm of rural human capital would allow each country to learn from the experience of the others. The evidence is clear that agricultural productivity and successful development depend on rural human capital as well as physical resources.

Policy cooperation

Cooperation among these neighboring countries with respect to agricultural policy may include information exchange as well as some harmonization of regulations. Japan and South Korea have well developed rules and procedures for phytosanitary and food safety standards. Some harmonization of these policies would facilitate trade between them and also make it easier for outside exporters to provide goods to each country. This point also applies to the development of grading standards for domestic and international marketing. China and North Korea must learn from their neighbors how to implement such regulations. The recent Uruguay Round GATT agreement requires countries to show that they do not use technical regulations as hidden trade barriers, so this area of regulation is under some revision. China and North Korea can also learn from observing the policy process in Japan and South Korea.

Provision of market information is another typical role of government for which some cooperation would be directly useful. Agreements to share information would facilitate trade among all the countries. South Korea is in the process of revising its agricultural "situation and outlook" system and this experience may be useful to its neighbors.

Finally, Japan and South Korea are world leaders in protectionist high cost farm policy. All four

countries could benefit from a joint opportunity to examine their neighbors' policies and establish a dialogue on farm policy successes and failures. Learning from a neighbor's mistake is as valuable as learning from successes. Such policy dialogues sometimes occur, but systematic and regular discussions would deepen understanding, avoid frictions, and improve policies within each country.

Conclusions

This paper reviewed the agricultural situation in four nations in Northeast Asia. It also provided a discussion of options for agricultural cooperation in the subregion. Our review of the production, trade, and policy situation and the current outlook suggests that a plan for broad and diversified international trade is required to achieve food security and maintain healthy agriculture in the long term. These countries are agricultural importers who will supply a significant but inadequate share of food demand domestically, especially as incomes continue to rise.

Agricultural cooperation in the subregion will most naturally take place in a variety of ways other than through a formal subregional trade agreement. These nations have much to learn from one another and can also gain from increasing harmonization and standardization of agricultural practices and regulations. Some of this will occur through the international exchange of technology between private firms and cooperatives. Some cooperation will involve governments. Future security throughout the region can certainly be enhanced by continued agricultural cooperation and progress.

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