Journal of Rural Development 18 (Winter 1995) : 207~226

THE OUTLOOK AND MEANING OF KOREA'S PARTICIPATION IN THE AGRICULTURAL COOPERATION IN NORTHEAST ASIA

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I. Introduction

There are two ways of solving the problem of insufficient domestic food production : direct imports from world food markets and indirect imports through foreign agricultural development. Until recently, Korean agricultural imports depended upon the former, which was easier than the latter.

Importing agricultural products through overseas agricultural development has several difficulties, such as economic efficiency problems which require large amounts of investment, labor and material input problems for overseas production, and the distributional problem of the outputs. Korea has already experienced failures in agricultural investments in Argentina and Australia. Thus, overseas agricultural investments cannot be active from the viewpoint of the Korean government. The private sector, however, has actively participated in the planning and implementation of overseas agricultural projects.

Generally speaking, agricultural investments are sunk and earn a low rate of return over a long period, so private firms can hardly participate. Then, how can two private Korean firms invest in China and Russia? These two firms are supposed to export 50% of their products from China and Russia, respectively. It is worthwhile to review the meaning and difficulties of their projects.

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II. The Meaning of Agricultural Development in Northeast Asia

1. Decrease in the Self-Sufficiency Ratio and Importance of Stable Food Supply

Korea opened its import markets under the Uruguay Round (UR) agricultural agreement. The Korean government is trying to adjust the agricultural structure in order to improve competitiveness in response to the liberalization of agricultural trade. Especially, it has planned large-scale investment projects financed by the "special agricultural tax".

General indices on the Korean agricultural sector have been estimated by the Korea Rural Economic Institute with consideration of the country schedule (C/S) of the UR agricultural agreement and environmental changes in the agricultural investment plan.[1] The report includes indices, such as quantities demanded, supplied and imported; self-sufficiency ratios; producer's prices; gross outputs; value-added and gross farm income by agricultural products. According to the estimations, self-sufficiency ratios for soybeans and corn are 4.9% and 0.8%, respectively. Except for rice, for which the self-sufficiency rate is 95.8%, most grains should be imported to meet the domestic need. In 2004, soybean and corn imports are expected to be 1,758,000 tons and 7,831,000 tons, respectly.

How will the situations of food supply in Korea change with unification? Even considering North Korea's 2,000,000 ha arable land, the quantity of grain supplied will still be deficient. According to the data from the Unification Board and KREI estimates, the North Korean food self-sufficiency ratio stayed at a level of 40% in 1995 because of adverse weather, a failure in agricultural policies, and substantially insufficient arable land. Even if we assume the maximum output from North Korea's arable land calculated by applying South Korea's highest possible unit production, it will be hard for the quantity supplied to meet demand, since demand will also increase after unification.

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[1] Cho J, Sung M. and Sagong Y., *Mid - and Long - Term Perspective of General Indices in Agricultural Sector*, KREI, 1994.

A decrease in the self-sufficiency ratio implies an increase in imports. According to the UR agricultural agreement, the trade of agricultural products will be further liberalized and the share of imports will increase. If the two Korean firms cultivate only soybeans in their agricultural development area of 462,000 ha and if production is equivalent to the recent record of 2000 kg/ha, then the total production of soybeans will be more than 900,000 tons if we do not consider the cultivation system, which exceeds 50% of the predicted import quantity in 2004. Therefore, overseas agricultural development or cooperative projects can be a good source of stable food supply.

TABLE 1 North Korean Food Supply and Development

Unit : 1,000 M/T

Year	Total Demand	Total Production	Insufficient Quantity	Self-Sufficiency Ratio(%)
1984	5,303	5,600	+297	105.6
1987	5,515	4,952	△563	89.8
1990	5,757	4,812	△945	83.6
1991	5,762	4,427	△1,335	76.8
1992	5,894	3,898	△1,996	66.1
1993	6,065	2,923	△3,142	48.2
1994	6,156	3,768	△2,388	61.2

Sources : The Unification Board for 1990 ~ 92, and KREI estimates for the data after 1992.

2. Worsening Domestic Agricultural Circumstances and Overseas Agricultural Development

Korea has experienced seven Economic Development Plans since 1962. During the period, there have been enormous changes in economic conditions as a whole and in agriculture as well. Especially, cultivated land and agricultural labor forces have diminished continuously while rural wages have risen sharply. Though comparisons with large-scale agriculture in the U.S. and Australia or with low-wage agriculture in China, Russia and other Southeast Asian countries, it is not difficult to see that Korea is in a disadvantageous

position in agriculture.

According to Agricultural Basic Statistics in 1994, the average area of cultivated land is 1.3 hectares per household and only 4.2% of the total households cultivate more than three hectares. The size of farm population was 2,400,000 in 1994, which is in a diminishing trend.[2] Emigration of young labor under the age of 20 was 60% of the total reduction or 144,000. The rural wage increased to $50 per day for males, which is almost the same as laborer's salary per month in China and Russia.

TABLE 2 Changes in Korea's Main Agricultural Indices

Year	Cultivating Area (1,000 ha)	Agricultural Labor (1,000 person)	Rural Wages (₩/day for males)
1965	2,256	4,742	-
1975	2,240	5,339	1,467
1985	2,144	3,733	9,695
1990	2,109	3,292	18,563
1993	2,055	2,845	30,350
1965 ~ 93ave(%)	△0.33	△1,81	18.3

Source : MAFF, Statistical Yearbook on Agriculture, Forest and Fisheries, 1994.
Note : Wages are in nominal terms.

The UR agreement and the launch of the WTO system have promoted internationalization and liberalization of the Korean economy, including the agricultural sector. Internationalization in agricultural sector, however, does not simply result in increases in imports of agricultural products. It includes not only the opening of the domestic market but also the overseas movement of production site. If there exists advantageous farming conditions which could provide and stable production with low costs in the long-term, then foreign investment may be worth consideration. Fortunately, some regions in the northeast China and the Russian far east can satisfy these

[2] The farm population decreased 590,000 in 1991, 360,000 in 1992 and 300,000 in 1993.

conditions, so several firms are already engaged in farming there[3].

Overseas farming, however, can incur some troubles which are not necessarily the case for domestic farming.

3. Advantages of Agricultural Development in Northeast Asia

In northeast of China and Russian far east areas, soybeans and wheat will be the main crop while rice, corn and potatoes are partly being cultivated depending upon the farming conditions. According to the contract, the Korean counterpart takes 50% of the total output and can export it to South Korea or other countries. In order to produce and export the crops to South Korea, those firms must have some advantage over direct purchases from the world markets.

Data for production costs in the Touxing zone in the Three-River Plain and the Sunyasen farm in Primorski Oblast are shown in Table 3. These two regions are plains located in the south and north sides of the Amur river and have similar levels of wages so that production costs are not much different. The production cost of

TABLE 3 Sino-Russian Production Costs[4] (1994)

Unit : US$/ton

Area	Soybean	Wheat
Touxing farm in the Three - River Plain, China	86.70	51.40
Sunyasen farm in the Primorski Oblast, Russia	90.00	-

Source : Unpublished data from Dairyuk Development Co. Ltd and Kohap Group.

[3] Except for the above two regions, Donga Group participated in farming 53 ha at Bengagy, Libya since 1992 and Samsung Group plans to purchase large areas of land for cultivation in Argentina and Australia. Semo Co. already established a farming company to cultivate 53,000 ha in Primorski Oblast in July 1995. Hanil Group also has exchanged a memorandum with the Primorski government for livestock breeding in July 1995. Hyundai is engaged in the production of timber investing US$1,600,000 in Primorski Oblast.

[4] According to the *Report on the Validity of the Agricultural Development Project in the Tambo Area in Amur Oblast* by Kohap Engineering in 1994, the costs of producing soybeans, wheat and barley are US$25.60, US$15.80 and US$15.80 per ton, respectively. These are about 30% of the costs in Table 1. It seems to have resulted from socialist economic calculation methods which typically undervalue land service charges, wages, and depreciation.

soybeans was around $90 per ton for each farm. The wheat production cost by the Sunyasen farm is not available. However, it appears similar to that of the Touxiung farm.

Both costs differ significantly from international prices. Compared to the export prices from Gulf Bay in the U.S. (Table 4) plus 20%~25% transport costs to Busan, the U.S. wheat was $150 per ton in 1994 while the actual import price of the Chinese wheat was $109 per ton. Even considering that the quality of the Chinese wheat is lower and less homogeneous than that of the U.S. wheat, the gap seems huge especially when the wheat is used for feed.

The difference in soybean prices is at least over US$100 per ton. Agricultural development areas in China and Russia can be accessible by railroad through North Korea and the distance from South Korea are between 800 km - 2000 km. Thus, if it is possible to pass through North Korea, production in these areas will be more advantageous.

TABLE 4 Wheat and Soybean Export Prices in the U.S.

Unit : US$/MT

Items	1992	1993	1994	1995. Feb
Wheat	151.80	140.70	150.30	154.30
Soybean	220.80	239.90	239.60	219.40

Source : USDA, ERS, Agricultural Outlook, May. 1995.
Note : The prices are FOB Gulf port base.
The wheat price is a weighted average of those for food and feed.

III. Korea's Participation in Agricultural Development in Northeast Asia

1. Agricultural Development in the Three-River Plain

Three northeast provinces in China (the Manchu area), were restricted for non-government activity by the "Fengjin" policy from then 17th (1688) until the 19th (1861) century. After the Opium War (1840), ports were opened and railroads were built to exploit resources in this area with the realization of an invasion into China by the imperialistic

powers. Construction of northeast inland railroad and the opening of Liaodong Bay enabled agricultural, forestry, fisheries and mining products in this area to be transported, and it accelerated the exploitation by the imperialistic powers. The Qing government withdrew the traditional "Fengjin" policy and adopted a liberalization policy by encouraging migration into this area in order to increase the region's population.

After the foundation of the People's Republic of China in 1949, the Chinese government cleared the remaining vestiges of Wei Manchu (1932~1945), which was controlled by Japan and tried to develop this area as a base for agriculture, forestry, mining and manufacturing. Especially, the Chinese Department of State established the Northeast Economic Zone Planning office to intensively manage economic, scientific, technological and social development. However, there also exist unfavorable factors: a relatively long freezing season (4~6 months per year) and existence of low swamp areas in riverbeds.

The details of the comprehensive agricultural development project at the Touxing farm of the Three-River Plain, Heilongjiang Province are as follows;

- ○ Process of the project
  - April 16, 1992: spot corporation, China-Korea Joint Corporation, Ltd. for Three-River Plain agricultural development in Heilongjiang Province was established.
- ○ Natural conditions
  - Climate: crop period; April-September, average nonfrost days; 146 days, average annual precipitation; 527.6mm.
  - Soil: 33,450 ha (88% of the total development area) is second class soil which can be converted into field and paddy. The soil is fertile with 10% organic ingredients.
- ○ Prospects of the project
  - Land utilization schedule: Total development area; 38,000 ha (paddy land; 5,000 ha, field; 25,330 ha, cattle breeding and fish farm; 3,200 ha, forest area and building sites; 2,470 ha, others; 2,000 ha).
  - Total costs of development: US$28,544,000, to be appropriated by invested capital (US$8,951,000) and debt (US$19,593,000).

- Development costs per ha: US$750 (2% - 3% of the development costs for the west seashore of Korea)[5].
- Costs in detail

Item	Costs(US$1,000, %)
Total	28,544(100.0)
Irrigation and drainage	8,256(28.6)
Purchase of farming machinery	7,256(25.4)
Road construction	1,173(4.1)
Electricity	119(0.4)
Communication facilities	199(0.7)
Boundary forest	299(1.0)
Farm building	3,389(11.9)
Land reclamation	2,262(7.9)
Design	2,772(9.7)
Farming	2,519(8.8)

○ Development period: 1992 - 2061 (70 years)
○ Predicted annual production: rice 4,500 kg/ha, soybean 2,250 kg/ha, wheat 2,200 kg/ha.
○ Allocation of profits/ losses: equal proportion
○ Obligations
- China's obligation: 1) application, registration and admission for establishment of the firm
  2) acquisition of land use permits
  3) 25% of total expenses including capital
  4) construction related to facilities, building and reclamation
- Dairyuk's obligation: 1) 75% of total expenses including capital
  2) export of products and processed goods

[5] Hyundai and Donga group performed large size of a land reclamation project in the west seashore of Korea in 1987 and 1991, respectively. At that time, each development cost was US$46,000 per hectare and US$27,500 per hectare.

- ○ Preferential policies of the central and provincial governments for the project
  - Agricultural tax exemption for newly reclaimed land by the fifth year.
  - Promoting emigration of 2,000 residents from eight villages; bearing all the migration expenses of 2,700,000 yuan, including land compensation costs of 910,000 yuan, moving costs of 796,000 yuan, and resettlement funds of 990,000 yuan.
  - Supply of agricultural materials such as, fertilizers, pesticides, and diesel.
  - Establishment of sectoral support schedules for the project by the related branches of the governments.
- ○ Remaining schedule: total cultivated land will reach 368,000 ha by 2004.
  - 38,000 ha in the Touxing zone, 15,000 ha in the Daqing zone, 210,000 ha in the Muyuan zone, 85,000 ha in the Xingkaihu zone, 20,000 ha in the Jiamusi zone.

2. Agricultural Cooperation in Primorski Oblast

The area of the seven administrative zones in the Russian far east is 621,59 km^2, which is sixty three times larger in size than South Korea and 36.4% of the whole area of Russia. The population in this region is a little more than 8 million and 5.4% of the total population in Russia. It is so far from Moscow to Vladivostok (9,216 Km) that the political importance of this region has been underestimated for a long time. Recently, however, the importance of the resources such as forests, fisheries and minerals in this region has increased after the Russian economy has been transformed into a market economy.

Primorski and Amur Oblasts are the largest grain production area in Russia since the ratios of rural population and cultivated land are higher than any other Oblasts in the Russian far east. Kohap Group has already cultivated soybeans, on the 2,000 ha of the Sunyasen and Kremovsky farms in Primorski Oblast in 1995.

These areas possess excellent conditions for investment projects since they are not newly developed regions but have been used by the former collective farms. Thus, the agreement was that Russia

provides farm land, machineries and warehouses while Kohap Group invests cash for managing farming.

Outlines of the cooperative agricultural development project managed by the Kohap Group and the agricultural department of Mixilovsky in Primorski Oblast are as follows :

○ Process of the project
- March, 1995: KORUS-1 Co., Ltd established
- June, 1995: spot corporation PRIMKO., Ltd establishing in Primorski Oblast

○ Natural conditions
- Climate
  Primorski Oblast; the highest average temperature is 33℃ and the lowest is -36℃.
  Amur Oblast; the highest average temperature is 35℃ and the lowest is -40℃.
  Average annual nonfrost days; around 130 days.
- Soil: fertile with black soil for the most part, average humus soil is 260 tons/ha.

○ Prospects of the project
- Land utilization schedule ('95 first stage): total 8,600 ha
  Primorski; Sunyasen Farm 1,000 ha
  Kremovsky Farm 1,000 ha
  Amur; Privolnoye Farm 6,600 ha (partly cultivated)
- Amount invested: Primorski Oblast; US$1,200,000 (US$600,000 by Kohap Group)
  Amur Oblast; US$2,600,000 (US$1,300,000 by Kohap Group)
- Costs in detail (only in Primorski)

Items	Cost(US$ 1,000, %)
Total	600(100.0)
Farming cost	460 (76.7)
Purchase of machinery and maintenance costs	100 (16.7)
Utensil and furniture	40 (6.6)

○ Cooperation period: unlimited
○ Cultivating schedule
- Producing soybean production on 2,000 ha in Primorski Oblast
- Target harvest: 2,000 kg/ha of soybeans
- Marketing schedule: Russia and Kohap retain the rights to sell 50% of total products, respectively.

○ Remaining schedule: Cultivated total area to be 94,000 ha by 1999
- Primorski Oblast; 44,000 ha
- Amur Oblast; 50,000 ha

3. Comparison of Agricultural Development Projects in the Three-River Plain and Primorski Oblast

There is no big difference in the climate condition between the Three-River Plain in China and the two farms in Russia since both regions are located within the range of 132 E and 45 N. Thus, arable crops are almost the same, soybeans and wheat which are expected to be imported on a large scale by South Korea. Other common factors are the distribution of output, availabilities of low-wage labor, and plans to expand the scale of development and farming.

The most critical difference is that land should be reclaimed for farming in the Three-River Plain, while the collective farms have been utilizing in Russia. Thus, the former needs more initial investment for irrigation and drainage, reclamation, and new machinery, while the latter needs capital only to purchase farming materials. The former has a problem of dispersed residents which required a central government intervention at the end of 1994 while it is not the case for the latter.

With respect to the cooperation periods, the Chinese government and the Dairyuk Development Co. explicitly expressed 70 years as the effective period while there is no limit on the project period between Russia and the Kohap Group. It means that the positions of these two firms are remarkably different. Basically, the difference resulted from different political and economic conditions and patterns of land utilization in the two areas in China and Russia.

TABLE 5 A Summary Comparison of Agricultural Development Projects Between the Three-River Plain and Primorski Oblast

Classification	Touxing farm, in the Three-River Plain	Sunyasen and Kremovsky farms, in Primorski Oblast
○ Conditions for development or cooperation	development	cooperation
- Area of land	38,000 ha	2,000ha
- Natural conditions		
· Average temperatures	2.6℃	max 33℃, min - 36℃
· Rainfall	528mm	around 500mm
· Average nonfrost periods	146 days	around 130 days
· Annual sunshine periods	2,500 hours	around 2,500 hours
- Land utilization patterns	to be newly developed	currently arable
- Government support	active	so and so
- Residents on the spot	to be emigrated	no need to migrate
- Capital	US$28,544,000	US$1,200,000
· Rate of Korean holdings	75%	50%
○ Crops to be cultivated	soybeans, wheat	soybeans, wheat
○ Supplies of farm materials	self - procurement with support of provincial government	self - procurement
○ Social overhead capital	to be newly constructed	good
○ Dividends of products	same ratio	same ratio
○ Uses of funds	irrigation and drainage, purchase of machinery, reclamation, construction	farming, maintenance
○ Farming plans in 1995	pilot sowing of soybean	production of soybeans
○ Cost of production(U$/ton)		
· Soybeans	86.70	90.00
· Wheat	51.40	-
○ Cooperation periods	70 years	unlimited
○ Schedules in the future	368,000 ha(by 2004)	94,000 ha (by 1999)

Note : This table summarizes chapter Ⅱ and chapter Ⅲ of the text

One of the very difficult problem in the project which requires a relatively large amount of investment is the unexpected cancellation of the contract due to non-economic reasons. Therefore, contracts usually include guaranteed operation for a specific period. On the other hand, projects using currently arable land and available labor need only farming costs, so what is more important is net profits rather than whether the operation period is guaranteed or not.

In Table 5, we can see the difference in the positions of the Chinese and Russian governments (central or local) with regard to the development areas or cooperative farms. The Chinese government seems to have a more active and enthusiastic attitude than Russia since the development of the Three-River Plain requires large amounts of investment and are almost impossible without this investments.

IV. Shortcomings of Agricultural Development in the North Eastern Region

1. The Natural Environment and Technical Limitations

The Russian far east and the northeast of China are located at about 50° latitude. The lowest temperature during the winter is below -30° C and the freezing period is approximately 4 to 6 months. Because of the shortage of sunlight, arable crops are limited. In addition, a small amount of annual rainfall, about 500 mm, makes production of most field crops difficult. Most rainfall concentrates during the summer season. Many swamps exist because the landscape is flat and rivers and streams are slow and rolling. Over 20 percent of the Russian far east is composed of swamp and grass areas around swamps. The Touxing Development Zone in the Three-River Plain is also basically a swamp.

Two Korean firms participate in the development of farm areas or in cooperative farms. It is expected that they overcome the natural conditions. However, Rice farming is not easy because abundant water and high temperatures are needed during the summer season. Cultivation of wheat, corn or soybeans is not subject to this problem. These three crops have traditionally been produced in the region for a

long time.

The second limitation is a potential flood in the northeastern region. Russian farms managed by Kohap Group have a good natural environment and infrastructure. These farms have been operating for a long time and have few problems in terms of planting technology. Amur Oblast is well known as the region with the highest crop yields in Russia. The Touxing agricultural zone in the Three-River Plain is in a field with little water. Most rivers in this area do not have tributary streams and roll excessively in the flat landscape. Flood damage by intense rainfall from July to August can persist for a long time.[6] However, the Chinese government has implemented its Qixing River Development Plan since 1984. This plan calls the expanding of the river width by about 1 km, changing the river into a straight, and making flood control areas. As a result, the water overflow problem was greatly improved. The Dairyuk Development Co. will build about 65 km of main water distribution lines, 1,431km of local water distribution lines, 241 km of farm roads, 25 bridges, and 331 wells to extract ground water. When this plan is accomplished, the water shortage will be alleviated and the potential for flood damage by heavy rainfall in the summer will be decreased.[7]

2. Management Ability

Kohap Group and Dairyuk Development Co. have long-range plans to cultivate 94,000 ha in Russia and 368,000 ha in China, respectively. Modern management skills are needed to successfully manage large farms. Since Russia and China have had socialistic economic systems, it may be difficult to manage the farms, employees and capital efficiently. Particularly, employee management is difficult because the employment structure in socialist countries works like a social

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[6] *Evaluation of Touxing Agricultural Comprehensive Development Project in Fujin City*, Dairyuk Research Institute, 1990. p. 26.

[7] Japan conducted a research project to build a comprehensive experimental station for agriculture in Heilongjiang Province. The final report of, *Investigation of the Basic Plan for the Comprehensive Experimental Station for Agriculture in China's Heilongjiang Province*, shows that although there are some problems with the weather, soil, and breeding, Japanese technology can solve these problems successfully.

security system. Social and economic disparities between Russia and China also need different types of management.

The Russian farm managed by Kohap Group will use current farm workers. Newly invested fund in this farm will be used mainly for farming. Russian farmers supply land as well as labor forces, but they depend upon foreign capital to solve the problem of farm expenses. It is expected that decreasing labor productivity in farm production as well as resentment towards the inflow of foreign capital will not happen. Therefore, the management of capital and labor might not be a big burden. General farm management, including the management of equipment and labor, has some weak points in that investors have few opportunities to participate in farm work directly.

In contrast, the Touxing farm's managers and technicians are provided by the Korean counterpart, so it will be easier to handle the management situation. However, the management of labor and capital will not likely be easy. Particularly, it will be difficult to change farm employees' labor habits built from the social economic system. When farm employees lose their work capacity due to old ageing or some other reasons, it will be burdensome for the Korean counterpart. Chinese domestic law requires that the job losses of old people be handled properly. If farmers think they lose their job opportunities because of large scale foreign capital investment, Chinese farmers could develop a strong antipathy to foreign farm investment. The Touxing farm can increase the efficiency of capital through direct management; however, it is expected that this farm will also have a heavy burden coming from invested capital.

3. Instability of Economic Policies

Following recommendations from the western countries, the Russian government implemented drastic price liberalization in 1992. The government increased the money supply to subsidize the industrial sector and firm's debt liquidation. As a result, hyper-inflation occurred, which shrank production. The exchange rate depreciated from 0.6 ruble per dollar in 1989 to 5,000 in 1994. The Russian far east is no exception either. As the far east region depends upon the central government, general economic changes directly affect this region. The decline of military industries around Vladivostok led to a

difficult economic situation because the far east region did not have any alternative industries except the export of raw materials. It is also difficult to export raw materials such as oil, wood and mineral resources through normal international trade channels because of the intervention of Russian criminal organization. The appearance of organized crime is caused by a weak market economy, declining government regulation, and weak enforcement powers of the legal system. It is widely believed that organized crime controls capital. Therefore, the inflow of foreign capital also has difficulties under such abnormal circumstances. Market investigation and research are being passively conducted, not actively. Although Kohap Group invests in various cooperative farms with the cooperation of the local governments, the size of investment has been small. Investment will be expanded in the long run; however, cooperative investment will be likely chosen instead of risky direct investment.

In terms of economic stability, the Chinese economy is more reliable than the Russian economy. It has already been about 18 years since China started reforming and opening its economic system. Market exchanges in China have been guaranteed at a satisfactory level since that time. Although a little chaos and disorder exist in some specific regions and sectors, it does not seem a serious problem for the general economy. Inflation as well as the overheating of economic activities are emphasized as main economic problems. China has experienced annual economic growth rates of over 10 percent from 1992 to 1994, and the inflation rate reached about 21 percent in 1994. China established a strong anti-inflation policy to cool down the economy in 1995. It is possible that the Dairyuk Development Co. can be exposed to a risky situation, because of unexpected changes in investment conditions.

However, there is a potential problem that the distribution of farm products in China might occur. Food production in China was 445.1 million tons in 1994. Food production has not increased since 446.2 million tons were produced in 1990. Food production increased to 456.5 million tons in 1993 but decreased to 445.1 million tons in 1994. Food production decreased by 11.4 million tons in 1994 compared to 1993. Since the average population growth per year has been about 13 million since 1990, annual food consumption per capita has declined from 393 kg in 1990 to 373 kg in 1994. The reduction in

food production not only causes farm prices to rise but also induces inflation and political problems. The reasons are that annual food consumption per capita is over 400 kg[8] and over 100 million people are still under the poverty line in China. Because of the demand for land from nonfarm sectors including the expansion of infrastructure, farm land has decreased about 306,000 ha per year from 1985 to 1993. In addition, traditional planting areas for food production have been transferred to highly profitable crops as well as the livestock sector.

The Chinese government regulates exports of some crops indirectly because of shortages. Eventually, the Chinese Department of State prohibited exports of major crops, including rice and corn in January 1995. The export ban was strengthened after an increase in food prices due to July flood damage around the Yangzi River, the worst in the last 40 years. Ten provinces and independent cities around this region produce about 40 percent of total food production in China. Food processing and livestock sectors in Asian countries that heavily import crops from China will be affected. The export ban in China will also create uncertainty in the world crop markets. Korea imported 3.67 million tons of corn from China in 1994. In order to substitute corn for wheat this year because of high world wheat prices, Korea is expected to import about eight million tons of corn in 1995. Therefore, the export ban in China will have a big impact on Korea because wheat and soybeans will be cultivated as the main crops in the Three River Plain and over 50 percent of the production will be exported by the Dairyuk Development Co.[9] In the case that the export ban for food remains for a long time, the Dairyuk Development Co. will be confronted with serious management problems.

4. Possibility of Obtaining Profits from the investments

In the viewpoint of investing firms, the most important factor is the rate of return on investment. If the rate of return is negative, it is not a

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[8] Lee S, *Prospects of Food Supply and Demand in China and Counter Strategies in Korea*, South Korean Embassy in Beijing, p. 8, Aug 1995.

[9] The contract to import 36,000 tons of Chinese corn by the National Livestock Co-operative Federation was cancelled in Oct 1994.

normal economic activity regardless of its good objectives and motive. This study conducts a simple benefit-cost analysis. It is hard to get specific data about the planting acreage, production and expenses because the Three River Plain development is placed at the very early stage of the development process. Benefits and costs are roughly calculated with data collected by Kohap Group in Table 6. As cooperatively cultivated acreage is about 2,000 ha and the yield per ha is expected to be two tons in 1995, the total production is estimated to be about 4,000 tons. Total revenue is about US$876,000 by applying recent international prices as shown in Table 4. If the production cost per ton is US$90 as shown in Table 1, total production cost is US$360,000 and Total profit is US$516,000. Because Kohap Group receives a 50 percent portion of the farm products, its net profit will be US$258,000 from 2,000 ha. Net profit per ha was calculated to be US$129. The Kohap Group invested US$600,000 for 2,000 ha. Specifically, farming costs are US$460,000 and the remaining part is being used for machinery purchases and other expenses. When considering the opportunity cost of capital, overseas farm investment is inefficient in the short run. In order to earn a profit, operating costs should be decreased by expanding the planting acreage and gaining economies of scale. There are still some problems. Generally, the rate of return per ha for soybeans is greater than those of wheat and corn. To avoid losses from consecutive soybean planting, soybeans can be planted on only about 50 percent of the total acreage.

It is difficult to directly apply the cases of the Sunyasen and Kremovsky farms in Russia to the Touxing farm in China. The Touxing farm can normally operate only after a few years because it requires a huge amount of development costs. Therefore, we can expect that economic profits of the Touxing farm will be less than Russian farms due to the development costs in the short run.

TABLE 6 BENEFIT-COST ANALYSIS OF THE TWO RUSSIAN FARMS

	Planting Acreage	yield per ha	Total Production	Expected Selling Price	Production Cost	Total Revenue	Total Cost	Total Profit
Unit	ha	ton	ton	US$/ton	US$/ton	US$1,000	〃	〃
Two Farms	2,000	2	4,000	219	90	876	360	516

Source : Kohap Group Agriculture & Fishery Project Team, Situation of Farm Cooperative Projects in Russia, June 1995.

Note : No restrictions to export of farm products is assumed.

V. Conclusion

Korea is not currently self-sufficient in food consumption. Korea has to prepare for a possible worldwide food crisis. Korea imports most agricultural products, except rice, due to high labor costs and insufficient arable land among others. With respect to corn and barley, the import ratio is nearly 100%. The ratio for soybeans is estimated at 88.8% in 1995.

Importing agricultural products from foreign farms, developed through foreign direct investment, might be one way to meet domestic need for food. To import agricultural products from these foreign sources, it is necessary for the farm products to be price competitive in the world market. According to the analysis in section Ⅱ, soybean production in China and Russia seems to have a price competitiveness. If so, firms can develop overseas farms by direct investment.

The development of overseas farms, however, may have many difficulties. Major problems are how to technically overcome specific natural conditions of foreign countries, how to efficiently manage the farms, how to deal with concerns about inconsistent foreign country's economic policies, and how to obtain positive profits from the investment. The biggest problem in investing in China and Russia is unstable economic conditions. The Russian political situation is not yet clear and China prohibits exports of major grains in order to meet their domestic needs. Even though the country allows exports of agricultural products at the time of a contract, it is not always guaranteed when its domestic, political and economic unstability will occur.

The most important thing for the investing firms is making profits from the investments. Benefit-cost analysis for the Russian Sunyasen Farm shows that an overseas farm investment is not profitable in the short run. An expansion of farm land may make it profitable. The result of the benefit-cost analysis in the Three River Plain of China seems to be worse in the short-term than that of the Sunyasen Farm because the Three River Plain is a newly developed region. The big advantage of the Three River Plain is, however, the favorable interest and support from the Chinese government.

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