



REGIONAL REPORT AGRICULTURAL COOPERATION IN GREATER TUMEN REGION





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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AQSIQ	General <i>Administration of Quality Supervision, Inspection and Quarantine</i>
ASDS	Agriculture Sector Development Strategy
BoM	Bank of Mongolia
CPF	Country Programming Framework
DSPP	Department of Strategic Planning
EU	European Union
EPA	Economic Partnership Agreement
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FMD	Foot and Mouth Disease
FSCF	Fund on Supporting Crop Farming
FSCL	Law on Ensuring Safety Of Food Products
FU	Fodder Unit
FZ	Free Zone
HACCP	Hazard Analysis and Critical Control Points
GAP	Good Agriculture Practice
GASI	General Agency for Specialized Inspection
CAREC	Central Asia Regional Economic Cooperation
GDP	Gross Domestic Product
GFSI	Global Food Safety Initiative
GoM	Government of Mongolia
GHP	Good Hygiene Practices
GMP	Good Manufacturing Practices
GTR	Great Tumen River
ha	Hectare
IBLIP	Index-based Livestock Insurance Project
IFC	International Finance Corporation
ID	Identification
IMAR	Inner Mongolian Autonomous Region
IPM	integrated Pest Management
kt	Thousand metric tones
KOICA	Korean International Cooperation Agency
KOPIA	Korea Photovoltaic Industry Association
KITECH	Korea Institute of Industrial Technology
KRC	Korean Rural Corporation
LEWS	Livestock Early Warning System
LDF	Local Development Fund
MDG	Millennium Development Goals
MFA	Ministry of Food and Agriculture
MNCC	Mongolian National Chamber of Commerce and Industry
MNT	Mongolian Togrog
MOFALI	Ministry of Food, Agriculture and Light Industry
MOU	Memorandum of Understanding
MSUA	Mongolian State University of Agriculture

MUST	Mongolian University of Science and Technology
mt	Metric Ton
MWCA	Mongolian Wool and Cashmere Association
MESC	Ministry of Education, Science and Technology
NAMHEM	National Agency of Meteorology, Hydrology and Environmental Monitoring
NCC	National Codex Committee
NEA	North East Asia
NEMA	National Emergency Management Agency
MNLP	Mongolian National Livestock Program
NPFS	National Program for Food Security
NSO	National Statistical Office of Mongolia
OFFS	On-Farm Food Safety
OIE	International Organization for Animal Health
PPP	Public Private Partnerships
PPRI	Plant protection Research Institute
PRC	People's Republic of China
PR	People's Republic
PSARTI	Plant Science Agriculture Research, Training Institute
R&D	Research and Development
RIAH	Research Institute of Animal Husbandry
RF	Russian Federation
ROC	Republic of China
ROK	Republic of Korea
RUB	Ruble
SDC	Swiss Development Corporation
SEFF	State Emergency Fodder Fund
SLP	Sustainable Livelihoods Program
SME	Small and Medium Enterprises
SOE	State Owned Enterprises
SPS	Sanitary and Phytosanitary
SSIA	State Specialized Inspection Agency
STF	Science Technology Fund
TADs	Transboundary Animal Diseases
TB	Tuberculosis
TCP	Technical Cooperation Program
UN	United Nations
UNDP	United Nations Development Program
UHT	Ultra High Temperature
VABU	Veterinary and Animal Breeding Unit
VABD	Veterinary and Animal Breeding Department
VABA	Veterinary and Animal Breeding Agency
VAT	Value Added Tax
VRI	Veterinary Research Institute
WB	World Bank
WHO	World Health Organization
WTO	World Trade Organization
ZUFZ	Zamiin Uud Free Zone

I. INTRODUCTION

Since 1992, based on the United Nation Development Programme's advocacy, the Tumen River regional cooperation development programme, including China, Russia, South Korea and Mongolia, has continuously improved the cooperative mechanism, expanded cooperation areas and explored innovative ways to build the sound basis for its regional cooperation and the opening-up policy in Northeast China Region.

On August 30, 2009, the State Council officially approved the *China Tumen River regional cooperative development plan for -- taking Chang Ji Tu for the opening up and development pilot zone* (referred to as "Tumen River regional development programme"), which put forward that it would base on Tumen River, server for the whole Northeast Region, regard Hunchun as a window, consider Yanji, Longjing and Tumen as the pilot zones, rely on Changchun and Jilin and implement the open strategy in border and hinterland to form a economic rising zone and leading area with strong economic power as well as promote the agricultural cooperation and development in Tumen River region.

The agricultural sector is very significant to the Mongolian economy, accounting for 15% of GDP, of which 86% is derived from livestock production. It provides for 37% of employment of the total workforce and is the very much the sole employment source in Mongolia's vast rural areas. While the sector is diminishing in importance from an overall economic perspective, the supply of food items for urban populations has assumed a greater importance with increasing urbanization. With rising prices and limited supplies, this has become highly politicized but is also seen as providing an opportunity to reduce the current levels of high unemployment. The sector's overall importance to the economy decreased from 38% in 1995 to 15% in 2014, figures that have been influenced by the impressive performance of the construction and mining sectors that are assuming a more dominant role. The rural population is static at about 190,000 households but now represents a declining proportion of the total population (46% in 2001 compared with 43% in 2013).

Current policies for the development of agriculture aim to (i) create favorable business conditions, (ii) increase agricultural productivity, (iii) ensure sustainability, (iv) improve supplies of hygienic food, and (v) introduce new production technologies into the sector. The policy has been developed into an action plan by the Ministry of Food and Agriculture (MFA) that proposes investments in improving animal husbandry, rebuilding and expanding crop production, developing the food industry, and conducting research. New policy for Food and Agriculture is being drafted and will be submitted to the Cabinet soon.

Countries in the NEA are major players in the global economy and take top places in global agricultural trading. This creates enormous opportunities for the members based on mutually beneficial agricultural cooperation. Mongolia's current agricultural sector growth requires increased exportation of agricultural products to the international markets, especially to neighboring countries, through sound resource management and advantages that the sector can offer. Previously, Mongolia's development has been hampered by its landlocked position, geographical isolation, extreme climate, lack of infrastructure and uncertain regulatory environment. But its location, adjacent to a rapidly growing China, has become a major advantage. China is Mongolia's largest trading partner, accounting for around 89 per cent of Mongolia's merchandise export revenues (predominantly through the export of copper and coal), and 37 per cent of merchandise import expenditure. China, Russia and Korea provide the greatest export market potential given their size, proximity, and established trading

relationships. Ensuring stable access to these markets will require the governments and partners to negotiate trade agreements with favorable quota and tariffs levels. It will also require Mongolian food products to meet the sanitary and phytosanitary requirements of the importers.

The Republic of Korea is one of the countries with highest population density and dependent on significant amount of foods from overseas. The total population is about 50 million as of 2013. Population density is about 500/km², following Bangladesh and Taiwan. World lowest increase rate of population is one of the serious problems in Korea. Recent population increase rate dropped to 0.43% in 2013 from 2.21% in 1970. Another problem related with population is ageing. The proportion of people with over 65 years old increased 12.2% in 2013 from 3.1% in 1970. The self-sufficiency of the major grains is less than 30% when including animal feeds. Due to the limited land area, overseas cooperation for securing food supply is inevitable. Korean government established policies for agricultural development, consisting of competitiveness, efficiency, safe and stable supply of food, welfare in rural area, and income increase. The measures for strengthening competitiveness includes incorporation of advanced technologies with traditional agriculture, conversion of agriculture into so called a 6th industry, which is a combined concept including traditional agriculture, agricultural product processing, and sales of the products in rural area. Research and development for agriculture are also included in the measures for the future.

Agricultural cooperation under Greater Tumen Initiative is considered as a great chance to deal with the food security problem. The potential of agricultural cooperation in Northeast Asian region including Far East part of Russia is enormous in that there exist plenty of natural and human resources, technology and capitals required for agricultural development. Through the cooperation, the participating member countries will share the increased agricultural productions and resulting positive economic effects in the areas such as employment, regional development, and investment in related industries.

Meanwhile, international cooperation in agricultural sector is not easy in that there are many obstacles to overcome. Protection of domestic agriculture, policies related with importing and exporting agricultural products, duty systems are a few of the obstacles. Some companies which are currently operating industrial farms keep appealing their difficulties and frustration in running their businesses.

In this report, discussed are current overall status GTI member countries, trades of agricultural and food products, cross-border cooperation in agricultural sectors, and approaches for GTI agricultural cooperation in their perspectives. It may take a long time and efforts to initiate actual cooperation. When the projects for the agricultural cooperation get on the right track, it will help securing major food supplies and further growths in related industries in the region as well as the participating countries.

II. CURRENT STATUS OF PRODUCTION AND TRADE IN AGRICULTURE

2.1 MAJOR AGRICULTURAL PRODUCTS AND OVERALL STATUS OF AGRICULTURE

2.1.1 China

In 2014, the grain production in China has achieved “the eleventh consecutive year”, with the total amount reaching 607.1 billion tons which has been 5.160 billion tons more than that of the last year. There has been an adequate supply of grain, cotton, sugar, fruit, vegetable, tea, meat, milk, eggs and aquatic products. The market maintains a smooth operation with the stable development of agricultural machinery, reclamation and processing. The total amount of products including farm, animal, forestry, and fishery products was about 9.7 trillion RMB in 2013. Agricultural product was 5.1 trillion RMB and animal husbandry was 2.8 trillion RMB. The statistics shows continuous increase in the amount of the agricultural production for decades. In terms of production weights, vegetables are the largest followed by rice, corn, sugar crops, and wheat. In animal products, the largest product is pork, followed by milk, poultry and eggs, and beef.

2.1.1.1 Major agricultural products' status

Rice

In 2014, the output of rice in China has reached 206.43 million tons and the domestic price has risen while maintaining steadily. According to the forecast in *China's Agricultural Outlook*, in the next decade, the total output of rice in China will be above 200 million tons steadily, the planting acreage will steadily reduce and the per unit area yield will sequentially increase. It is estimated that the planting acreage will reduce to 29.55 million hectares, the per unit area yield will reach 6.955 tons per hectare, the total output will reach 206.50 million tons and the domestic consumption will be 144.76 million tons¹ in 2024.

Corn

In 2014, the planting acreage of corn in the whole year has been 37.1 million hectares, with year-on-year growth of 2.1%; the per unit area yield has been 0.026 tons per hectares, dropping 3.3% year-on-year; the total output has been 215.673 million tons, falling 1.3% year-on-year. In the aspect of consumption, the growth of corn consumption has been slow due to the slow domestic economic growth, insufficient demand in the downstream of highly processed products of corn, scant demand of feed consumption, epidemic disease and substitution in consumption and other factors; consumption for edible and cultivation has remained basically stable, the total consumption at home in the whole year has been 195 million tons, decreasing 1.3% year-on-year. In the next decade, the planting acreage of corn may sequentially increase; however, the space for its growth will shrink due to the decrease of cultivated land and water resource shortage. Therefore, there will be a marked slow growth in corn's planting acreage in future.

¹ Expert Committees on Market Early-warning in Ministry of Agriculture: *China's Agricultural Outlook 2015-2024*, China Agriculture Scientific Press, 2015

Sugar Crops

There has been a big impact in Chinese sugar market in 2014 because of high production cost and price differences at home and abroad. The domestic output of sugar has been 13.318 million tons, with year-on-year growth of 249.6 thousand tons in amplification of 1.9%; the consumption of sugar has been 14.80 million tons, with year-on-year growth of 900 thousand tons. The product needs breach has expand from 830 thousand tons in 2013 to 1,480 thousand tons in 2014. Due to the low price of sugar in China in recent three years, the profit of sugar farmers has reduced continuously. It is estimated that the planting acreage of sugar crops will shrink obviously in 2015. The output will be 11.00 million tons, 17.4% lower than last year; consumption will be 15.11 million tons, 2.1% higher than last year, and the product needs breach will be 4.11 million tons. With the influence of population increasing, urbanization process accelerating and economy developing, the consumption of sugar will continuously increase for a long time. It is estimated that the consumption of sugar will be 18.51 million tons in 2024 which will be 3.71 million tons heavier than that in 2014 with the growth of 25% and average annual growth rate of 2.3%. In 2024, the product needs breach of sugar will be about 6 million tons with self-sufficiency rate of 66%.

Soybean

In 2014, the planting acreage of soybean has been 6.59 million hectares, 3% lower than last year, reducing for the fifth consecutive year. In the next decade, with the enlargement of financial funding in the state's three agricultural policies and the improvement of subsidy policy in target price of soybean, the planting acreage of soybean will increase while maintaining stable, the per unit area yield will improve steadily and so will the output. In 2024, the planting acreage will reach 7.21 million hectares, 12.5% higher than 2015 with average annual growth rate of 1.2%. With the improvement of the price-and-market mechanism, the motivation of farmers' planting soybean (peanut and rape) and other oil crops will remain stable.

Dairy Products

In 2014, the milk yield's recovery in China has been better than the forecast, with year-on-year growth of 5.5%. In the next decade, with the promotion of large-scale livestock and poultry breeding, Chinese cow breeding will enter a transforming and critical period and its scale degree will rise at a faster pace. It predicts that, in 2024, the scale and farming proportion of livestock on hand for more than 100 cow farms will reach 65%, 20% higher than that of 2014.

Meat

In the next decade, it will be tight in the supply of beef and mutton affected by raising cycle, production cost, development transformation and frequent occurrence of disease and other factors. It predicts that the proportion, pork accounting for meat production, will reduce form 66.4% in 2014 to 64.9% in 2024 in China. The scale farming of livestock on hand for more than 500 pig farms will dominate the pig breeding industry. By 2024, the slaughtering rate will reach over 60%. Boosted by the price and state supporting policies, the degree of scale, standardization, industrialization and organization in the cattle and sheep breeding industry will rise significantly. It is estimated that the production of beef and mutton in 2015 will be respectively 3.1% and 3.7% higher than that of 2014.

Poultry and Eggs

In 2014, the production of poultry and eggs has been 28.940 million tons, with year-on-year growth of 0.6%, lower growth rate in the recent five years. In the next decade, the production of poultry and eggs in China will

maintain a leadership role in the world benefited from the intensification and large scale of poultry production; however, the farmers in small scale will quit the industry faster due to restriction of the environmental protection and market development, which will further optimize the structure of farming scale and reduce the growth of production.

Feed

Chinese feed industry has entered a mature period; therefore, the feed industry may “increase in saturation style” mainly in the next decade. The production cost will possibly increase influenced by the rising tendency of resource constraint, labor cost and price level. There will be many factors influencing the feed industry including economic new normal, environment stress, emergency and non-traditional risk. Economic new normal will decline the profit in the feed industry. With environment stress increasing, the feed industry will be influenced by emergency and non-traditional risk obviously.

Vegetables

In 2014, the planting acreage and output of the vegetable have increased. The planting acreage has been 21.3 million hectares, with year-on-year growth of 2.0%; the output has been 748.75 million tons, with year-on-year growth of 1.9%. The total consumption in the whole country has been about 467.14 million tons, the consumption for edible of which has been 198.33 tons accounting for 42.5% of the total consumption; and consumption for edible has been 0.145 tons per person a year. In the next decade, the growth space for planting acreage of vegetable will be limited, so the growth of planting acreage, per unit area yield and total output will be slow.

Aquatic Product

In 2014, the output of Chinese aquatic product has been 64.61 million tons, with year-on-year growth of 4.7%; and its wholesale price has increased 3.5%. Led by the policies of ecology first and structural adjustment, the protection for marine fishery resources and ecological environment has enhanced and the sustainable development capacity of fishery has improved continuously, so the output of aquatic product especially cultured products will have much space to improve. In the next decade, the output of aquatic product will grow with a slower speed. It is expected the output of aquatic product in 2015 will be 66.43 million tons.

2.1.1.1 Major agricultural status in three Northeast Provinces and Inner Mongolia

Heilongjiang province produced the total of 463.3 billion RMB in agricultural, forestry, animal, and fishery production in 2013. Farm cultivation was 285.6 billion RMB and animal production was 143 billion RMB. In terms of the total weight of the production, grain was about 50 million tons and vegetables were 7.2 million tons. The average for last 14 years up to 2014, corn was the top product in terms of the weight, followed by rice and vegetables. For animal products, milk was the top product, of 5.2 million tons while the meat was 1.8 million tons in 2013. The average values of animal products for last 14 years also show that milk is the top products followed by pork in the province. Major fruits produced in Heilongjiang province are watermelon and muskmelon.

Agricultural status in Liaoning Province

Liaoning province shows about the same amount of agricultural, forestry, animal, and fishery production as that of Heilongjiang province. Due to its location close to sea, Liaoning produces more amount in fishery products. As of 2013, Liaoning province produced 435 billion RMB of farm products and 168 billion RMB of

animal products. Grain production was about 22 million tons, mainly corn and rice. About 32.7 million tons of vegetables were produced in 2013 in the province. In terms of the weight, vegetables are the top products followed by rice and corn based on 14 year averages until 2013. For animal products, about 4.2 million tons of meats were produced and 2.8 million tons of poultry and eggs. Apples and pears are the main fruits produced in the province.

Agricultural status in Jilin Province

Jilin province showed about 267 billion RMB in agricultural, forestry, animal, and fishery productions. Farm products and animal products take the halves of the total amount of the production. Jilin province produced 35 million tons of grains and 9.4 million tons of vegetables. Corn is the top product in terms of the weight followed by vegetables and rice. Over 2.6 million tons of meats were produced, and poultry and eggs are less than 1 million tons in 2013. Major fruits are water melons

Agricultural status in Inner Mongolia

Inner Mongolia has about the same amount of agricultural production as that of Jilin province. The total amount of the agricultural production was 270 billion RMB. Farm products were slightly more than animal production in the amount. Grain productions were 27.7 million tons and vegetables were 14.2 million tons in 2013. Major grain produced in Inner Mongolia is also corn. Traditionally, Inner Mongolia is a large producer of milk. Milk production was decreased to 7.7 million tons from over 9 million tons for recent several years.

2.1.2 Mongolia

2.1.2.1 Overall status

Agriculture continues to be the single main component of the Mongolian economy both in terms of its contribution to GDP (14.5%) and to employment (29,8%), it is equally important to the agro-processing sector, supplying the necessary raw material inputs to manufacturing and industry. During Mongolia’s transition to a market economy, agriculture was the main socio-economic sector by providing over 35 percent of GDP and 45 percent of the country’s employment through the 1990s. Agriculture, including forestry and fisheries, has contributed an average 17.1 percent of GDP, compared to sectors such as mining and quarrying (19.6 percent), wholesale and retail (8.2 percent), manufacturing (6.2 percent), and construction (2.2 percent) over the past decade. However, with increased mining industry, agriculture sector’s contribution has decreased gradually and reached 14,5%, which is roughly equal to mining 16. Table 1.1 shows that, by 2013, agriculture’s share of GDP, at current prices, was only 14,5 percent, less than mining (20 percent) sector.

Table 1. GDP and Agriculture’s Share at Constant 2005 Prices (Billion MNT)

Indicators	2005	2006	2007	2009	2010	2012	2013
GDP	2779.6	3 017.4	3 325.9	3 913.7	4 162.8	5 492.7	6 144,1
Agriculture	608.2	654.1	757.4	796.3	664.2	801.3	911.3
Mining	608.2	646.3	665.0	711.5	736.9	861.5	1031,2
Agriculture %	22%	22%	23%	20%	16%	15%	14,5%
Mining %	22%	21%	20%	18%	18%	16%	20,2%

Source: NSO

With huge territory of agriculture land, agriculture production in Mongolia is both challenging and risky. Fully, 88 percent (1.38 million km²) of Mongolia’s territory is considered agriculture land, of which 98 percent (1.35 million km²) is pasture land and less than 1 percent (1,200,000 ha) is considered arable. The territory consists

of several environmental zones, including mountainous, forest, grassland and desert. Mongolia's weather condition is very extreme, that affect increasing dependency of the agriculture sector on the weather condition. Within agriculture, extensive livestock rearing remains the dominant activity accounting 83,4% of the total production in 2013, the crop sector accounting for the remainder, which includes mainly cultivation of wheat, potatoes and vegetables. Total gross agricultural output has increased by almost twice since 2006 and Mongolia is now self-sufficient in major stable food commodities, such as meat, wheat and potatoes.

Table 2. Gross Agricultural Output (Billion MNT) at constant 2005 Prices

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Ag Output	691.4	851.7	928.5	1,066.8	1,143.4	1,172.3	1,015.3	1,034.8	1,349.3	1,498.4
livestock	577.8	738.5	785.7	919.7	962.3	966.7	799.1	770.1	1,065.2	1,250.3
% Total Output	83.6	86.7	84.6	86.2	84.2	82.5	78.7	74.4	78.9	83.4
crops	113.6	113.2	142.8	147.1	181.0	205.7	216.1	264.7	284.1	248.1
% Total Output	16.4	13.7	15,4	13,8	15,8	17,5	22,3	25,6	21,1	16,6

Livestock numbers have increased 60 percent between 1990 and 2013 and recent numbers indicate that livestock numbers reached 51.9 million by the end of 2014, a 100 percent increase from 1990. The intensive crop development program and increased prices for agricultural commodities, have led to significant increases in crop production. Whereas livestock contributed 84 percent of agricultural output in 2004, it still dominates in the same percentage except during 2010-2012, owing doubling production of crop output. Meat and milk are the primary products of the livestock sector, contributing 61 percent of livestock output while hides, skins and fibers contribute 39 percent.²

Main products of the agriculture sector are dominated by the livestock originated products, and majority of them have very significant contribution to the manufacturing sector and to the export revenues. Annual production of meat is 249.7 thousand metric tons (mt), up 29 percent from 2006, but roughly equal to 2008. This reflects the cyclical pattern of herd build-up and rapid collapse that is becoming an increasingly prominent feature of Mongolian livestock production. More than half of the meat produced is mutton and goat. In the absence of any significant productivity improvements, output increases have been directly related to the increased number of animals.

Cropping output includes mainly cereals (wheat) and vegetables. The contribution of crops to agricultural output has been increasing since 2008, thanks to the successful implementation the Government programme Crop Rehabilitation III and also increasing importance of vegetable production. Production collapsed from 839,000 mt grown on 673,000 ha in 1989 to just 76,000 mt grown on 159,000 ha in 2005, the year of a severe drought. In 2007, the Government launched Atar 3 Program (Crop Rehabilitation III) for crop sector rehabilitation which supplied agricultural machinery, increased the area of irrigation through renovation and new construction, and imported improved seed. The improvements made to production capacity were complemented by favorable price conditions including price subsidies and rising world prices for wheat. Cereal production, which is primarily wheat, has increased more than triple times from 2004 and the country was self-sufficient in wheat production in 2012.

Potato production has been engaged by the small scale growers and it's recovery started since 1996, is now 58 percent higher than it was prior to the transition. Programs such as the Government's Green Revolution and several donor projects targeted at household food security have promoted vegetable production through the provision of subsidized equipment and demonstration activities but with no direct price supports. The Swiss Development Cooperation (SDC) has provided long-term support to the regeneration of the seed potato stock, the development of commercial potato seed multiplier farms, and the introduction of improved production techniques. Vegetable production has been increased steadily, reaching 101,000 mt in 2013, providing for

² Mongolia's Meat and Dairy Sector, (Oyu Tolgoi) Study, 8 May 2013

approximately 55 percent of domestic needs. Currently, a number of private companies see the greenhouse vegetable production as a new commercial business.

Agricultural Exports

The total value of Mongolian exports increased from US \$0.87 billion in 2004 to \$4.27 billion in 2013 influenced by increased mineral exports while the total value of agricultural exports increased from \$245 million to \$366 million in 10 years. Textile exports were relatively increasing while the value of hides and skins and vegetable origin products increased slightly. Food products were the only category of agriculture products to register an increase over the period.

Because of the growth of mineral exports, agriculture's share of total exports declined from 28,2 percent to 8.6 percent between 2004 and 2013. By comparison, mineral products now represent 81,9 percent of total exports. Whereas textiles and textile articles made up 22.7 percent of exports in 2004, by 2013 they represented only 6.6 percent. In fact, hides and skins, live animals and their products, food products and vegetable origin products combined represent only 2 percent..

Livestock sector provides the basic raw material for the agro-processing sector, the leading example being cashmere that is the country's third largest export item. The country exports both raw fibers and small amount of animal carcasses, together with some processed fiber and meat products where there is a surplus over domestic requirements (that surplus has rapidly diminished with the increased domestic population). There was an active trade in livestock products - skins and hides for processing both within Mongolia and in neighboring China. There is also a fledgling dairy industry developing round the urban centers where demand for fresh milk and dairy products is strong where there is a preference for the ecologically sound, fresh product. With milk production being highly seasonal, dairy processors tend to rely on imported milk powder that is reconstituted to complement the small quantities of out of season production to meet urban demands. For food items of animal origin, it is estimated that the dependence on imported products in Ulaanbaatar is 95% for butter while it is self-sufficient in meat other than chicken and pork.

2.1.2.2 Livestock production

Livestock sector is the predominant one within the agriculture sector and plays the major role in the employment generation and livelihood source in rural areas of Mongolia. It is equally important to the agro processing sector, supplying the necessary raw material inputs to manufacturing and industry. In 2014, the national herd consisted of 51.98 million animals including 23.1 million sheep, 22.0 million goats, 3.4 million cattle, 2.9 million horses and 349 thousand camels.

Livestock numbers remained constant from the 1960s to the late 1980s. However, with the breakdown of the collective system, subsequent privatization of the livestock herd, and the absorption of unemployed urban residents who had no other livelihood options than livestock production, numbers increased dramatically during the 1990s to a peak of 33.5 million total animals in 1998-99. However, after three severe winters (known as *dzud*), 9.6 million animals (29 percent) died. As shown in Figure 1, by 2009, herd numbers nearly doubled, growing from 23 million to 44 million. At irregular intervals, Mongolia experiences severe winter disaster conditions or *dzud* which is associated with restricted livestock access to grazing, very low temperatures and high livestock mortality. The *dzud* of the 2009-10 winter is estimated to have resulted in the death of 9.7 million animals at an estimated cost of MNT 460 billion (USD 340 million) as well as the loss of livelihood for thousands of households. As of 2014, total number of livestock has reached 51.9 mln.

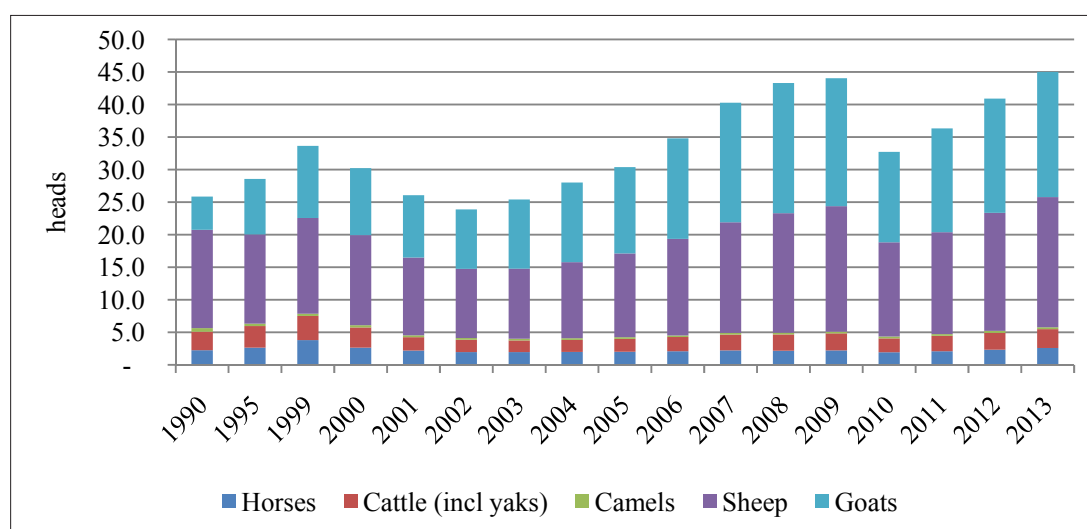


Figure 1. Trends of Livestock Growth, 1990 – 2013

Regional distribution of livestock has not changed substantially during the transition period other than increased importance of goats that has been noted in all regions. The region designated the mountain and forest steppe region has the highest number of cattle and horses, which, when combined with number of small ruminants, it confirms this region is the major livestock producing area in the country.

Livestock Disease Status

Animal health programs, services and status have declined since transition. This has resulted in the resurgence of Tuberculosis (TB), Brucellosis, FMD and other reportable diseases in the national herd, which pose a threat to public health and has locked Mongolian livestock products out of most export markets. There is a range of internal and ecto-parasites that affect animal productivity and also cause blemishes to hides that reduce their value for processing. Mongolian meat is generally considered to be ecologically clean as its animals are reared on natural pasture without fertilizers, chemicals and pesticides and only limited interventions from veterinary treatments.

Consistent with OIE protocols, Mongolia has public and private veterinary services. In 2011, Veterinary and Animal Breeding Units (VABUs) were established at the Soum level to provide professional and technical services. Each unit has one veterinarian, one animal breeding specialist and one person to deal with SME development, extension and pasture management and fodder production. The creation of the VABU system, in all soums, has provided the basic institutional capacity to deliver service to local communities. Veterinary services are provided by local private veterinarians based on the service fees approved by the local and Aimag government. Herders pay for all veterinary services except vaccinations, which is funded by the Government.

Agro-processing.

The key characteristic of the manufacturing sector in Mongolia is the wide range of industries that are dependent upon livestock generated raw materials for the manufacturing process. These include meat processing, dairy, leather tannery, leather footwear and products, fur garments, cashmere processing and garment manufacturing, camel hair processing and garment production, wool carpets and blankets, felt shoes and other felt products. Current production levels of these items are only a fraction of their pre-transition levels (except for cashmere) as many agro-processing enterprises collapsed with the transition to a market based economy. Nevertheless, livestock raw materials still form the basis for almost all the textile industry, and a significant proportion of the food and garment industries. Domestic livestock-based industries face keen competition from Chinese

manufacturers with their surplus capacities and economies of scale. Chinese traders buy significant quantities of Mongolia's livestock products (mainly fibers and hides).

Major Livestock Products

Meat production

The livestock population in 2014 within the country was 45.1 million and 10.8 million from which was for slaughtering meat processing including both small and big cattle. 249.7 ton meat was prepared from above mentioned number of livestock and approximately 212.9 ton meat is needed for domestic demand. Only 9% of all prepared meat is used for processing meat production. The Government prefers to develop intensive animal husbandry to increase effective output of products from per cattle while keeping the number of livestock within the country. It will be effective and efficient to keep livestock content ratio like 56.8% of big and 43.2% small cattle.

Dairy Products

Traditionally the dairy segment has been a strong performer, with nomadic herding and traditional dairy-product making at the heart of Mongolian society. Self-sufficiency in milk production during the socialist era, the country suffered a downturn in the 1990s, due to a fall in state support and extensive livestock losses. Following the collapse of the domestic dairy industry due to rapid privatization, the large domestic demand for milk and dairy products such as cheese and ice cream in urban centers has been met largely from imports. Domestic production of fresh milk is also highly seasonal and marketable surpluses are usually generated for a short period of the year. Milk factories have substituted fresh supplies by reconstituting imported milk powder. Some liquid consumption is met from small dairy plants using domestically produced milk in both pasteurized and un-pasteurized form, the latter being sold by middlemen in markets and also on the street, in unhygienic conditions, posing considerable health hazards. There are other small scale dairy processing plants producing a range of dairy produce including yogurt, cheese and other traditional Mongolian dairy products supplying the urban centers and rural urban populations.

Cashmere

Mongolia is the second largest producer of raw cashmere, accounting for 6000-7000 mt, after China, 9000 mt. The estimated number of the goat population in Mongolia by 2013 was reached to 19.2 million with the average yield of cashmere 0.135 kg. The total number of prepared cashmere was 6730 ton and 4070 ton from which were exported. The enterprises involved in cashmere processing and garment manufacturing in the country have sophisticated de-hairing, spinning, dyeing, weaving and knitting equipment, some of which were upgraded in recent years.

Carpets and Other Wool Products

Mongolia produces large quantities of coarse wool, some of which is discarded in the countryside due to the poor transport infrastructure (high transport costs) and limited demand. Ninety four per cent of Mongolia's clip comprises coarse fibers (suitable only for carpets, blankets, felt footwear and insulating products), 4% is semi-coarse, and only 1% is fine or semi-fine and suitable for garment production. There are three major carpet producers and one blanket producer that have been privatized, two in Ulaanbaatar and one in Erdenet. Their combined production capacity for scouring, spinning, knitting and felt making is far in excess of current production levels.

Hides and Skin

Most Mongolian hides and skins are exported to China either raw or as semi-processed wet blue hides. Mongolian hides and skins are very competitively priced, though some price differential is due to the generally smaller size of animals in Mongolia, their lighter skins, and quality aspects (blemishes from ecto-parasites). Since 1990, some 35 small and medium companies have also been established for mainly primary processing (24), but also for processing fur (4), and leather and tannery products (10). These processors face difficulties in procuring raw materials because of their access to capital at reasonable interest rates also coincides with the peak buying period for livestock and plants are run well below their capacities. There are also 170 SMEs operating in the manufacturing of the skin commodities.

2.1.2.3 Crop production

In 2013, agriculture contributed some 15 percent to GDP at constant prices, and of that, about 15 percent is derived from cropping, the remaining 85 percent from livestock. The crop sub-sector in Mongolia had experienced significant difficulties in the transition from command to a market economy that can be witnessed by the fact that Mongolia's self-sufficiency for wheat, flour, potato and vegetable collapsed and domestic production reached its lowest level during 2005-2007.

Crops have shown a steady increase in their contribution to Agriculture GDP relative to livestock since 2008 thanks to the Government funded Crop Rehabilitation Programme-3. The steady growth in crop output also reflects the GoM's current policy objective of achieving self-sufficiency in food supply in Mongolia as stated in *strategic objective 2* of Mongolia MDG-based Comprehensive National Development Strategy (MCNDS 2008). The GoM has increased investments in irrigation systems and agricultural machinery to support crop production in addition to subsidies.

About 90% of the country's land area was classified as agriculture, and only a small portion of this agricultural area is classified as arable, the bulk being meadows and pastures. The area classified as arable has itself declined from around 1.35 m ha in the 1980s and 1990s to around 1.2 mln ha in recent years. Immediately prior to transition in 1989, the area under crop was reported as being some 838,000 ha that has dropped sharply during middle of 1990's to 2006, then it increased again reaching 330,000 ha by 2013.

Output and Productivity

Cereal yields are up 21 percent since 1990. Potato producers have also increased productivity although average yields remain a good deal lower than those achieved by more advanced commercial producers or producers in other countries. Vegetable production, which is dominated by smallholders, has shown the least improvement, constrained by old seed, lack of mechanization and technical and managerial knowledge. The greatest productivity advances in crop production will come about through soil conservation, fertilization, improved varieties, efficient water use and better management and technologies.

Cereals currently represent 81 percent of the sown area. Wheat alone represents 79 percent of the total sown area. Both of these shares have declined as farmers have diversified into other crops. Potatoes are sown on 12,360 ha, or 4 percent of sown area while vegetables are grown on 12,270 ha. Fodder production accounts for 42.6 thousand tons, which is very low compared to the planned economy period. Oilseeds are classified as "technical crops" in Mongolia and are primarily rapeseed/canola, which have increased sharply in area over the past four years and mostly imported to China. Corn is grown in only very small amounts for silage. The number of cereal growers prefer to introduce production of new crops, such as canola, soybean and others for rotation purposes and also as a cash crop. The relative areas of sown area by crop are provided in Table 3.

In 2013, total sown area had recovered to 380,000 ha with another 280,000 in fallow preparation, making the total utilized crop land 660,000 ha using a 40 percent fallow rotation. Much of the 1.2 million ha of land originally brought under cultivation as part of the first Virgin Land Program in the early 1960s was fragile and eroded quickly under conventional tillage. The MFA now considers 800,000 ha to be the maximum that could be under cultivation. Controlling soil erosion is a goal for the MFA and to that end, the introduction of soil conservation practices such as minimum tillage is part of policy. As of 2013, 30 percent of wheat production used minimum tillage with chemical spray.

Table 3. Output and Yields for Main Cereal Crops

	1989	1995	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Output ('000 tons)												
Cereals	839.1	261.4	138.4	75.5	138.6	114.8	212.9	391.7	355.1	446.1	479.3	387.0
Wheat	686.9	256.7	135.6	73.5	127.8	109.6	209.8	388.1	345.5	435.9	465.3	368.4
Yields (tons/ha)												
Cereals	1.25	0.73	0.80	0.47	1.1	0.94	1.38	1.55	1.37	1.49	1.57	1.32
Wheat	1.30	0.74	0.81	0.48	1.1	0.9	1.4	1.6	1.39	1.54	1.55	1.4
Barley			0.61	0.60	0.6	0.63	1.38	1.05	1.04	1.4	1.39	1.4
Rapeseed			0.68	0.69	0.8	0.1	0.55	0.44	0.5	0.4	0.64	0.61

Source: National statistics Office, Ulaanbaatar

Vegetables are now produced on small plots, often less than a quarter of a hectare, many of them in the areas around Ulaanbaatar and other urban centers. Estimates of output for the main kinds of vegetables show increased diversification in recent years. Cabbage and turnip, however, remain the main vegetable crops grown, although more recently carrots have become increasingly important.

Lately, crop producers start canola/rapeseed has been exported to China but primary production has reached the level to attach investment into processing. There are two companies, one is in oil refinery and other one is operating oil crushing factory. They are looking for farmers growing good varieties of canola and as initial stage, 20 mt of Raffull Rapeseed have been distributed to farmers on contract for production.

The opening of these crushing facilities will provide a value-added oil product for human consumption. Mongolian demand for vegetable oil is estimated at 25,000 l. It will also provide a substantial amount of high quality canola meal for use in the intensive livestock industry. Using an estimated canola production amount of 30,000 mt at yield rates of 60 percent canola meal, a total of 18,000 mt of high protein meal could be produced.

Major Crop Products

Wheat

The “Third Crop Rehabilitation Campaign” (also called Atar 3)” (2008-2010) was the central and most successful Government program for the crop sector. The program goals were to: i) create favorable economic conditions for farming; ii) increase agricultural production; iii) ensure food safety; iv) eliminate dependence on imports; v) increase self-reliance; and, vi) intensify development of crop production. Government targets under this program were to stabilize production on 600,000 ha of arable land and achieve, by 2010, 100 percent self-sufficiency (420,000 mt) in wheat, 131.0 percent (173,000 mt) in potatoes and 102 percent (171,000 mt) in vegetable production based on bringing a total of 238,000 ha of abandoned land back into production. In 2010, actual production was 345,458 mt of wheat, 167,956 mt of potatoes and 82,266 mt of vegetables. By 2013, total cereal production was 388.8 thousand tons of which 368.0 thousand tons were wheat and 191.0 thousand tons were potato.

Flour

Flour is regarded as strategic food product, therefore the Government provides strong support not only to cereal producers as well to milling companies. Government soft loans have been provided to roughly 40 flour mills in Darkhan-Uul, Hovsgol, Bulgan and Selenge to upgrade facilities and purchase raw materials. In order to stabilize rising food prices, the mills using these loans are required to supply first grade flour at a wholesale price not more than MNT 550/kg and a retail price not more than MNT 650/kg. The mills are now in a better position to pay for raw product in a timely fashion. However, some cite that there are times that market demand cannot be met because they cannot finance the raw product. Operating capital is needed to purchase wheat and and long-term investment capital is needed in order to build storage capacity.

Livestock Feeds

Mongolia imports 70 to 90 mt/day of corn and some concentrated feeds and vitamins for use on intensive farms. Livestock feeds can utilize grains and oilseeds, fodder crops and crop by-product. Higher levels of wheat and other crop production have increased the availability of by-products for the livestock feed industry. Bran is produced at a rate of approximately 23 percent of the weight of wheat going into a mill. In 2005, the total potential bran production in Mongolia from the milling of domestic wheat was approximately 17,400 mt while in 2012 it reached 107,000 mt. With the growth of the wheat sector, Mongolia exported 22,000 mt of bran to China in 2012.

Potato and vegetable production

By 2013, Mongolia produced 166,000 mt potato on 15,500 ha with an average yield of 14.6 mt/ha. Consumption has increased to 83 kg/cap and imports are negligible (3,200 mt). Mongolia now faces the problem of over production, having produced over 27% surplus in 2013 compared to a demand of 185,000 mt including 145,000 fresh potatoes and 40,000 of seed potatoes. Vegetable production includes carrots (33,000 mt), turnips (24,000 mt) and cabbage (20,000 mt) and much smaller amounts of onion, cucumber and tomato. Production meets about 45% percent of local demand. With increased potato production and successful SDC implemented “Mongolian potato” project, which made substantial contribution to rehabilitation of the seed potato, Mongolia is self sufficient for potato.

Seabuckthorn

Sea buckthorn production is being promoted by the Government of Mongolia and area has increased to 5,000 ha in 2013, up from 1,300 ha three years ago. The program target is to reach 13,000 ha by 2016 along with another 2,000 ha of other berries. Total production from this area will be 30,000 mt/year. While most production is in small plots, some large scale operations have been established. To improve the productivity of sea buckthorn production, the MFA is supporting research into genetics and varieties and the Sea Buckthorn Association reported that eight institutes across the country have been selected to examine economic traits.

2.1.2.4 Overview of agriculture in Mongolian GTR

Land in eastern Mongolia is predominantly steppe plain suitably used for raising livestock in nomadic way and for agriculture, mainly wheat and fodder crops. Eastern Mongolia accounts for 12 percent of total livestock, 18 percent of pastureland and 16 percent of crop land of the country. Use of arable land for cropping in the Eastern Mongolia was declined from 204.1 thousand ha in 1989 to 10,5 thousand ha in 2007. As of 2013, total of 77.6 thousand ha was put in the cultivation is making the situation better accounting for 38.0 percent of the land used in 1989, which means more than 126.5 thousand ha of arable land still remain as unused or abandoned.

Eastern Mongolia is also rich in animal genetics of highly productive indigenous breeds of beef cattle and sheep that produces up to 30 percent of higher meat output for cattle and 10-15 percent higher for sheep as compared to ordinary breeds. This region is often considered as the Mongolia's agriculture reserve land due to its rich resource in fertile land and vast grazing grassland.

Mongolian GTR consists of Dornod, Sukhbaatar, and Khentii. Before 1990, Dornod was a largest producer of crop products in the region having 89,140 ha of arable land, where they used to cultivate grain for 39,300 ha, potato for 400 ha, vegetable for 200 ha, fodder crop for 7,700 ha respectively. Crop harvest was reaching to 65,5 thousand ton for grain, 2,9 thousand ton for potato, 1,0 thousand ton for vegetable and 21,0 thousand ton for green fodder in that time. Launch of national programme for Crop rehabilitation in 2008, helped to revive crop production in Dornod province making the most of the abandoned land be used for cropping. Khentii province is the one of the main producers of meat beef and mutton that supplies to urban market. It has the highest number of cattle, sheep and goat as compared to other two provinces in the eastern Mongolia. The number of herding household of the province is 6588. Currently, Khentii province has 90,000 ha of cultivable land out of which, 40,000 ha of land is possessed by 25 local farming enterprises to grow wheat and other crops comprising of oat, barley, rye, rape seed, fodder crop, potato and vegetables. Crop cultivation in Khentii province was enormously increased since the collapse of collective system 1990 reaching to its historic peak. As of 2014, total cultivated land was 24,200 ha which is 2.1 times higher than the previous year. Traditional livestock herding dominated by the sheep, horse and cattle rearing is main economic activity within the agriculture business in Sukhbaatar province. Sukhbaatar has 8.0 million ha of pastureland. As of 2013, the number of herding household was 6552, while 30 farming entities and 610 household engaged in crop production.

2.1.3 Korea

2.1.3.1 Major agricultural products and overall status

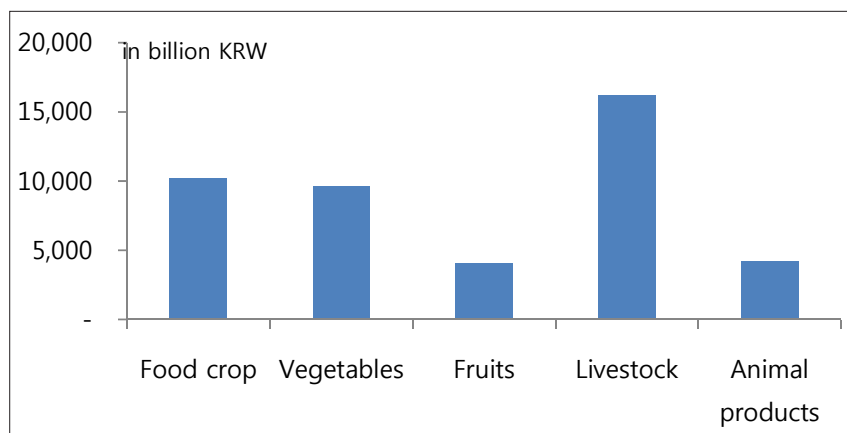
In the Republic of Korea (ROK), three quarters of the total land area is mountainous and east parts are higher and mountain ranges. Annual precipitation ranges about 1,400 mm and is concentrated during the summer. The total population is about 50 million as of 2013. Population density is about 500/km², following Bangladesh and Taiwan. World's lowest increase rate of population is one of the serious problems in Korea. Recent population increase rate dropped to 0.43 percent in 2013 from 2.21% in 1970. Another problem related with population is ageing. The proportion of people with over 65 years old increased from 3.1 percent in 1970 to 12.2 percent in 2013.

The total crop land area in ROK is 1.94 million ha as of 2013, which is about 19% of the total land area. Paddy field takes about 55 percent of the crop land. When orchard field and pasture for livestock farms are included, a total of 2.05 million ha is used for agriculture. Greenhouses take about 100 thousand ha out of the crop fields, which is used for mainly growing vegetable crops. As of 2014, the total production of rice is 5.64 million tons as rough rice, which indicates 6.9 ton/ha.

The total value of agricultural and livestock production was 44.6 trillion KRW (Korean Won) as of 2013. The total amount from cultivation including fruit was 28.3 trillion KRW and livestock and related products produced 16.3 trillion KRW. Major crops include food crop of 10.3 trillion, vegetable crops of 9.6 trillion, and fruits of 4.1 trillion KRW. Apple and tangerine are the top major fruit produced in Korea, producing about 1 trillion KRW. Major livestock animals include pig of about 5, cow of 3.7, chicken of 2.2 trillion KRW, respectively. Livestock products such as fresh eggs and milks account for about 4.2 trillion KRW. A total production from food and related industries including packaging and food additives accounts for 47.3 trillion KRW. Food production industries take 38 trillion KRW out of the total production.

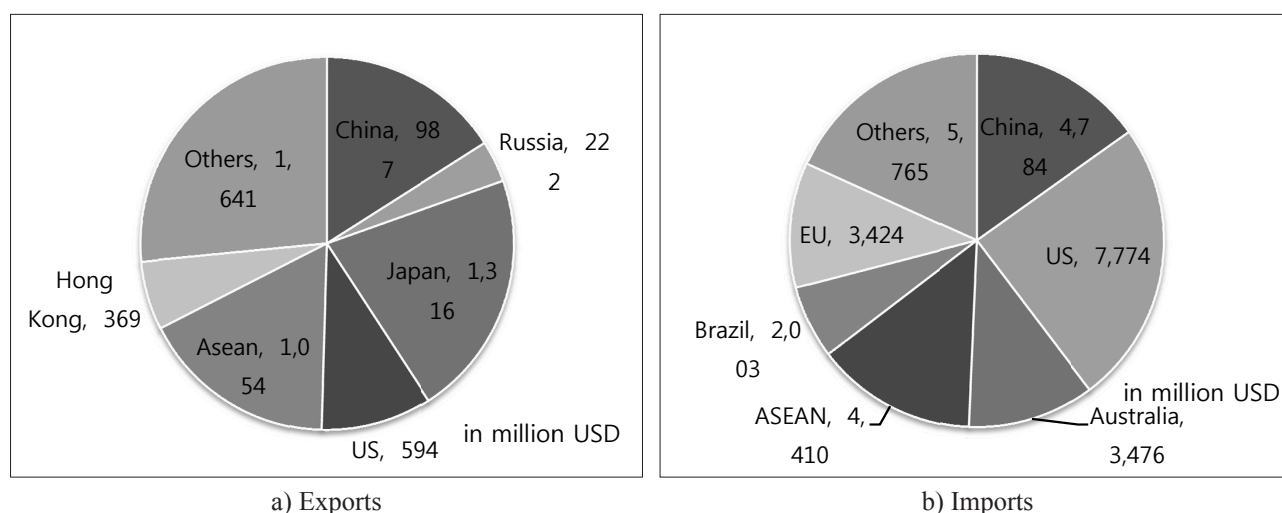
The production values in agriculture over the last 10 years look stable with slight increases in recent 5 years. The production values in vegetables contribute recent increases in the total production values in cultivation, whereas other sectors such as food crops and fruits remain the same. The total production values in livestock indicate long term increase due to increasing demand of meat and dairy products. A slight increase in the values of livestock production is observed during 2009 and 2010 due to the increase of the number of cattle.

Major top 5 agricultural products in terms of the amount of production values are rice, pig, beef cow, chicken, and milk. Egg, strawberry, pepper, apple, water melon, ducks are following the top products. One of the interesting products in the table is rice straw, a crop residue which is used for forage in beef or dairy farms. The rice straw has been widely used for substituting import of large amount of forage.



Data source: Korean Statistical Information Service (<http://kosis.kr>)

Figure 2. Korean agricultural production values as of 2013



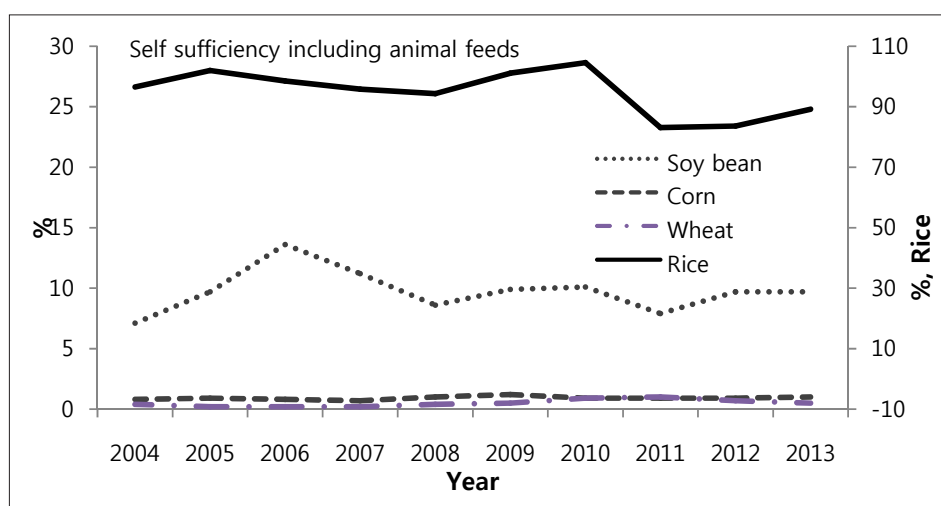
Data source: Korea Agricultural Trade Information (<http://www.kati.net>)

Figure 3. Distribution of countries for trades of agricultural and food products (2014)

Based on 2014 statistical report, a total export of agricultural products and processed food is about 6.18 billion USD, including fresh agricultural products of 1.12 billion and processed food of 5.06 billion USD. Vegetables, fruits, and ginseng are the major export of fresh agricultural products. Major vegetable exports include Kimchi, paprika, vegetable seeds, and strawberry. Recently the exports of strawberry and mushrooms are increasing and help increasing in farm incomes. Major countries of agricultural export include Japan, China, the United States, and Russia. As of 2014, the total amount of agricultural and food exports to Japan and China are 1.32 and 0.99 billion USD, respectively. Russia imported 0.22 billion USD of Korean agricultural and food products in 2014.

Compared to the export, Korea imports much larger amount of agricultural products, amounting 31.6 billion USD as of 2014. In 2014, total import of agricultural products was about 19.3 billion USD while livestock related import was 5.62 billion USD. Agricultural import consists of 4.37 billion USD of grains, 1.9 billions of meals for animal feeds, and 1.68 billion USD of fresh fruits. The United States and China are the major

import countries, with the total import of about 7.77 billion and 4.78 billion USD, respectively. Recently, Brazil became one of the major import countries due to increase in corn import, reached to about from 2 to 3 billion USD in recent years. The top imports are corn (\$2.64 billion), beef (\$1.85 billion), pulp (\$1.44 billion), and pork (\$1.26 billion). The amount of the grain imports reflects the current status of domestic production. Almost all demands of wheat and corn are satisfied by imports and only about 10% of bean consumption is covered by domestic production. Only rice is nearly self-sufficient. Statistics show that the self-sufficiency of grains is 23.1% including animal feed as of 2013. When excluding animal feed, the self-sufficiency of grains increases about 47%. The self-sufficiency of grains is similar to that of Japan which is also heavily dependent upon imports.



Data source: Korean Statistical Information Service (<http://kosis.kr>)

Figure 4. Self-sufficiency of major food crops in recent 10 years (Including animal feeds)

In 2013, total consumption of grains for animal feed was 10 million tons of which only 2.7% is domestic. The entire amount of corn for animal feed is imported. When it comes to concentrate feed, domestic production rate is about 23% as of 2013.

The total demand of forage or roughage is 5.73 million tons as of 2013. About 82% of the total forage is supplied by domestic production which is mainly from rice straw (2 million tons) and Italian ryegrass (1.7 million tons). The forage market is about 1.1 trillion KRW and the forage import is 425 billion KRW.

The United States and China are the major countries from where most agricultural products are imported. Top imports from the United States are beef, grains, and fruits. The total amounts of agricultural imports are 5.7 billion from China, 0.29 billion from Russia, and 1.5 million USD from Mongolia while agricultural exports to China is 0.95 billion, 0.24 billion to Russia, and 40 million to Mongolia as of 2013.

2.1.3.2 Overview of agriculture in Korean GTR

Korean GTR has about 24% of total area for crop fields. Unlike the national figures, paddy field occupies 46% of the crop lands since Korean GTR is relatively more mountainous compared to other provinces. The land area in Korean GTR is about 37.6% of the total national land area. About 19.4% of the total crop field is occupied by greenhouses, for growing vegetables. The total production of rough rice was about 1 million ton and the production per ha is 7.2 ton/ha which is a little higher than national figure.

In Korean GTR, major livestock animal is cow, about 2.8 million head, which is about 29.5% of the national total figure. Other livestock animals are about 15%. Food and related industries produced only 2.3 trillion KRW, which is about 15% of the total national production.

The exports of agricultural and food products from Korean GTR was about 1 billion USD in 2014, which is about 14% of total exports of Korea. About 85% of the exports were food products. Gyeongsangbuk province exported 22 million USD of mushrooms alone, which is about 60% of the total mushroom products.

Gangwon Province

Gangwon province has about 19% of total Korean land area and its cultivation land area including orchards is about 8.1% out of national one since the province has more mountain areas than other provinces. Gangwon province covers 21.5% of total mountain areas in Korea while it has only 13.4% of paddies and 4.9% of upland areas. The province has about 45% of land area in Korean GTR. The total production of food crops in Gangwon province is 247,900 tons and vegetables are 370,000 tons in 2013.

As of 2013, the number of farm population is 177,227 which is 18.6% less than that in 2003. The number of farm population over 65 years old is 36.8% in 2013 while it was 26.3% in 2003. Majority of farm households, about 66% in the province has farm land less than 1.0 ha while 4.4% of farms have more than 5 ha area of farm land. Currently about 30% of farms are growing rice, followed by vegetables 29.2%. The number of rice production households decreased by about 12% point while vegetable production households increased by 5.5% point compared to 10 years before. Average annual income of farm households in Gangwon province was about 30 million KRW of which only a third comes from agricultural activities.

Due to the national perception that the province has uncontaminated natural resources, agricultural products are well accepted as clean and environment-friendly. Particularly, natural vegetables and herbs produced in the province are getting higher market demand along with the income increasing. Although the agricultural products have a good reputation in terms of its quality, the competitiveness of traditional agriculture is relatively low. For example, major vegetable productions in higher elevation areas are facing deterioration of soil quality since most of the farms are located in slope area.

In a master plan published in 2012, Gangwon province listed the directions for the development of agriculture. Some of notable lists are horse industry, premium dairy farm and industrial complex, local and traditional food industry, and providing competitiveness of farm households particularly in rice production.

Gyeongsangbuk Province

Gyeongsangbuk-do or Northern Gyeongsang Province has about 19 percent of the total Korean land area and its cultivation land area is 21.2 percent of the entire cultivation area as of 2013. Farm land areas are decreasing over the years, showing 4.1 percent decrease in 5 years since 2006. The orchard area is over a quarter of all orchard area in Korea. In fact, the province has the largest orchard areas for growing most of fruits such as apples, grapes, yellow melons, peaches, plums. The number of farm population is about 200 thousands in 2010, which is about 16 percent of total farm population. Since 1980, the farm population has been decreasing. The number of farm population of 65 or older is 35.4 percent, which is much greater than 7.3 percent in 1980.

Incomes from agricultural production in Gyeongsangbuk province was just 91.4 percent of national average in 2008. However, the incomes increased substantially recently, mainly due to the increase of number of livestock farms which have relatively more income than cultivation farms. The numbers of livestock farms were mostly increased except for milk cow farms.

Environment-friendly products which include organic products and products with no or less pesticide applications are getting more market demand in Korea. Gyeongsangbuk province has over 20,000 ha for the environment-friendly cultivation, which is about 11.6% of the national total areas. When it comes to food processing and production industries, the number of companies is less than 2,000, about 8.2% of the total number of food production companies in Korea. The number of employees hired by these companies is about 13,000, which is 5.5 percent of the national figures and way below the average of other provinces. Consequently, the production values of the food related companies in the province are about 1.4 trillion KRW, about 4.9% of the total production values in Korea. Food additives and related companies like packaging are relatively small out of the national figures.

Ulsan Metropolitan City

Ulsan is a metropolitan city that has rural region as a part of the city, facing Gyeongsangbuk province to the North and Busan city to the South. The total area is 1,060 km², about 1% of the Korean total land area and about 3% of Korean GTR area. Cultivation area is about 13% which is smaller than the average proportion, and forest area is 64%.

Ulsan has been one of the biggest heavy industrial regions, including petrochemical complexes, automobile manufacturing, and ship yards. Therefore agriculture has a limited contribution to the whole economy in the city. Similar to other provinces, Ulsan is also interested in environment-friendly agriculture and livestock farming. The city is encouraging additional production of environment-friendly agriculture. The other notable agricultural and rural policies include integrated rural development, assistance programs for the export of agricultural products, forage production for animal feeds, preventive measures against animal epidemics. Main exports of Ulsan city are fruits, mushrooms, and flowers to the US, China, Japan, and South Asian countries.

Busan Metropolitan City

Busan Metropolitan City has the smallest land area in Korean GTR, about 770 km². Cultivation land is about 13% with no orchards, and forest land is 46% of the total area. Paddy and upland areas are 0.3% and 0.7% of the total areas, respectively. Vegetable production has the second largest land area next to paddies. The population is about 3.5 million and farm population is about 25 thousand people as of 2010. Total amount of food grain productions is about 17 thousand tons. The export of agricultural product from Busan was 9.7 million USD and food products were 211 million USD in 2014.

2.1.4 Russia

The territory of Russia in this report covers Primorsky territory, which is officially defined as a part of the Greater Tumen Region and plus four adjacent regions that border with GTR territories of Mongolia and China. The state of the agriculture and its general parameters are given in the table. In Russia the share of production of agriculture on Zabaikal territory is insignificant and in different years it varies from 0.4% to 0.5 %. In Siberian Federal district the share of Zabaikal territory is 3.4% - 3.5 %. For the economy of Zabaikal territory the agriculture is one of the leading spheres. In the structure of gross regional product the share attributable to economic activity “agriculture, hunting, and forestry” was evaluated as 5.3-7.0% in 2007-2011. For the period 2008-2012 agriculture of Zabaikal territory maintained positive dynamics of development despite the unfavorable weather conditions in 2010 and 2011. The volume of gross output (in comparable prices) in 2012, compared with 2007, increased by 22.7 %; with an increasing annual growth rate of 1.3% to 5.3 %. In 2012 in comparison with 2007 in all categories of farms production of livestock and poultry for slaughter increased by 20.0 %, milk - by 10.8 %, potatoes - by 30.4 %, vegetables and food melons - by 46.1 %, grain - by 26.7 %, and honey - 2.1 times as much; at the same time, egg production decreased by 27.2 %, wool - by 11.9 %.

Table 4. Economic characteristics of the areas and territories of Greater Tumen Region

Province	Primorsk territory	Khabarovsk territory	Zabaikal territory	Jewish Autonomous region	Amur region
Area, km ²	164 673	787 633	431 892	36 266	361900
Agricultural land, ha	1 648 500	236 300	7 653 600	170 000	2 372 100
Arable land, ha	751 400	88 600	558 600	124 000	929 300
Ag. production, billion Rubles	27.8	17.9	17.1	4.86	28.3
Crop production, billion Rubles	16.7	9.2	4.4	3.5	17.5
Animal production, billion Rubles	11.1	8.7	12.7	1.36	10.8
Populations, in 1000	1 938,5	1 339.9	1 090,.	170.4	811.3

Note. Data are given for various years 2012-2014

The livestock industry is the leading sector of agricultural production, the share of which in different years varies from 75% to 80%. Zabaikal territory is important in livestock farming in terms of the production volume in the Russian Federation. Meanwhile, the territory shows relatively low productivities in both agricultural and livestock farming sectors. By 2020 it is expected to increase the gross grain harvest by 32.7%, rapeseed - 4 times as much, potatoes and vegetables - by 7-9%, cattle meat breed - almost 2 times as much, meat of cattle and poultry for slaughter - by 14.5%, milk - by 15% and eggs - by 66%.

The volume of agricultural production in Amur region for the period 2008-2012 increased by 1,9 times. In 2012, agricultural production was manufactured in the amount to 28.3 billion rubles. In this case, the share of crop production in gross agricultural output on average over the five years constituted 63.2%, livestock –36.8%. Amur region is the largest producer of soybeans in Russia. In 2014, over 1 million tons of soybeans were produced in Amur region. In terms of the structure of agricultural production in Amur region during 2008-2012, the agricultural companies had the following structure: 41.6 % - agriculture organization, households - 45.9 %, farmers -12.6%. In general, for structure of production, there are dynamics of the increase in the share of agricultural enterprises (41.9% - in 2008 to 42.7% - in 2012) and farmer economy (11.5% - in 2008 and up to 13.1% in 2012). The average annual growth rate of agricultural output in the period up to 2020 is expected to be at least 2.4 - 2.5%, food production is 3.5 - 5%. In the gross regional product of Jewish Autonomous region the share of agriculture constitutes about 14%. On the rural territories 55.7 thousand people (31.9% of the total population of the region) live there, and 6.8 thousand people are employed in agricultural production. Such traditional industries as beef cattle and growing are typical for agriculture in this region. One hundred thousand tons of soybeans, about 30 thousand tons of grain, and 106 thousand tons of potatoes are produced on general crop acreage (112 hectares). The number of cattle is more than 14.5 thousand heads, including the cows – 6.4 thousand heads, and livestock beef cattle – 2.8 thousand heads. The number of pigs in the region is 20 thousand. Annual meat production of cattle and poultry in live weight is 5.3 thousand tons, milk production - 24.5 thousand tons (data for 2011). Production of agricultural products in all categories of farms by 2020 (in comparable terms) is expected to increase by 22.3% in comparison with 2012. The average annual growth of agricultural production over the eight-year period should be more than 2%. The growth in livestock production will result in the share of local meat production up to 45%, and local milk production up to 85.3% by 2020.

The increase in production of agriculture and food production was due to the implementation of the prior national project “Development of agro-industrial complex” and the regional target program “Development of agricultural production on Primorsky territory for 2008 - 2012”. In 2007 - 2011 average rate of annual growth of agricultural products were 6.7% and food products - 5.1% despite the unfavorable 2010. Compared to 2007, the gross grain harvest increased by 73%, the increase in the production of eggs reached 26.1%, meat of cattle and poultry in live weight - 24.3%, including pig meat – 26.3%, poultry meat – 42.6%.

The average annual growth rate of agricultural output in the period up to 2020 should be at least 5.8 - 6.2%, food production – 6.3 – 6.5%. Higher rates are expected in the groups of meat and meat products, milk and dairy products that will help satisfy the need for meat and meat products by 80.3%, and in milk - by 47.9%.

The measures under the state Program will double the production of meat of livestock and poultry for slaughter in 2020, compared to 2012 – by 56.5 thousand tons, milk - by 40.3 thousand tons. In 2011 compared to 2008 cultivated area of all crops on Khabarovsk territory decreased by 0.1 thousand hectares or 0.1% and amounted to 77.0 thousand hectares. Cultivated areas under cereals decreased by 5.3 thousand hectares or 39%. Cultivated areas under fodder crops increased by 0.7 thousand hectares or 23%. Cultivated areas of forage crops and potatoes increased by 0.7 and 0.4 thousand hectares respectively. In 2011 compared to 2008, categories of farms had both increases and decreases in production: soybeans - by 60.0% which amounted to 13.9 thousand tons, potatoes - by 3.8% (280.6 thousand tons); the production of field vegetables decreased from 69.0 to 61.3 thousand tons (11.2%), cereal - from 26.6 to 10.4 thousand tons (61.0%).

Milk production per cow in agricultural organizations of the region in 2011 reached 3 117 kg, which is 378 kg or 13.8% more than in 2008. In 2011 compared with 2008, milk production decreased by 1.4 thousand tons, or 2.7% due to the reduction of livestock. Milk production in the farms increased 2.2 times. In 2011, the production of meat (in live weight) increased by 17.4% compared to 2008, egg production decreased by 1.9%. Agricultural production in the region continues to function in the inadequate supply with means of mechanization, high degree of deterioration, and shortage of personnel with necessary qualifications.

Nevertheless as a result of implementation of the State program there will be ensured achievement of fixed values for major indicators: the index of production of agricultural products in farms of all categories (in comparable prices) will amount to 102.5%; the index of physical volume of investments into the fixed capital of agriculture will be 101.2%; the share of profitable agricultural companies in the total amount of agricultural organizations in the region will be 80%; the volume of production by 2020 will be: eggs (hen, quail) – 315.0 million pieces; meat in live weight – 69.7 thousand tons.

Production of livestock and poultry for slaughter (in live weight) by 2020 will increase in comparison with 2010 up to 69.7 thousand tons or by 45.7%, milk – up to 67.3 thousand tons. The main growth will be achieved through a growth in the productivity of livestock and poultry on the basis of the pedigree improvement. Average monthly salary in agricultural sector by 2020 will increase up to 30.0 thousand rubles or 2 times as much compared to 2012.

Thus, during the period 2000-2013 according to the dynamics of the indicators of agriculture of five Russian territories which enter Greater Tumen Region we can see positive trend of production of cereals, oilseeds, potatoes, vegetables, fruits and berries, the production of milk, livestock and poultry for slaughter. However, a weak tendency of reduction of a livestock of cattle and cows is observed. The development of agriculture on these territories is based on the policy of the government and regions. This policy is determined by the State program for development of agriculture for 2013-2020. The revival of agriculture of Far Eastern Federal district and the Zabaikalsk territory contributes to the increase in agricultural products exports to neighboring countries.

The main agricultural products are as follows: 1) cereals; 2) sunflower; 3) soybean; 4) potatoes 5) vegetables; 6) fruits and berries; 7) livestock and poultry for slaughter; 8) cattle; 9) milk; 10) sheep and goats; 11) pigs; 12) eggs. Among grain is wheat, corn, rice, buckwheat and others. Among oilseed crops, soybeans, which are produced in all areas except Zabaykalsk territory, occupies a special place. In addition, sunflower and rapeseed are grown. Among animal products the breeding of cattle, pigs, poultry, sheep, and goats should be underlined. Egg production is of great importance for the region. Statistic data for 10 years are presented in the appendix.

According to the data for the last 5 years, the rise of agricultural production was observed in every region. A particularly high intensity of development of agriculture is observed on Primorsk territory and Amur region.

2.2 POLICIES TOWARDS THE AGRICULTURAL SECTOR DEVELOPMENT

2.2.1 China

2.2.1.1 National policies related with the regional agricultural development

One Belt, One Road

On March 28, 2014, National Development and Reform Commission, Ministry of Foreign Affairs and Ministry of Commerce jointly issued *Vision and Proposed Actions Outlined on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road*, which has advocated China and countries along the Belt and Road should adhere to peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit. It has promoted practical cooperation in all fields and has worked to build a community shared interests, destiny and responsibility featuring mutual political trust, economic integration and cultural inclusiveness.

The Third Session of the Eighteenth Central Committee of the CPC

In November 2013, the Third Session of the Eighteenth Central Committee of the CPC put forward that in order to adapt to the new trend of economic globalization, China should promote domestic openness together with openness to the outside world, better integrate the “bring in” and “go out” strategies, stimulate the orderly and free flow of international and domestic factors of production, highly efficient allocation of resources and in-depth market integration, and foster new advantages in participating in and leading international economic cooperation and cooperation at a faster pace, in order to promote reform through opening up. China should also ease investment access, accelerate the construction of free trade zone and expand opening up.

Central Rural Work Conference in 2014

In December 2014, Central Rural Work Conference mapped out the agricultural modernization and deeply elaborated the national agricultural cooperation. China is one of the countries with the highest degree of agricultural openness in the world, and agriculture has been deeply involved into the international market, which has brought rare opportunities and favorable conditions as well as risks and challenges for it. In the process of international cooperation in agriculture, China should increase the introduction of the key foreign technology, management experience, seed resources and high-level scientific research personnel and other elements; regulate the scale and pace of import and export of the agricultural products to prevent the shock for domestic market and agricultural production; and promote the policy of “going out” in agriculture to cultivate a number of suppliers of food and agricultural enterprises with international competition.

No. 1 Central Document

According to No.1 Central Document in 2015, Opinions on Deepen Reform and Innovation to Accelerate the Agricultural Modernization, China should improve the ability of using international and domestic markets and two resources. China should strengthen regulation of import and export of agricultural products, actively support the exports of superior agricultural products and grasp the scale and pace of imports of agricultural products. The document also stressed that China will further promote social capital and business capital to invest into the agricultural sector through policies; and enhance support on modern agriculture in modern

breeding industry, agricultural processing and circulation, and agricultural social services through PPP mode and other innovative modes.

The Twelfth Five Year Plan of Modern Agriculture Development

National Modern Agriculture Development Plan (2011-2015) has pointed that China should improve quality and level of “bringing in” in agriculture. Through the bilateral, multilateral and regional cooperation mechanisms, China should strengthen exchanges and cooperation in agricultural science and technology, attract more investment and talents, and improve agricultural utilization of foreign capital. China should continuously make good use of foreign preferential loans and grants, and promote the introduction, digestion and absorption of advanced technology and equipment. China also should make full use of the platform for intergovernmental cooperation, so as to expand channels for agriculture “going out”.

The State Council’s Opinions on Supporting the Development of Leading Enterprises in Agricultural Industrialization

The document has pointed that China should develop the international market and improve the level of agricultural opening up. China should expand agricultural exports. China should actively guide and help enterprises to take advantage of the GSP and regional preferential trade policies, so as to enhance their competitiveness in agricultural exports. China should strengthen the construction of transformation and upgrade demonstration bases of foreign trade of agricultural products and expand the export of agricultural products. Under the premise of risk control, China should encourage the use of export credit insurance to provide risk guarantees for exports of agricultural products. China should improve the efficiency of customs clearance to provide convenience for agricultural exports. China should also support leading enterprises to apply for trademark registration and cultivate brands of export products.

Other policies related with the regional agricultural development

As the only one development plan that is allowed to open border areas approved by the Chinese government, China Tumen River regional cooperative development plan for -- taking Chang Ji Tu for the opening up and development pilot zone has put forward that China will build Chang Ji Tu, the opening up and development pilot zone, into an important open region in the border, an important gateway opened for Northeast Asia, an important platform for economic and technological cooperation in Northeast Asia and a new growth pole in Northeast China; and build it into the pilot zone and demonstration area of opening up and developing in the border. The plan has focused on eight construction projects: the international free trade zone in Tumen River region; the international land port zone in Chang Ji; the innovation zone of science and technology; the international, cooperative and industrial zone among the provinces; the modern logistics zone; the eco-tourism zone; the zone concentrated high-end service industries; and the modern agricultural demonstration zone.

For Jilin Province, through the implementation of the Planning of Increasing Production of Commodity Grain in Jilin Province, China will speed up the projects’ constructions including irrigated transformation, fertility of fertile soil, governance of black soil area, standard grain, seed cultivation and promotion, demonstration of agricultural mechanization, integration and popularization of production technology, prevention of grass rodent and pest, and utilization of water in air cloud to steadily improve the comprehensive grain production capacity in the region. China will implement crucial strategies to promote the all-round upgrade of products, quality and management in animal husbandry. China will promote the standardization of healthy aquatic breeding and develop specialized aquatic products. China will also carry out characteristic agriculture including business plans of gardening specialty, construction of plastic films vegetables, revitalization plan of ginseng industry, modern North medicine base and the forestry industry and other projects.

2.2.1.2 Provincial Policies

Hei Longjiang Province

As the “Modern integrated agriculture development plan of Hei Longjiang province(2011-2015)” has been released and developing export-oriented agriculture by sizing the rare opportunity which the construction of development and opening up in border regions is about to become national strategy, Hei Longjiang province implements the agricultural strategy of “go global” and “the programme of revitalizing foreign exchange-earning enterprises”, further promote the development and cooperation with Russian agriculture, support the development of top five advantages export base including fruits and vegetables, grains, rice, mountain area specialties, animal products so as to improve the trade level of agricultural product. In 2015, the agricultural development area towards Russia in Hei Longjiang province reaches 0.17 million hectares, an increase of 48.4% compared to 2010. The export base area of standard agricultural product is up to 0.17 million hectares, and the import and export trade volume of agriculture achieve US\$ 4 billion.

To further promote the transformation and upgrade in agricultural cooperation for Hei Longjiang province to Russia, the agricultural industry association for Hei Longjiang province to Russia was officially set up in 2012 by self-organized Chinese enterprises which have the events of agricultural production, development and cooperation within Russian territory, aiming to unite the resources of best quality with Russian agricultural industry, provide full service, help and improve the development of Russian agricultural industry, solidly and effectively play the role as a bridge in government-business relationship. In 2013, the association has owned management right for 0.35 million hectares of land, which contains nearly 0.17 million hectares of cultivated land where its member enterprises are mainly distributed in three administrative regions including far east federal region, Siberian federal district and Ural federal district, and established a long-term steady agricultural cooperation relationship with local governments. At the same time, the government of Russian federation formulated and released a new national plan for agricultural development (2013-2020). Russia plans to invest 50 billion rubles before 2016, build up 5 agro-industrial complexes in Primorsky Krai in the far east federal region, Khabarovsk Krai, Amur oblast, Sakhalin oblast and Jewish autonomous oblast, develop related industries like crop farming, animal husbandry, food processing and logistics, provide a significant platform for Sino-Russian cooperation so as to implement each other's advantages and achieve mutual benefits and win-win results for bilateral agriculture.

Liao Ning Province

In July, 2014, the official document, namely, the notification for Fifteen measures about promoting steady improvement of current economy in people's government of Liao Ning province, emphasizes on encouraging expanding foreign trade export, arranges special funds to encourage export enterprises to expand export, runs national or provincial foreign trade export base with pragmatic spirit, encourages the exports of large-sized complete sets of equipment and high-end equipment manufacturing industry, expands the exports of mechanical and electrical products, high-tech products and agricultural products, supports the export of products which yield intellectual property rights, brand, marketing network, high technology, high value-added and high efficiency. Moreover, it will hold transnational trade fair, invite overseas buyers, and fully subsidize the booth fee from the enterprises which participate in important overseas exhibitions.

In March, 2015, when carrying out “The CPC Central Committee and State Council on strengthening reform and innovation and speeding up agricultural modernization drive views”, Hei Longjiang provincial government gives its suggestion to propel the modern agricultural construction and speed up the transformation of agricultural development model, especially to expand the export of agricultural products. The government will make the plan for the development of agricultural import and export product, perfect the support system

of agricultural product's export policy, and enhance the import and export of some important agricultural products like grain and cotton as well as the tariff rate quota control.

Ji Lin Province

In 2015, the No. 1 document from Ji Lin provincial government put forward that build up the modern agricultural industrial system, establish a perfect agricultural cooperation mechanism to the outside, encourage agricultural enterprises to go outside to buy and take part in stocks from international agricultural products' processing and trade enterprises, support strong enterprises to construct production base, warehouse equipment, marketing network beyond the borders. The government will implement related framework agreements on national agricultural cooperation, push forward the construction of overseas agricultural bases which center on grain production. It will speed up the construction of overseas agricultural industrial park which is a collection of production, processing, storage and logistics, and support the overseas agricultural enterprises to carry back their agricultural products.

Meanwhile, there is a clear deploy for strengthening international agricultural exchange and cooperation in the government document called "The modern agriculture in Ji Lin province develop the 12th Five-Year Plan", which we need to bring public relations and landform advantages into full play. Regarding international market as the guide, the countries like Russia, Japan and Korea as the centers, superior green and featured agricultural products such as grains, meat and Changbai mountain series in Ji Lin province as the foundation, we will continue to increase the introduction of advanced applicable production and processing skills in agriculture, vigorously strengthen the construction of agricultural products export base, actively train and develop agricultural products export enterprise, exploit the overseas resources and promote the international trade for agricultural products in depth, and accelerate the process of agricultural internationalization in whole province.

2.2.2 Mongolia

2.2.2.1 National Policies for Agricultural Development

The overall agricultural policy objective, implemented through legislative decrees and laws, is to ensure national food security by providing "the entire nation with stable supplies of accessible, nutritious and safe food to create healthy livelihoods and high labor productivity". Furthermore, livestock production constitutes the largest agricultural sector and according to the 1992 Constitution, "Livestock is the national wealth of the country and subject to state protection". Support to agriculture is therefore embedded in national policy. Increasing agricultural competitiveness, improving the quality of food products, and environmental sustainability and natural resources management are all guiding principles of the current agricultural policy. The policy is intended to make government support to agriculture more rational.

The national policies of social and economic development, including agriculture sector are set out in many key documents as following:

- The MDG-based Comprehensive National Development Strategy of Mongolia (2008-2021)
- The Action Plan of the Government of Mongolia
- The State Policy on Food and Agriculture (2003-2015), which is being renewed and the new draft is pending for approval by the Mongolian Parliament
- The State Policy Toward Herders (2009)
- The "Third Campaign for Reclamation" National Program for development of Crop production (2008-2010)
- The National Program for Food Security (2009-2016) and
- The "Mongolian Livestock" National Program (2010-2021) amongst others.

The MDG-based Comprehensive National Development Strategy of Mongolia defines the goals and strategic objectives of food, agriculture, regional and rural development and environmental policies that would be implemented through various targeted activities in two phases (Phase I: 2008-2015 and Phase II: 2016-2021). The overall policy priorities are identified in this document as:

1. Agriculture and food industry shall be developed into a modern agricultural and industrial complex through raising their capacity to compete at the market, strengthening their ability to meet risks; the basic needs of the population in terms of flour, meat, milk, potato and other vegetables will be met fully by domestic production, and measures will be taken to ensure their sufficient supply, improved quality and health security;
2. A regional development policy shall be implemented continuously and the development gap between urban and rural areas will be significantly reduced;

The overall objective of the MNLP is to modernize the country's livestock sector so that it is adaptable to the changing climatic and social conditions and create an environment where the sector is economically viable and competitive in the market economy. The MNLP will be implemented in 2 phases from 2010 to 2021. With a financial target of allocating no less than 3% of annual state budget, this program seeks to develop a livestock sector that is economically viable, competitive in a market economy, and adaptable to impacts of climate change. The intention is to ensure a safe and healthy supply of food to the population, to deliver quality raw materials to processing industries, and to increase export revenues. In this context, the following priority areas have been outlined:

- Drawing special attention from the State to the livestock sector as the main traditional economic activity of the country, to assist in the formulation of a favorable legal, economic and institutional environment for sustainable development, and to develop a good governance in the livestock sector;
- Improving animal breeding services based on social need/demand, increasing the productivity and production of high quality, bio-clean livestock products and raw materials and increasing market competitiveness;
- Raising the veterinary service standard to international levels and protecting public health through securing Mongolian livestock health;
- Developing livestock production that is adaptable to climatic, environmental, and ecological changes with strengthened risk management capacity; and
- Developing targeted markets for livestock and livestock products; establishing proper processing and marketing structures and accelerate economic turnover through an incentive system.

An implementation period of the State Policy on Food and Agriculture, which was approved in 2003 is coming to an end in 2015, the MFA is drafting a new policy on Food and Agriculture (2015-2015), which is expected to submit to the Government's approval near future. The concept of the new policy is based on securing food safety of population, promoting and protecting investment and adapting new techniques and technologies in the agriculture sector, developing and strengthening human capacity and opportunity, improving production competitiveness and productivity, creating and developing value chain, promoting quality based government supports and subsidies, identifying the best government interventions, providing private and public partnership and developing knowledge based economy.

Also, draft policy has developed accurately specified objectives and the state supports as compared to the previous sector policies. It has specified to bring food and agriculture's share to 20% as a percentage of GDP by 2025, crop rotation area to 1050 thousand hectares (769 thousand ha in 2014), and cattle share in total herd to 20% (6.7% in 2014) and meat slaughter weight to 460 thousand tons (294 thousand tons in 2014). One of the major policy directions is to increase food and agriculture sector's contribution for export.

2.2.2.2 Regional Development Policy

Although Mongolia has a vast territory, it has a sparse and scattered population and engages a nomadic cattle breeding in rural areas except nearby urban settlements. Considering this situation, the Mongolian government approved Regional Policy Development Concept in 2001 deciding that reducing economic and social imbalances between the areas is a vital prerequisite for Mongolia to move on to a path of sustainable development of 21st century. Mission of the Regional Policy Development Concept is to reduce population and production concentration, currently occurring, through rational use of land and its resources, livestock and agricultural raw materials reserves and intellectual capacity according to environmental carrying capacity, bring a development level closer by reducing urban and rural development gaps, provincial and regional disparities and imbalances, create a favorable environment, internal and external, to accelerate national economic and social progress.

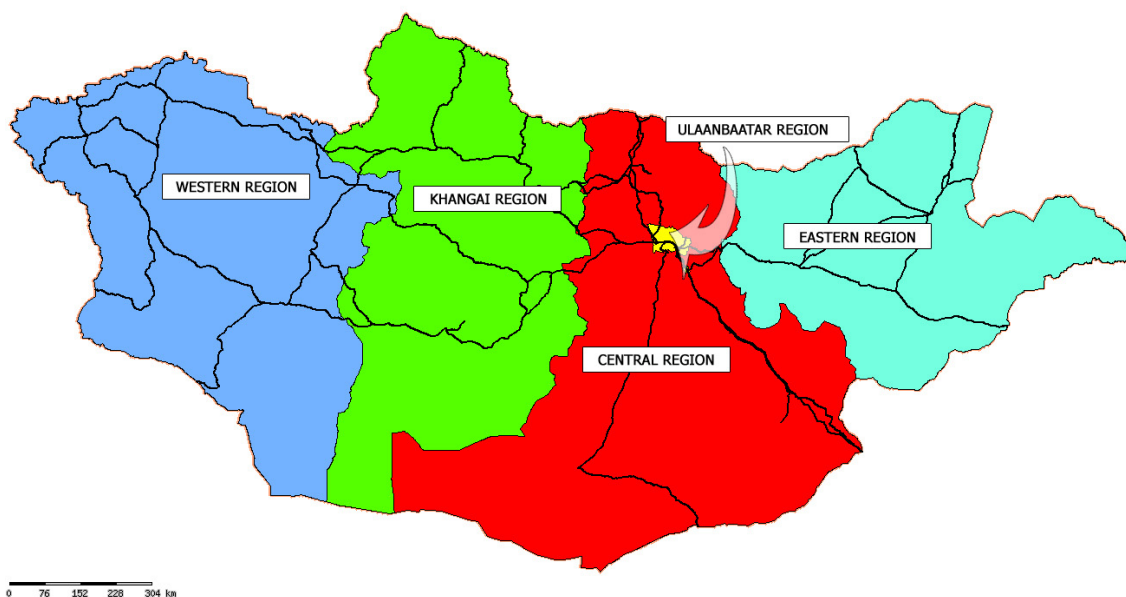


Figure 5. Mongolia's Regional Economic Zones

As a way to implement the main directions of the Regional Development, it has identified 4 economic zones, Western, Khangain, Central and Eastern and pointed out to develop Ulaanbaatar city as an independent zone. The zones have fallen into the following provinces

- Western zone: Bayan-Olgii, Gobi-Altai, Zavkhan, Uvs, Khovd;
- Khangain zone: Arkhangai, Bayankhongor, Bulgan, Orkhon, Övörkhangai, Hövsgöl;
- Central zone: Gobi-Sumber, Darkhan-Uul, Dornogobi, Dundgobi, Omnogobi, Selenge, Töv;
- Eastern zone: Dornod, Sükhbaatar, Khentii;
- **in Ulaanbaatar's zone:** the territories of the Capital city and its districts, and the settlements around the capital city.

In view of environmental and raw materials resources and human potential, the zones are stated to be supported in conducting agricultural activities in the following ways: the Western zone for pastoral cattle breeding, irrigated crop farming, and small and medium sized processing plants; the Khangain zone for pastoral cattle breeding, crop farming, tourism; the Central zone for pastoral and intensive cattle breeding, crop farming, processing plants; the Eastern zone for intensive crop farming, cattle breeding, small and medium sized enterprises, tourism etc.

Connect the Mongolian territory, **in the eastern zone**, with Asian roads and rail networks in the directions of Choibalsan-Ereentsav and Choibalsan-Sumber-Rashaant and furthermore, actively engage in the implementation of the Northeast Asia Cooperation program “Tumen Gol” and open a gateway to communicate with the Asia and Pacific countries; **in the central zone**, with Asian road and international rail networks in the direction Altanbulag-Sukhbaatar-Ulaanbaatar-Sainshand-Zamin Uud and turn it into a main hub for cross-country trade and transport relations via Asia and Europe; **in the western zone**, implement step by step objectives to connect with the Russian Federation and PRC trade and economic network in the directions of White Lake, Handgait, Artssuuri, Bulgan and Burgastai and further explore possibilities to connect the main horizontal axis of the country with the countries of Middle Asia and Middle East; **in the Khangain zone**, implement step by step objectives to connect with the Russian Federation and PRC trade and economic network in the directions Baga-Ilenh, Hanh, Teshig and Shivee huren.

The policy regards, at first, to establish free trade and customs zones at “Altanbulag” (Selenge province) and “Tsagaannuur” (Bayan-Olgii province), adjoining border points with the Russian Federation and “Zamiin Uud” (Dornogovi province), an adjoining border point with the PRC and according to an international standard, create business environment for cooperation, which would be mutually beneficial for traders and investors, both domestic and foreign, and after gathering adequate experience, to expand construction of special /free/ zones of proper types and directions deep inside the territory of Mongolia. Also, the policy has set out an objective of laying a total of 10,000 km of paved road, the Millennium Road, along the horizontal and vertical axes of Mongolia.

With the purpose of implementing the objectives of establishing free zones at the border crossings specified in the Regional Development Policy, real investments and financial sources are being identified starting 2007 and the Law on a Free Zone was revised and approved by the Parliament in February, 2015. According to the revised Law on Free Zones, previously effective special statuses such as tourism, trade have been changed and instead, under the same status of free zone it has enabled to conduct activities tailored to mainland features.

According to this law, in any of the free trade zones, investors are going to have favorable conditions for running the business they are interested in. Some of the rebates that will be provided to the enterprises that are going to run a business in the free trade zones are:

- a. no quantitative restrictions will be imposed on hiring of foreign workers and specialists
- b. the entities and individuals in a free zone employed foreign workers and engaged in a work and service with an income are fully exempt from work place payments
- c. the legal entities in a free trade zone that have implemented projects and programs for training and retraining of their workers, the cost will be deducted from a taxable income of the year.

Thus, after making new changes in a legal framework and successfully working on infrastructure development of free trade zones, the Zamiin-Uud Free zone has been opened for investors and is expected to start from June 2015. Detailed information is given in the Cross border agricultural cooperation section.

2.2.2.3 Land tenure legislation

The land of Mongolia is strongly connected to the Mongolian way of life and culture and the land is traditionally considers as the “The Roots of the State”. Until 1992, when Mongolia started its transition to the free market economy, land could not be privately owned by citizens. Therefore it was collectively and freely used by everyone. In 1992 the Mongolian Democratic Constitution was enacted. This new Constitution provided the conditions allowing the transfer of state-owned land to citizens of Mongolia for private ownership. The Mongolian Land Law is regulated by several legislative and government acts such as: The Land Law: In 1994 the first Land Law was enacted. It was revised on 7th June, 2002, effective on 1st January, 2003. The new

Land Law maintains many of the 1994 law's provisions; The Law on Allocation of Land to Mongolian Citizens for Ownership was enacted by Parliament, on 27th June 2002.

Land users and land possessors must pay land fees. Land fees are established pursuant to the Law on Land Fees. Herders are exempt from paying fees for pastureland and hay fields. Regarding agricultural land, possessors of the land have a preferential right to buy this specific land for agricultural purposes. Without any possession right on agricultural land, citizens can, however, buy agricultural land via auction. Land owners have the full rights to their land, but are strongly prohibited from transferring land to foreign citizens or stateless persons pursuant to law. Privatized and nationally owned lands in Mongolia are defined by different baskets of rights and tenure structures.

One of the most important omissions in the current Land Law is provision for long term user rights for pastureland that is central to the issue of protection and sustainability. Their definition is necessary because land user rights define the control, organization, access, and permissible utilization of pastureland by individuals or groups of individuals.

2.2.3 Korea

2.2.3.1 National Policies for Agricultural Development

Korean government established policies for agricultural development, consisting of competitiveness, efficiency, safe and stable supply of food, welfare in rural area, and income increase. The measures for strengthening competitiveness include incorporation of advanced technologies with traditional agriculture, conversion of agriculture into so called a 6th industry, which is a combined concept including traditional agriculture, agricultural product processing, and sales of the products in rural area. Research and development for agriculture are also included in the measures for the future.

Currently, Korea launched FTA (Free Trade Agreement) with 11 counterparts which include Chile, Singapore, EFTA(European Free Trade Association : Swiss, Norway, Island, Liechtenstein), ASEAN, India, EU, Peru, the United States, Turkey, Australia, Canada. The FTAs had Korean agriculture face more competition with those countries. In order to provide more competitiveness, the government assists farms through providing technologies for reducing production costs, compensating economic losses by natural disasters, and various direct payment schemes. Nurturing elite workforces in agricultural production areas is also a good measure to strengthen the competitiveness of Korean agriculture in the long run.

As described in the current status of Korean agriculture, Korea has a very low self-sufficiency of food grains. Therefore, stable supply of food has been one of the most important issues in agricultural sector. The measures for improving self-sufficiency include international cooperation and encouragement of agricultural development by private companies in foreign countries. Recognizing the importance of international cooperation in securing food supply in Korea, "Overseas Agricultural Development and Cooperation Act (OADC Act)" was established and enforced in 2012.

National policies on overseas agricultural development was improved and better defined after the sudden rise of world grain prices in 2008. A ten year national plan for overseas agricultural development was prepared then. The plan is aiming for securing oversea supply chains to meet 10% of major grain consumption. The other main objectives of the plan include facilitation of international cooperation of agriculture and related fields and mutual benefits with partner countries through the cooperation. After OADC act was enacted, a master plan of overseas agricultural development was also prepared based on the national plan. The master plan was prepared through complementing previous national plan and describes more specific strategic

plans to secure food supply from abroad. The plan contains five major tasks based on the recognition of the vulnerability of food security and unstable world grain prices. OECD-FAO is predicting that food supply will be more fluctuating due to climate changes and shortage of water resources and increase rate of food supply will be smaller than that of demand. In addition, Korea is importing over 90% of corn, wheat, and soy bean as the sixth largest importer as well as over 80% of the grain import is dependent on a few countries such as the United States and Australia. About 50% of the import is supplied by the 4 major grain companies.

Table 5. Master Plan for Overseas Agricultural Development and Cooperation(2012~2021)

Major Tasks	Descriptions
Diversify the region of overseas agricultural development and cooperation	Current OADC projects are located mostly in north east and south east Asia. The region is to be diversified to eastern Europe and American continent. Eastern Europe countries have a good potential for producing wheat while south American countries for corns and soy beans.
Facilitating grain import through the overseas projects	In order to ship particularly grains as a result of OADC for domestic consumption, various supports are available to the enterprises. Financial programs to distribution business and support for developing improved variety of crops.
Nurturing enterprises	Financial assistances are extended to the project for producing energy crop, silage, sugar cane, coffee, and oil plants. Agriculture related enterprises are also encouraged to participate in the OADC programs. Training programs are arranged for developing human resources who work in OADC projects. Official programs will be incorporated with private projects, particularly agricultural ODA programs.
Systematic assistance for overseas programs	A number of companies which are currently carrying out OADC projects are expressing difficulties of accessing information in local area of the investing countries, such as natural resources availability, legal and regulation systems, and investment environment. Government will support collecting and providing information that are required for the companies to start and continue their projects.
International cooperation for world food security	Securing food supply is not only a domestic issue but also a world agenda. OADC programs should be able to contribute solving poverty and starvation in developing countries. Communication dialogues and cooperation with international organizations such as FAO and APEC will continue.

2.2.3.2 Legislation for International Cooperation in Agriculture

The main purpose of “Overseas Agricultural Development and Cooperation Act (OADC Act)” is to contribute both national economy and international community through agricultural cooperation. The act describes not only the international cooperation for securing national food supply, but also official development assistance projects in agricultural sectors. In order to promote overseas agricultural development projects, the act allows various supports such as subsidizations, financing, tax reduction, etc. Subsidies are available from the government for the expenses for the overseas agricultural development, such as surveying, technical development and training, technical exchanges and cooperation with foreign countries, and so forth. In addition, the government can arrange financing for surveying and business permit acquisition, for construction and operation of facilities, leasing or purchasing land for overseas agricultural development.

2.2.3.3 Policies for Agricultural Development in Korean GTR

In Gangwon province, policies for agricultural development are focusing on increasing farm incomes, providing more vitality in rural area, and wellbeing of farmers. The measures for the policies include improvement of infrastructures such as irrigation and drainage facilities, helping reducing costs of agricultural production,

supporting competitive farm management, promoting rural tourism, and so forth. Gangwon province allocated 566 billion KRW including provincial budget of about 56 billion KRW in order to realize the measures. Gyeongsangbuk province is facing several problems in agriculture. They include continuing decrease in rural population, reductions in farm land area, low incomes of farmers, and so forth. The province proposed the policy for overcoming the situations, through the following

- Preparation of capital for assisting agricultural development, about 300 billion KRW by 2030
- Development of human resource for young farm entrepreneurs
- Supporting 5 major agricultural industries : rice, food, seeds, insects and horse
- Supporting exports of agricultural products through constructing horticultural complexes

2.2.4 Russia

2.2.4.1 National Policies for Agricultural Development

The main document that combines a number of programs related to the development of agriculture in the country is the “STATE PROGRAM of development of agriculture and regulation of markets of agricultural products, raw materials and food for 2013 - 2020 years” with the changes in 2014.

It consists of sub-programs:

- 1 “Development of sub-sectors of crop production, processing and marketing of crop production”;
- 2 “Development of sub-sector of livestock production, processing and marketing of livestock products”;
- 3 “Development of meat cattle breeding”;
- 4 “Support of small businesses”;
- 5 “Technical and technological modernization and innovative development”;
- 6 “Implementation of the State program of development of agriculture and regulation of markets of agricultural products, raw materials and food for 2013 - 2020 years”

Federal target programs:

- “Social development of village until 2013”;
- “Conservation and restoration of soil fertility of agricultural lands and agricultural landscapes as the national heritage of Russia for 2006-2010 and for the period till 2013”;
- “Sustainable development of rural areas for 2014-2017 and for the period till 2020”;
- “Development of reclamation of agricultural lands of Russia in 2014 - 2020”;
- 7 “Development of vegetable cultivation in open and protected soil and seed potato”;
- 8 “Development of dairy cattle breeding”;
- 9 “Support for breeding and seed production”;
- 10 “Development of wholesale distribution centers and infrastructure of the system of social food”;
- 11 Development of financial and credit system of agro-industrial complex”

The program includes the following priorities:

1. Development of import-substituting sub-sectors of agriculture, including vegetable and fruit;
2. Ecological safety of agricultural products and food; *increasing exports of agricultural products, raw materials and food as saturation of the domestic market*;
3. Minimizing of logistics costs and optimization of other factors that determine the competitiveness of the products based on rational allocation and specialization of agricultural production and food industry in different zones and regions of the country in the framework of accession to the world trade organization;

4. In the sphere of production - cattle breeding (milk and meat), as a strategic sub-sector which use competitive advantages of the country, primarily the presence of significant areas of agricultural lands;
5. In the economic sphere – the increase of incomes of agricultural producers; in the social sphere – sustainable development of rural areas as an indispensable condition of preservation of labor and territorial integrity of the country, creation of the conditions for the economical and physical availability of food on the basis of rational norms of food consumption for vulnerable population;
6. In the development of productive capacities - land reclamation for agricultural purposes, introduction of unused arable land and other categories of agricultural land;
7. In the institutional sphere - development of integration relations in the agro-industrial complex and formation of product sub-complexes, as well as regional clusters;
8. In academic and personnel areas – ensuring of the development of innovative agro-industrial complex;
9. Implementation of anti-epizootic measures in respect of infectious animal diseases; support of the development of infrastructure in the agricultural market;
10. Ensuring of marketing of agricultural products, improve its marketability by creating conditions for seasonal storage and part-time work;
11. Improving the efficiency in regulation of markets of agricultural products, raw materials and food; modernization of material and technical as well as technological base of breeding and seed production;
12. Support of small businesses; ensuring of effective functioning of public authorities in the sphere of development of agriculture and regulation of markets of agricultural products, raw materials and food;
13. Increasing of the level of profitability in agriculture to ensure its sustainable development;
14. Maintaining of the financial sustainability of agro-industrial complex; improving of the quality of life of rural population;
15. Stimulation of innovative activity and innovative development of agro-industrial complex;
16. Biotechnology development; creating of conditions for effective use of agricultural lands; development of land reclamation for agricultural purposes;
17. Environmentally regulated use of land, water and other renewable natural resources in agricultural production and improvement of soil fertility to the optimal level in each specific zone.

Expected results of the Program:

Increase in the proportion of Russian food products in the general resources of food products (with consideration of the structures of turning stocks) by 2020: grain – up to 99.7%; sugar beet – up to 93.2%; vegetable oil - up to 87.7%; potatoes - up to 98.7%; meat and meat products - up to 91.5%; milk and dairy products - up to 90.2%; an increase in the production of agricultural output in farms of all categories (in comparable prices) in 2020 compared to 2012 by 24.8%, food products – by 32.5%; providing an annual average growth rate of investment in fixed capital of agriculture in the amount of 3.1%; the increase in the average level of profitability of agricultural organizations at least to 10-15% (including subsidies); bring the ratio of wages in agriculture and the average for the economy up to 55%; bringing the specific weight of expenses for the purchase of energy in the cost structure for primary production up to 9.4%; the increase of potatoes production in the agricultural companies, farms including individual entrepreneurs up to 6 million tons, vegetables – up to 5.2 million tons, greenhouse vegetables - up to 1.4 million tons; increase in the capacity of modern potato and vegetable storages - 3.5 million tons; providing of agricultural producers with seeds of major crops, including corn, sunflower, sugar beet, potatoes, vegetables, and melons produced in Russia in the amount of no less than 75%; reducing the share of imported breeding material; the introduction of new capacity of simultaneous storage wholesale distribution centers up to 4716 thousand tons; the increase in the vineyard area - 140 thousand hectares;

increase in the capacity of modern storage of fruit - 812.1 thousand tons for simultaneous storage.

2.2.4.2 Regional Preferences

State program of development of agriculture for 2013-2020 has replaced the State program of development of agriculture for 2008-2012.

By analogy with the Federal program “STATE PROGRAM of development of agriculture and regulation of markets of agricultural products, raw materials and food for 2013 - 2020” there were developed regional programs specific to the economic development of the region. These programs include:

1. “Development of agriculture and regulation of markets of agricultural products, raw materials and food on Zabaikal territory for the period 2014 - 2020”;
2. “Development of agriculture and regulation of markets of agricultural products, raw materials and food. Raising the standard of life for the rural population of Primorsk territory for 2013 - 2020”;
3. “Development of agriculture and regulation of markets of agricultural products, raw materials and food on Khabarovsk territory for 2013 - 2020”;
4. “Development of agriculture and regulation of markets of agricultural products, raw materials and food of Amur region for 2014 - 2020”;
5. “Development of agriculture and regulation of markets of agricultural products, raw materials and food in Jewish Autonomous region for 2013-2020”.

Federal program is linked to regional programs. They have the same structure. In addition, the Federal program includes expected results by regions, budget allocations and separate sub-programs. In particular the Federal program provides the indexes of improvement of production compared to the previous year, which suggests annual increase by 2.1 - 5.8%. Meanwhile, the regional figures for Far Eastern Federal district correspond to 3.6-4.0%. Especially high rates are rates of production increase on Primorsk territory – 5.5-7.3%. In other words, there are no significant differences between the federal and regional planning.

2.3 CURRENT CROSS-BORDER COOPERATION AND FUTURE AREA FOR COLLABORATION

2.3.1 China

2.3.1.1 China-Russia cross-border cooperation

Based on the principles of mutual benefit and common development, China and Russia actively extend cooperation in agricultural fields. Until now, there is fruitful rewarding, which transform cooperation from purely border trade and labor export to the industries like exploiting overseas agricultural resources and deep processing for green food.

Multilateral and bilateral agricultural cooperation mechanism

As Ministry of Agriculture in China and Russia extend cooperation under a number of multilateral and bilateral agricultural cooperation mechanisms, China’s Ministry of Agriculture and the Russian Federation Ministry of Agriculture established agricultural cooperation mechanism under the multilateral mechanisms such as BRICs, APEC, SCO, CICA and the regular meeting between Chinese and Russian prime Ministers, implemented the cooperation agreements in agricultural field reached by leaders on both sides, promoted multilateral and bilateral agricultural cooperation. During the period of multilateral meetings such as the 2nd and 3rd meeting of BRICs Ministers of Agriculture in 2011 and 2013 as well as the 2nd and 4th APEC Ministerial Meeting on

Food Security, both Ministries of Agriculture in China and Russia held bilateral meeting, and reached a couple of consensuses on strengthening bilateral agricultural cooperation.

Trade cooperation on agricultural products

Sino-Russian agricultural trade developed rapidly, increased from US\$ 0.618 billion in 2000 to US\$ 3.89 billion in 2014, an annually surge of 16.01%. Since 2010, Chinese export volume is greater than import volume in terms of agricultural products to Russia, whose trade deficit turned to trade surplus.

Russia has become China's important trade partner. In 2013, Russia became Chinese 15th trade partner for agricultural products, ranking 8th in exporting countries on agricultural products and 14th in importing countries for China. In 2013, the total trade volume of Sino-Russian agricultural products reached US\$ 3.702 billion, accounting for 2% of Chinese trade volume on agricultural products. Product structure of bilateral agricultural product trade tended to centralize. In 2013, the main products for China exporting to Russia contain aquatic products, fruits and vegetables, accounting for 31.47%, 21.98% and 21.31% separately, and the main importing aquatic products from Russia, accounting for 95%. According to the statistics from the Russian Federation Ministry of Commerce, China has become one of the major importing countries in terms of aquatic products. Nearly 80% of importing aquatic product in China is frozen fish, however, the frozen fish which Russia exports to China takes up 50% in the import volume of Chinese aquatic products, which shows that Chinese aquatic products basically rely on the raw materials from Russia.

Labor Service Cooperation

Since 1980s China and Russia gradually opened border ports, therefore China began to develop small-scale agriculture in Russia's Primorsky Krai so as to spur the labor export to Russian agriculture. Since then, about 20,000 Chinese farmers have gone to Russia to engage in agricultural production, which mainly distribute in the Russian Far East.

Since entering the new century, labor service cooperation between China and Russia have some development, but some problems like low level, small scale and fluctuation still exist. According to the statistics from China's Ministry of Commerce, in the first half year of 2010, a total number of 66,000 contract workers with foreign nationalities work in the Russian Far East, including 43% of Chinese Citizen where most of them engaged in labor service in agricultural production. Heilongjiang province is the major province which exports labor service to Russia. As cross-border agricultural cooperation is developing, in the year of 2012, the number of accumulated labor output reached over 150,000, and the overall revenue exceeded 2 billion RMB, mainly focusing on Russian Far East and Siberia. In general, there still exists a great distance in the cooperation scale of Sino-Russian agricultural labor service as well as the development of relationship between two countries, and the agricultural labor output for China to Russia still have some problems like overly focusing on several fields, small proportion of scientific and technical researchers, lower overall quality.

Agricultural science and technology cooperation

At present, the agricultural cooperation between China and Russia has stepped into brand new stage which develops modern agriculture and high technology. Two countries have exchanges and cooperation in fields such as agricultural technical training, expert exchanges, exchange of germplasm resource, animal husbandry production, animal epidemic disease prevention and control, agricultural machinery, quality safety of agricultural products and ecological agriculture. Academy of Agriculture in China and Russia have signed up a couple of science and technology cooperation agreements, extended cooperation in fields including protection and compensation in steppe ecology, crop breeding and cultivation, research and utilization of plant genetic

resources, crop pest control and animal husbandry and veterinary medicine, and exchange visits and academic exchanges on both sides are frequent.

At the beginning of 2014, Chinese Academy of Agricultural Science established cooperative relationship with Saint Petersburg State University in Russia, and both sides signed up “Memorandum of Understanding”. Chinese Association of Agricultural Science Societies signed up the document with regard to the exchanges and cooperation of agricultural science and technology with Russian Agricultural Science. The flower garden farm of Suzhou agricultural school and Flower Proving Ground of G Meelia Jeff Agricultural College reached a preliminary consensus on developing flower industry by utilizing green house, land, energy, labor from Russia and germplasm resources, technologies and fund from China, and a preliminary agreement on exchanging excellent crop germplasm was signed.

Hei Longjiang province made headway in the cooperation with Russian agricultural technology, and learned some advanced technologies from Russia, such as micronutrients fertilizer produced in Russia and new achievements for chemical control which include biological surface activator and crossbreeding swine “Michurin”. At the same time, Russia also learned advanced technologies such as corps planting like cucumber, tomato, and watermelon from China. In 2009, Agricultural High-tech Cooperation Park between China and Russia in Hei Longjiang province got the formal approval, investing 700 million RMB, with 2 square kilometers of core area and 50 square kilometers of radiation area. Four national experimental stations, which contain beekeeping, fruit tree, rice and edible mushroom, were built by 2011, hiring ten-plus agricultural experts from Russia. As a result, technical content of agricultural cooperation on both sides further increased.

Cooperation on fishery

The governments of China and Russia have successively signed *The Fishery Cooperation Agreement* (1988), *Protocol on the Collaboration in Fishery Resources Protection and Adjustment and Proliferation in the Boundary Waters of Heilongjiang River and Ussuri River* (1994), and *The Cooperation Agreement on Preventing, Stopping and Eliminating Illegal, Unreported and Unregulated Fishing of Marine Living Resources* (2012). In 1988, China and former Soviet Union signed the fishery cooperation agreement and established the Mixed Committee on Fishery Cooperation of the two nations. Up to now, both sides have already held 23 committee meetings. Sino-Russian cooperation on fishery includes 3 main fields, including fishery resources management of boundary waters, marine fishing and crackdown on illegal trade of aquatic products. Under the framework of Sino-Russian Mixed Committee on Fishery Cooperation, the two countries have cooperated on fishery resources conservation and marine fishing in the two rivers by holding regular fishery administration and expert meetings, conduct regular joint inspections on boundary waters, and exchange delegations to participate in and observe activities of the other country like propagation and releasing fishes. At present, fishery resources in the boundary waters of the two rivers have been conserved; fishery events involving foreign nationals have declined; fishery order has been obviously improved; and boundary fishery is enjoying a stable development.

Cooperation on agricultural investment

By the end of 2013, China has directly invested 77 agricultural enterprises in Russia, mainly including enterprises in planting industry (60), farming, forestry, animal husbandry and fishery service (8), and animal husbandry (7). By the end of 2013, in the agricultural enterprises that China started in Russia, there are as many as 3,645 staff of the host country on duty.

In 2013, China’s investment flow to Russia is 152 million U.S. dollars, accounting for 63.6% of that to Europe. The investment to Russia is mainly on planting industry (103 million dollars) and forestry (41.34 million dollars).

By the end of 2013, China’s investment stock to Russia is 440 million dollars, accounting for 77.8% of that

to Europe. The investment is mainly on planting industry (262 million dollars) and forestry (91.80 million dollars).

In 2013, China mainly planted grain and commercial crops in Russia, harvesting 158 tons rice, 225 tons corn, 590 tons soybeans, and 31 tons other oil plants.

China's agricultural development in Russia has three forms, namely, leasing land, purchasing land and cooperative production. In addition, China strives to develop green, pollution-free and organic fruits and vegetables. By improving agricultural production standard, establishing and perfecting overseas sales market of agricultural products, China has enriched local supply of agricultural products, making contributions for the agricultural cooperation and relationship of the two countries.

2.3.1.2 China-Korea cross-border cooperation

Exchanges and cooperation on agricultural science and technology

China and South Korea have carried out good exchanges and cooperation in fields like crop variety selection, plant protection, livestock-raising, gardening and agricultural environment. At present, the two sides have conducted 60-plus research projects. There are over 400 experts visiting each other for exchanges, and the two sides exchange views on the co-building laboratory.

Trade cooperation on agricultural products

In 2014, the trade value of Sino-Korea was 5.63 billion dollars with a year-on-year growth of 10.2%, of which China exported to Korea 4.87 billion dollars with a year-on-year growth of 10.9%, and imported from Korea 0.76 billion dollars with a year-on-year growth of 5.6%. China mainly exported aquatic products and vegetables while imported aquatic products and sugar. Since 2008, China has been actively organizing its enterprises to take part in the Seoul International Food Industry Exhibition in Korea. In 2014, there were totally over 50 domestic enterprises joining the exhibition, signing 57 contracts of intention with 11.50 million dollars. They made deals mainly on quick-frozen vegetables, meat products, minor grain crops, edible mushrooms, bee products, chestnuts and tea.

Exchanges and cooperation in the field of veterinarian

The competent departments on veterinarian of the two countries have established good cooperative relationship. Both sides make notification for information of serious animal diseases like bird flu and foot-and-mouth disease to one another in time, and exchanges on some policy problems such as disease prevention and control.

The cooperation under the framework of "China-Japan-South Korea" mechanism

The first session of the conference involving the secretaries of agriculture in China, Japan and South Korea was held in South Korea in April, 2012. The second session plans to be held in Japan at the end of 2015. Under the framework of the above mechanism, the three countries have carried out activities of animal disease prevention and control and exchanges of researchers, including Seminar on East Asian Foot-and-mouth Disease Prevention and Control, Research Forum on Northeast Asian Agriculture Policy, Seminar on China-Japan-South Korea Crop Science, China-Japan-South Korea Heads Meeting of Scientific Research Institution on Aquatic Products and Large Jellyfish Seminar and so on.

Sino-Korea agricultural cooperation model

In Sino-Korea agricultural cooperation, the Korean side provides cooperation fund and agricultural technology, and China provides the products and land resources that Korea needs, which is the so-called model of “import-development” agricultural products. Firstly, China is a large agricultural country. Increasing agricultural production and grain yield is a long-term task for its national economic development, but insufficient agricultural input has already restricted the grain yield. Thus under strained national finances, attracting foreign capital is the correct choice to develop agriculture. Secondly, South Korea has relative few land resources, whose agricultural products heavily depend on import; agricultural products supply boasts instability to some extent; and there are some existing risks in food security. Therefore, building agricultural products bases in Northeast China that is near South Korea with rich resources for agricultural production is of strategic importance for economic development and social stability. By the means of direct or indirect investment, Korean enterprises work with Northeast China on the overall development of agriculture and the products are then exported back to Korea, which not only solves Korea’s domestic grain supply problems, but also promotes Chinese structural adjustment of agriculture and industrial upgrading.

2.3.1.3 China-Mongolia cross-border cooperation

Bilateral agricultural cooperative mechanism

In May 2002, Ministry of Agriculture in China and Mongolia signed MOU of Agricultural Cooperation, which specifies the two parties’ cooperation in fields like planting, livestock-raising, animal hygiene and agricultural processing and decides that the two countries take turns to hold working group meetings on agricultural cooperation every two years. This mechanism plays a positive role for the two parties to discuss and confirm agricultural exchange and cooperation plan, and to promote pragmatic cooperation. At present, they have held 6 working group meetings accordingly. The seventh meeting will be held in Mongolia in 2016.

Trade cooperation of agricultural products

In 2014, the total volume of trade between China and Mongolia was 227 million dollars with a year-on-year growth of 8.6%, of which China exported to Mongolia 95.9264 million dollars with a year-on-year growth of 4.03%, and imported from Mongolia 131.2214 million dollars with a year-on-year growth of 12.7%. China mainly exported grain, vegetables and fruits while imported animal by-products (cashmere).

Cooperation in animal epidemic disease prevention and control

In November 2011, veterinarian departments of the two countries signed *MOU of Sino-Mongolia Cooperation on Animal Hygiene*. Under the framework of the MOU, the two parties agree to establish the direct dialog mechanism among Sino-Mongolian management organizations of national and provincial level; set up places to share animal hygiene information by assigning contacts in both national and provincial level, notify each other animal hygiene information and so on; list foot-and-mouth disease and bird flu as key animal diseases of bilateral joint prevention and control and carry out related work in the border provinces of the two countries firstly.

Cooperation of Agricultural Technology

In recent years, remarkable achievements have been made in agricultural technology cooperation between China and Mongolia. Third-party organizations, like international organization, regional organization and bilateral cooperation organization, have established higher-level and wider-range platforms for agricultural technology cooperation between China and Mongolia. The South-South cooperation project in the framework of “Special Programme for Food Security” conducted by China, Mongolia and Food and Agriculture Organization (FAO) performed especially outstanding.

In 2008, in order to support the South-South cooperation project in the framework of “Special Programme for Food Security”, Chinese government donated 30 million US dollars to FAO to set up trust fund. In January, 2010, China, Mongolia and FAO signed third-party agreement, Mongolia became the first country to utilize the trust fund supported by Chinese government among the members of South-South cooperation project. The first phase of South-South cooperation project between China and Mongolia lasted 3.5 years, during which time, 29 agricultural enterprises and private sectors in Mongolia’s 8 provinces and 2 municipalities received technical support from 19 China’s experts and technicians. The experts and technicians offered technical demonstration and training in the fields such as feedstuff, livestock raising, fruits and vegetables, playing an important role in promoting local agricultural production and increasing local people’s income as well as improving their living standard. After the successful implementation of the first phase of South-South cooperation project, China, Mongolia and FAO officially signed third-party agreement of the second phase of South-South cooperation project between China and Mongolia in the 32nd FAO Asia-pacific Regional Conference in March of 2014.

Cooperation of Human Resource Development

In recent years, China’s Ministry of Agriculture has held several training courses for agricultural managers and technicians from Mongolia, including greenhouse crops cultivation, pest control and agricultural production and management. In 2013, China’s Ministry of Agriculture held training course on livestock and poultry for the members of Central Asia Regional Economic Cooperation (CAREC) in Beijing, trainees from Mongolia attended the training and discussed on livestock and poultry raising as well as animal epidemic disease prevention and control.

Cooperation of Planting Industry, Animal Husbandry and Agricultural Equipment

Planting Industry : Taking such conditions like agricultural labor resource, level of agricultural mechanization and the volume of chemical fertilizer applied in farming into consideration, the development of China’s intensive agriculture was better than that of Mongolia, namely, agricultural production efficiency was higher in China than in Mongolia. In addition, the production process in corn breeding and stock breeding was more advanced in China. Therefore, China’s panel utilized agricultural equipment provided by China to plant 18 hectares feed corn test field in Mongolia and harvested. In July of 2010, China’s Feng Ken Seed Company signed the cooperation agreement of experiment and demonstration of early-maturing hybrid corn with the Agricultural Science and Technology Research Center in Mongolia’s Dornod Province. With the careful guidance of China’s experts and technicians, China helped Mongolia to build greenhouse, plant and bring in new product, as well as increase production of unit area, so as to remarkably improve Mongolia’s economic benefit. Since 1996, the Beet Sugar Manufacture Research Institution in Inner Mongolia Autonomous Region has started to provide sugar beet varieties and cultivation technology for high yield and quality in Mongolia, as well as grow sugar beet on a trial basis in Mongolia’s agricultural region. The results showed that sugar beet varieties provided by China were appropriate for planting in large areas of Mongolia.

Livestock Husbandry : On November, 3rd, 2011, the seminar on cross-border animal’s disease prevention and control was jointly hosted in Beijing by China’s Veterinary Department of Ministry of Agriculture, Mongolia’s Veterinary and Animal Breeding Department of Ministry of Food, Agriculture and Light Industry, as well as offices of FAO in China, Mongolia and Korea. The seminar focused on the related issues of the prevention, control and cooperation of foot-and-mouth disease. In order to improve veterinarian’s competence in both China and Mongolia, cooperation were decided to strengthen in the seminar as follows: firstly, focused on the regional project of cross-border animal’s disease prevention and control, and begin with the animal’s disease prevention and control in border region, China, Mongolia and FAO should establish a successful model of prevention and cooperation of foot-and-mouth disease, and large-scale of popularization and application should be carried out. Secondly, focused on animal’s disease prevention and control, the veterinarian’s competence in both China and Mongolia should be continuously improved. Thirdly, China and Mongolia should continue

to support FAO to play a coordinating role, so as to strengthen the support of animal’s disease prevention and control to developing countries, and promote the establishment and improvement of cross-border animal’s disease joint-defense and joint-control mechanism by means of implementing the regional projects on cross-border animal’s disease prevention and control.

Agricultural Equipment: In Mongolia, the level of agricultural mechanization was low that artificial cultivation and manual harvest were very common. Compared to Mongolia, China has more advanced agricultural equipment. The cooperation in agricultural equipment between China and Mongolia was beneficial for the efficient agricultural production in Mongolia. On December, 12, 2009, Gao Shumao, China’s ambassador in Mongolia, signed the agreement on agricultural equipment in aid for Mongolia with Dendev Terbishdagva, the minister of Mongolia’s Ministry of Food, Farming and Animal Husbandry, providing tractors and equipments of water conservancy and irrigation valued 20 million RMB for Mongolia. On May 4, 2011, in light of the wish to help Mongolia, Chinese government handed over a batch of agricultural supplies included in the South-South cooperation project like small and medium tractors, planters, weeding machines and other agricultural equipments. According to the plan, China will develop demonstration projects in forage, livestock raising, greenhouse and merchandise trade, as well as provide agricultural equipments and related supplies to support Mongolia.

2.3.2 Mongolia

2.3.2.1 Free zones for cross-border cooperation

Mongolia is a landlocked country bordered with China in south and Russia in north, that is considered as one of the most extensive border (total length is 8214 km, of which 3485 km is with Russia and remaining 4731 km are with China) in the world. Mongolia has 26 border points in total, of which 12 have international passenger and transportation border status and 14 have two sides status, 10 points are located on Mongolian-Chinese border and 14 are on Mongolian-Russian borders, 20 of them have permanent and 6 of seasonal operation. In terms of transportation, only 3 border points have railroad transportation, 3 have air transportation and majority, 21 have only auto or car transportation access.

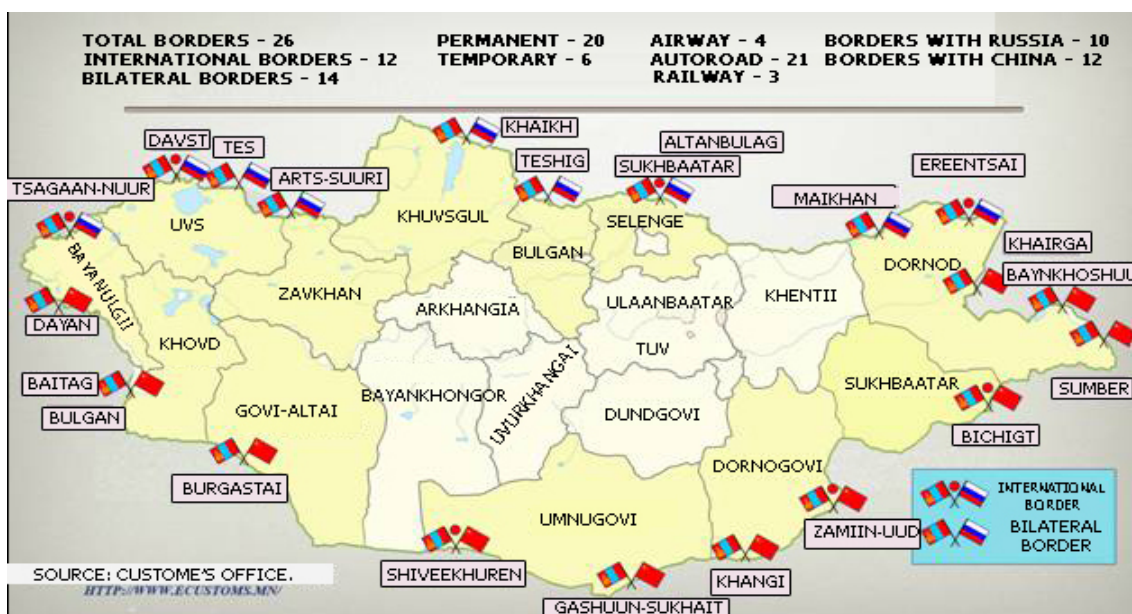


Figure 6. Mongolia’s Border Points

There are two main international inland ports between Zamiin-Uud, Mongolia and Erlianhaote, Inner Mongolia Autonomous Region (IMAR), China as well as Altanbulag, Mongolia and Khyagta, Russia. In the previous

section on Regional Development Policy, it was stated that these major international border points, Zamiin-Uud will be developed as a gateway to connect to North East Asian countries and actively engage in the implementation of the Northeast Asia Cooperation program “Tumen Gol” and open a gateway to communicate with the Asia Pacific countries; **in the central zone**, with Asian road and international rail networks in the direction Altanbulag-Sukhbaatar-Ulaanbaatar-Sainshand-Zamin-Uud and turn it into a main hub for cross-country trade and transport relations via Asia and Europe.

Zamiin-Uud Free Zone

In 2003, the Parliament of Mongolia passed the “Law on the legal status of the Zamiin-Uud Free Zone” (ZUFZ), which allows for the development of the industrial, commercial and tourist/entertainment sectors in the ZUFZ. The strategic objective for developing ZUFZ is to make it one of the economic growth engines that will accelerate the growth of Mongolia’s social and industrial sectors and improve the living standards for the Mongolian people.

The “Zamiin-Uud” Free Zone bordering with the PRC is located inside a border line of the Zamiin-Uud soum of Dornogovi province, at a distance of 680 km from Ulaanbaatar city, 230 km from Sainshand city and 5 km from Erlian, the PRC and in an area of 900 hectares. One of the 5 major projects being implemented by Mongolian government within the framework of a USD 300 million soft loan borrowed from the PRC in 2011 is the “Improvement of Zamiin-Uud Infrastructure Project” and thereof, the USD 58.8 million has been allocated for the project and the construction activities of the infrastructure are being successfully fulfilled. Currently, the following construction works have been completed: a thermal station, a heat transfer center, substations for electricity transmission, a pure water expansion plant for a pure water supply, a water purification plant along with related networks, and a sewage pumping station, a sewage treatment plant, and roads. Zamiin-Uud is also proposed to be a cross border agricultural product selling place, where Mongolian meat processors or slaughter houses are expected to establish and operate in accordance with Chinese hygienic and sanitary requirements.

Altanbulag Free Zone

Altanbulag Free Zone (AFZ) is a special zone of Mongolia adjoining to the Russian border, which occupies an area of 500 hectares and locates at a distance of 335 km from Ulaanbaatar city, 110 km from city of Darkhan, and 25 km from Sukhbaatar city /the center of the Selenge province/in the territory of the Altanbulag soum, a northern border crossing of Mongolia, an ideal transportation and geographic site that connects Mongolia with the Russian Federation and European countries.

The Altanbulag FZ was officially opened on June 22, 2014 in accordance with the government order No. 153 and is operating permanently moving into a special regime. Since 2006, the Altanbulag FZ got started entering into an investment agreement with private entities. Currently, there are 118 entities that entered into investment and land agreements and 58 signed to engage in a container sale. Some of the entities began running their businesses and invested a total of MNT 3.5 billion. This Free zone is expected to boost economic development between two countries.

Agriculture development in Khalkh Gol region and proposal for establishment of Agriculture Free Zone (approved by the Mongolian Parliament in July 2015)

Khalkh gol region is located in Dornod province, which is one of the three eastern provinces of Mongolia that belongs to the GTI geographical coverage. This region used to be under active crop production during the planned economy and then until late 2000, a region had been abandoned and cereal production decreased significantly reaching up to 2,900 ha. In this regard, the Government proposed a plan to re-develop the region

and made a political level discussion to initiate agriculture development projects in the Khalkh gol, with a vision that Khalkh gol region should be acting as an entry gate for the exporting of the Mongolian agriculture products to the neighboring China and other countries.

In 2010, aiming at re-developing agriculture in the Khalkh gol region, the Mongolian Government Resolution No. 97 was approved, that has an action plan for developing animal husbandry combined with crop production. The resolution and plan have been implemented under the 5 objectives, mentioned below and achieved the following outcomes:

One. *Develop an abandoned area of 30.0 ha in Khalkh gol soum that was held by individuals and entities into a crop production, as intended, and further explore and resolve possibilities to use more abandoned lands for agricultural purposes.*

Two. *Establish a Livestock and Crop Intensified Model Farm for 200 ha area in Khalkh gol region through KOICA's grant assistance*

Three. *Become a country that exports products, ensure the safety of agricultural products and contribute to ensure production growth and meet domestic food demand*

Four. *In the eastern region, build forest strips to protect farming area, conduct Environmental Impact Assessment and develop ecotourism*

Five. *Research and resolve issues of renovating and upgrading central water and sewerage system of the Khalkh gol soum's center; connecting power transmission lines to energy system of the Dornod region, building highways, roads and railways.*

The Ministry of Construction and Urban Development developed an engineering design on renovating and upgrading of the central water and sewage system of the Khalkh gol soum and submitted to the Dornod province in 2013. Technical and economic feasibility study was developed in 2013 to make an extension and reform in the eastern region energy system, install 35 kWh power transmission lines from a sub-station Tamsag to Khalkh gol soum's center and build a sub-station. Within the framework of connecting the border points Chingis-Choibalsan-Khalkhgol-Nomrog with paved roads a road embankment work is underway and a road construction is being completed. In the state policy on railway, 450 km railways in Sainshand-Hoot direction, 155 km in Hoot-Choibalsan and 380 km railways in Hoot- Nomrog direction have been considered in 2 phases, so far no performance though.

As a result of successful implementation of the resolution, mentioned above, a total of 41,000 ha of the land area has been placed under crop cultivation, further, it becomes possible to introduce and increase new varieties of crop as cash crop that do not grow in the central and Khangain regions. Based on increased supply of cereal production, fodder and forage production will be increased, that would stimulate establishment of intensified livestock farming to export crop and livestock originated products, such as meat and meat products initially in the neighboring cities in China further to Northeast Asia region.

In this respect, technical and economic feasibility study on building of an irrigated area from the Khalkh gol with no adverse effect on environment has been developed and in 2015, a regional comparative study for developing export oriented intensified agriculture was produced. In July 2015, the Mongolian Parliament approved the MFA's proposal on developing Agricultural Free Zones and as specified in the project proposal the Khalkhgol free Zone is crucial for increasing the competitiveness of the agricultural sector at international level and will help attract investments, domestic and foreign, into the agricultural production, introduce

advanced technology into production, get access to East Asia and Southeast Asia through improving the competitiveness of Mongolian meat and increasing price, increase employment through strengthening regional economic capacity and intensification of agricultural production.

Free zone is going to be established in the Bayankhoshuu border crossing, which is located in the Khalkh gol soum, which has 850 households and 3025 population. Crossing the Khalkh gol by a bridge makes it pass the border. The soum imports electricity from the PRC and is connected via 412 km dirt road with Choibalsan and via 196 km paved road to Hailaar city of Inner Mongolia. A railway in the city of Hailaar at Holonbuir is the closest railway line. As for population density within the 500 km of the region, in the Mongolian side, the Dornod province has a total population of 74,923, whereas in the territory of the PRC i.e. in the Holonbuir the population is 2,549,278 and several bigger cities. In other words, engaging in an intensive agriculture in the Khalkh gol region is possible and the outcomes in a relative short time period are confirming this and within the framework of the policy, the government and the partner countries attach a great importance to it. Also, in terms of geographical location, market, and infrastructure, the region has many advantages and this will be a great start to a cross border agricultural cooperation that has not been established in Mongolia until today and further, considers possibilities to export Mongolian brand products of agricultural origin.

2.3.2.2 Export and Import Commodity Border Control

State inspectors of the Exports and Imports Control, an affiliated organization of the Specialized Inspection Agency, perform at borders a sanitary and quarantine monitoring for agricultural products that are exported and imported through the Mongolian state borders. In other words, the agency is responsible for veterinary, quarantine, phytosanitary and food safety requirements for foreign trade in accordance with the Agreement on Sanitary and Phytosanitary Measures (SPS) applied in member countries of the World Trade Organization and carries out implementation and monitoring.

According to the WB Doing Business survey, Mongolia was ranked at 72 in the 181 in 2014 by its foreign trade capacity and the Cabinet attributed it to a lack of the legal regulation system that would set in detail monitoring and controlling methodologies fitted assortments and processing characteristics of goods checked through the border. Businesses got to criticize the pressures, bureaucracies and cumbersomeness of a custom inspection at a border. In view of increasing foreign trade turnover there comes an inevitable need to ease foreign trade and improve a legal framework for a specialized border control.

As a part of this, the Mongolian Government has newly approved several legal documents to optimize and renew the ongoing monitoring and inspection activities on imported goods. One of them is approval of the criteria that classifies imported goods in three categories based on their risk levels, which might endanger human life and health, animals, plants and environment. Now total 5744 goods have been evaluated against these criteria and it has been decided to exempt 3550 goods from specialized border inspection. Thanks to this new regulation, the old system that has been in effect for many years before and made all goods for importing subject to inspection and laboratory testing has changed and thus, a legal framework for easing foreign trade has come into effect.

According to the clause 3.1 of the Instruction on Imported Goods Inspection Manual, low risk goods are subject to “an inspection of documents”, medium risk goods are subject to “a physical examination and an inspection of documents” and high risk goods are subject to “inspection of documents, a physical examination and laboratory testing inspection”. Since the most of agricultural products are included in a high and medium risk group, they are subject to a physical examination and laboratory testing inspection and the following laboratory testing are required.

An inspection duplication has been able to be decreased due to the integration of activities of the customs authorities and other organizations into one set of a regulation to ease foreign trade and make border inspection as transparent, as mentioned above. Also, a total of 14 Specialized Inspection Agency Director's Orders about prohibiting imports of livestock and animals, raw materials and products of their origin from Russia and China into Mongolia have been cancelled and removed from the State Integrated Registration with the Ministry of Justice.

In order to increase export trade, 2 border crossings, namely the Bichigt of Sukhbaatar province and the Bayankhoshuu of Dornod province, have been added to the total of the border points allowed to export livestock, animals and plant seeds, seedlings and saplings and the Bichigt border point of Sukhbaatar province has been granted with an import right for raw meats and meat products. Considering a vast territory and a scattered livestock production of Mongolia, the border quarantine and inspection agencies are working close together by holding meetings and discussions to further support a cross border agricultural trade, promote cooperation and prevent obstacles as possible.

In 2013, ADB conducted situation analysis on the inspection and facilitation of SPS measures to facilitate trade in agricultural and food products among CAREC countries, including Mongolia. Based on this SPS inspection assessments, currently ADB is initiating the second phase of the project with objective to strengthen and upgrade SPS inspection capacity, where Mongolia has been selected as the first project pilot country. According to the preliminary soft loan project proposal, the project activities will focus on strengthening the existing border control inspection systems in terms of improving legal environment and strengthening human and technical capacities.

2.3.3 Korea

2.3.3.1 International cooperation in agricultural Sector

History

The first overseas agricultural cooperation in Korea started in 1960's when Emigration Act was enacted. During 1980's, international agricultural cooperation was driven by private sectors. In 2008, created was a special task force for overseas cooperation in agriculture and fishery under Ministry of Agriculture and Fisheries. The task force established how overseas cooperation in agriculture and fishery sectors were prepared and made successful. A 10-year basic plan for overseas agricultural development was made based on the Act, "Overseas Resources Development Business" in 2009. The OADC act which enacted in 2012 provided a foundation for a number of projects to be proposed and carried out.

- Agricultural emigrations : ~ 1970's

The first overseas agricultural cooperation was initiated in the form of agricultural emigration. The emigration was encouraged by the government so that the emigrants started cultivation in the land which Korean government officially rented or purchased from other countries. The destination of the agricultural emigration was mostly South American countries which were facing labor shortage while the large arable land was available. The effort was not successful for several reasons. The emigration was initially intended for simple emigration aiming to control population rather than agricultural emigration. Therefore there were no training programs for the selected emigrants. The emigrants were not selected from farmers either. In addition even government did not have enough information that was required for farming in their destinations. The lack of knowledge on policies and systems on immigration and agriculture also contributed to unsuccessful agricultural emigration in this period. In fact, the government did not monitor or show any interests to the performance of emigrants, which is important to develop or improve the programs.

- Initiation of overseas agricultural development : 1980's ~ 1990'

Agricultural emigration during 1970's was accepted as unsuccessful and the government did not recognize the necessities in overseas programs for agricultural development and cooperation during 1980's. There was a notable attempt conducted by a private company for overseas development in corn production. It participated in investing a corn farm in Washington in the United States in the 1980s. It was the first attempt of overseas agricultural cooperation created by private institution. However, the investment was discontinued due to low profitability and reluctance to outflow of foreign currency. During 1990's domestic market of agricultural products became open to the world and agriculture faced difficulties in continuing their productions. A number of private corporations started overseas projects for agricultural production during this period of time. The projects were limited to those countries located near Korea, including Northeast provinces in China and Primorsky region in Russia. These locations have another importance in securing food supply in that they are close to North Korea and can help solving food problems in unified Korean era of the future. This is why some non-profit organization also started agricultural development in these regions. Since the efforts made by the private institutions were initiated without enough preparation, they met a number of challenges and resulted in halting their operation in some cases. Main challenges and difficulties they met includes the following,

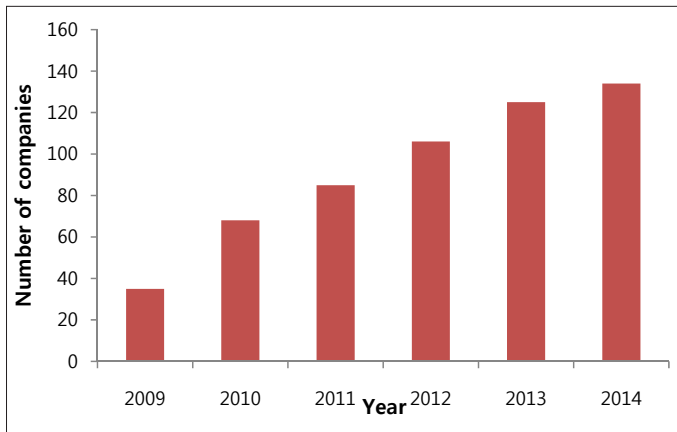
- 1) Lack of preparation in planning stages
- 2) Lack of information such as variety selection of crop, local data on natural resources such as soil and water, legal systems in partner countries.
- 3) Inappropriate financing and misjudgment of additional investment requirement
- 4) Not sufficient understanding of partners
- 5) Negligence of the importance of post-harvesting process and market access
- 6) Failure of additional financing due to wide-spread financial crisis during the end of 1990's

- Organized international development and cooperation : 2000's ~

The importance of food security was widely recognized through experiencing financial crisis in late 1990's and unstable price of grains. The government emphasized both overseas resource development and the security of food supply. A support system for overseas agricultural development and cooperation were established, including legal systems which provide loans for projects and support costs for preliminary investigation and assessments. As mentioned in the previous section, OADC act and 10-year master plan for overseas agricultural development and cooperation were prepared in this period of time.

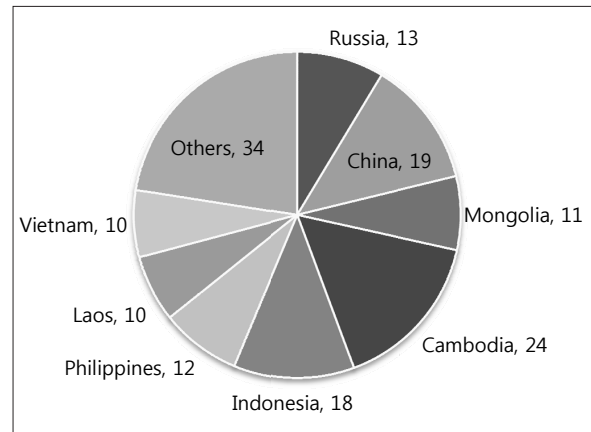
Current status and achievements

Since the 10-year master plan was made in 2009, the number of companies which started overseas agricultural development projects has increased continuously. As of the end of 2014, the total number of the companies which reported their overseas activities to the Ministry(MAFRA) is 149 in 27 countries. The number of companies increased about twice when the master plan was established, but the increase rate is decreasing in recent years. The countries in which the overseas projects are started are mainly Russia, China, and South Asian countries. Based on a report on overseas agricultural development, the total area developed for the projects in 2013 and 2014 were 69,700 ha and 53,700 ha, respectively, which represents 284,000 and 195,000 tons of food grains. However, the amount shipped into domestic market is only about 7,000 tons of grains in 2014.



Source: Evaluation and recommendations for overseas agricultural development projects by Korea FAO Association, 2014

Figure 7. Accumulative numbers of companies reported for overseas agricultural development



Source: Evaluation and recommendations for overseas agricultural development projects by Korea FAO Association, 2014

Figure 8. Distribution of countries for overseas agricultural development reported as of 2014

Overseas agricultural developments are concentrated in Russia and Asian countries. Agricultural development projects registered in the Ministry 13 in Russia, 19 in China, 11 in Mongolia, 24 in Cambodia, 18 in Indonesia. There are additional projects that were not reported to the Ministry. Only the companies which reported their overseas agricultural projects are eligible for loan programs from the government.

In addition to the corporations or projects in the list, there are several projects existing in China. From 1992 to 2005, hundreds of agricultural and food production projects started. Majority of the projects were of food production, such as Kimchi, sauces, and ramen. They are reportedly over 500 projects. Other major projects for agriculture and food production include,

- Livestock and animal products : 17
- Flower and trees : 132
- Fruits : 23
- Seed production : 7
- Fruit vegetables : 87
- Food grains and related products : 8
- Animal feeds : 11
- Organic fertilizer production : 7

The corporation received various benefits from Chinese government including tax exemptions, lower rental costs of lands, discount of utility that were not available in Korea. However, the majority of companies and projects failed to continue their business due to many obstacles and lack of understanding market situations. In spite of difficulties, several corporations managed to survive and continue to grow, mostly larger companies. They kept making efforts to understand the local markets and changes in economic situations with continuing research and developments.

Large corporations such as Nongshim, Purina, and Kimchi production companies have success stories. Nongshim is known to extend their business to construct new production plants over the continent. They are reportedly growing vegetables for their own products. Some of projects in dairy farms, flower farms, and fruits farms are also still continuing their business with good reputation. The other large food companies like CJ and Pulmuone are importing soy beans through purchasing from contracted local farms. The food company CJ already participated in producing tofu in Beijing in 2007. In 2008, Pulmuone also announced its cooperation with Chinese company to produce tofu in Shanghai. Pulmuone provided Korean consumers with chances to

visit the farms growing organic soybeans in China. It implies agricultural cooperation in GTI can be easily extended to tourism due to the geographical vicinity.

Food grain projects are mostly located in Russia, particularly in Primorsky region. As of 2014, about 22,000 ha of land was developed by Korean corporations in Russia, mainly producing soybeans, and other grains. The total production is about 53,000 tons from the projects.

In 2014, Korean government supported to open an office for providing corporation with technical assistance through Korea Rural Corporation. The office has a main objective to help Korean companies increase productivities in their projects. When GTI agricultural cooperation is initiated, Korean corporations can receive supports from the office including agricultural technology, information as well in various services.

Table 6. Current agricultural development projects by corporations in Russia

Corporation	Main crops	Location	2014		2015 Area (ha)
			Area (ha)	Production (ton)	
Total			21,964	52,807	22,847
Sansaeng	soybean, rice, oats	Khorol	6,448	15,750	5,500
Seoul feed	soybean, corn, oats	Ussuriysk	4,696	10,717	5,314
Hyundae	soybean, corn, oats	Khorol	7,329	19,283	8,435
Aro	soybean, barley, oats	Novonikolsky	2,271	4,366	2,415
Namyang	soybean, thistle	Khasansky	360	280	450
Pohang Ag. Cooperative	Oats, roughage	Novonikolsky	310	1,016	183
Bari Dream	Soybean products	Ussuriysk	200	120	200
Agroamur	Soybeans, corns	Partizansk	350	1,275	350
Future Invest Leaders	Grain distribution	Spask	-	-	-
Kim Hwabok	Soybeans	Khasansky	-	-	-
Chikojaru	Corn, soybeans	Dalnerechensky	-	-	-
Happybean	Soybeans, buckwheat	Mikhailovka	-	-	-

Source : Korea Rural Corporation

In 2009, a master plan was prepared for agricultural development in East Mongolia as a KOICA project. The master plan covers 270,000 ha area and has a design of 200 ha demonstration farm. The demonstration project started in 2011 and is about to completion. The master plan estimated the total cost of East Mongolian agricultural development is about 1 billion USD including construction of infrastructure like railways, road, electricity, and water supply.

2.3.3.2 Potential fields for collaboration under GTI

Direction toward agricultural collaboration in GTR

Considering current situation of agriculture and food supply, Korea defined that the main objective of overseas agricultural development and cooperation is to secure about 10% of major domestic demand of grains through the supply from overseas projects, which is described in the 10-year master plan. The plan was changed and updated to secure 35% of domestic grain consumptions through overseas agricultural development until 2021, which was proposed in 2012. As described in the analysis of Korean agriculture in the previous sections, the

self-sufficiencies of total food grains is below 30% of total demand. Therefore, the objective of the master plans is logically justified to secure the supply of food grains since Korea is highly populated and has no additional land for cultivation.

When it comes to agricultural cooperation in GTR, Korea has unique potential which allows the cooperation to be more successful. There are a number of resources including chemical production facilities with only about 70% rate of operation, funds for international cooperation the government allocated in annual budget, experts and institutions related to agricultural technologies.

Up to now, overseas agricultural development and cooperation projects have been pursued by private sectors except for the initial period when government drove agricultural emigration in the 1980s. The companies and institutions are facing various difficulties in every phases of agricultural business including planning, establishing the business, marketing products, and so forth. Some of difficulties such as legal processes in partner countries are nearly impossible to solve. These may be resolved by official dialogue between two counterpart countries. This is why so called Public Private Partnership (PPP) projects in addition to previous private ones are proposed. Agricultural cooperation under GTI need to incorporate both public and private aspects since they have different and various roles in the society compared to general industries. Next overseas agricultural development and cooperation projects as well as GTI project are expected to take places considering their public implications and contribution to national security of food grains.

The agricultural collaboration should also take environmental conservation and improving rural life into account. Agricultural development without caution tends to result in environmental deterioration. Some of the environmental problems include nutrients and chemical discharges from fields to surrounding environments and soil erosion, which degrade long term agricultural productivity. Another consideration to be taken into account is improving living environment for people in the region. Not only economic inducement but also good living conditions are very important to draw people in the region and ensure long term success of the project in the region.

Potential fields for collaboration

The master plan for overseas agricultural development clearly defines the overall goal is securing the supply of 35% of food grain demand through the overseas agricultural development until 2021. Therefore, government support for the investment and projects related with production of food grains are readily available. Although overseas cooperation in any other agricultural products can be included, food grains production and related fields are more favorable since the master plan is focusing on the food grains. The potential fields for collaboration in agriculture in GTR are listed as follows.

- Farm development for food grain production
As mentioned in previous paragraphs, Korea set a stable supply of food grains as the main objective of international cooperation of agricultural development. Therefore, farm development for good grain production will be easily supported and funded from various financial sources. The projects related to food grain production will be the field with highest priority of current Korean agricultural policy.
- Research and technological support for improving productivity and sustainability
Research and development for agricultural and food production are prerequisite to international cooperation of agricultural development. Successful projects for international agricultural development have been based on a firm background of research and development related with agricultural technologies and improving crop varieties. Disease and pest controls also require continuous technical support from expert groups. New technologies such as precision farming and variable application of chemicals can be adopted to improve productivities especially in large scale agricultural production.

- Development of agro-industrial complexes

Construction of agro-industry clusters provides wide spectrum of benefits in agricultural development projects. They can attract a large number of corporations or plants in the cluster or complex. Since the complex is based on agricultural production supplied from surrounding fields, food production corporations, storage and distribution facilities are required to place as well.

2.3.4 Russia

The growth of agricultural production in 2014 helped reduce imports and increase exports of food products and agricultural raw materials. 2014 year was a record year for export of agricultural products, raw materials and food, the volume of which reached 18.9 billion dollars which exceeded level of 2013 by 16.5%. This growth was reached by a sharp increase in exports of wheat (60.4%), barley (72.5%) and vegetable oil, safflower or cotton and their fractions (22.5%). As a result, the share of exports of food products and agricultural raw materials in the commodity structure of exports amounted to 3.8% in 2014. While 73.8 per cent of exports of agricultural products, raw materials and food were for far abroad countries and 26.8% of the exports were for CIS countries.

Agricultural production remains in the spotlight of international business. China, Republic of Korea and Japan as the closest partners in international trade are interested in the import of valuable agricultural products. The supply of soybeans and corn to the markets of these countries of Asia-Pacific region will grow in volume and in cost; customs charges will replenish the Federal budget.

Far Eastern Federal district and Siberian Federal district may export: soybeans and soybean products (soybean meal, oil), corn, buckwheat, rice, potatoes, poultry, pork, eggs, wild game meat and wild products.

In 2012, 1.2 thousand tons of *soybean oil* were exported from Amur region to China. Seventy-one tons of soybeans were exported in 2011, only 1 thousand ton from Priamurye was exported. The increase in trade was associated with lower export duties on soybeans in June-August 2012.

The total revenue from exports of agricultural products amounted to approximately 20 million dollars. There are plans to expand the range of supplied products of soybean processing and to start to sell bottled refined deodorized soybean oil to China. Imports of foodstuffs and agricultural raw materials from China through the Blagoveshchensk customs in 2012 was half that of exports and amounted to 35.3 thousand tons. Mostly they were vegetables and fruits.

The greatest volume of soybean exports to China passed via Blagoveshchensk customs post and amounted to 71.3 million tons, which is 10 times more than in 2010. In 2013, despite the flooding, more than 35 thousand tons of soybeans were exported via Blagoveshchensk customs post. In 2014, the Blagoveshchensk customs officers issued 40 declarations for export of 21,133 tons of soybeans. In early 2015 Russia exported to China 25,758 tons of soybeans. In total, the region plans to export about 200 thousand tons of soybeans. In addition to soybeans, other agricultural products are exported to China. Since the beginning of 2014, 5,300 tons of *corns* were exported.

The leader in gross fees of soybeans in Russia is Far Eastern Federal district, where in 2013 646.8 thousand tons of oil seeds were harvested. However, due to unfavorable environmental conditions soybean production during 1 year decreased by more than 37% (or 382.6 thousand tons). The share of Far Eastern Federal district in the national production of soybeans decreased up to 39.5% during a year. In 2014, about 1.5 million tons of soybeans were collected there. In accordance with the strategy project, the volume of exported corn and soybeans in the coming years is expected to reach 350 thousand tons, to access foreign markets with pork products.

The Agency for strategic initiatives actively promotes many projects in the field of agriculture in Russia, including, Primorsky territory. One of the projects is the agricultural complex “Green leaves”. It is the largest in the industry by amount of investment - 6.1 billion rubles. It has a huge export potential.

In Primorye there is a national center for the development of exports. In 2011, the region sent Korea a trial batch of 5 thousand tons of corn. In 2012 the export of agricultural products in Primorye increased to 30 thousand tons and currently export volumes are constantly growing. In 2014 the region exported fodder corn, food and fodder soybeans, and buckwheat.

Agro-industrial group “Armada” started to export crop products to China. The first export batch of new harvest of soybeans amounted to 630 tons (10 cars). The excess harvest is exported. A large portion of the soybean demanded in the domestic market is sold in Primorye. Next year agro-industrial group “Armada” plans to put into operation a large production facility – oil and fat factory. Deep processing of soybeans will be carried out.

In Khabarovsk-city there are analogues to Vladivostok “Centre for export development” and as the businessman noted it greatly helps him. He already managed to open a few branded shops selling ice cream in the cities of China.

Exports of foodstuffs and agricultural raw materials from Khabarovsk territory for the period 2008-2012 increased by more than 20 times – from 10.5% to 212.7 million \$ USA (annual growth rate - 112%). The share of these products in total exports of goods and services from the region increased during 2008-2010 from 0.5% to 13.7% and then decreased to 10.2% in 2011, and in 2012 amounted to 12.7%.

The largest food industry companies in Khabarovsk region are JSC “Dakgoms”, LLC “Merilen” and LLC “Baltimor-Amur”. The revenue of “Dakgoms” steadily increased from 687 million rubles in 2008 to 1 209 000 million rubles in 2012. Revenue of “Merilen” by the end of 2012 amounted to 438 million rubles having increased from the level of 2008 by 27% (346 million rubles). Income from main activity of the “Baltimor-Amur” decreased for the same period from 523 to 197 million rubles.

Products of crop production are corn, soybeans, potatoes, sugar beets, vegetables, flax, etc. Such Russian companies as Razguliay UkrRos, Belaya Dacha, Belgorod pellet feed, Golden field, Agrofirma “Buturlinskaya” and “Chernjvskoe”, as well as international companies: Scheid Vineyards, Hines Horticulture, Cal-Maine Foods, Chiquita Brands International, Delta & Pine Land Co. are engaged in crop farming in Khabarovsk territory.

Products of livestock are cattle, pigs, sheep, poultry, milk, eggs and others. Livestock of Khabarovsk territory is represented by the following Russian and foreign companies: AIC Cherkizovsky, Omsk Bacon, Tomilinskaya and Seymovskaya poultry factories, Ilyinogorskoe; Smithfield Foods, Pilgrim’s Pride, Sanderson Farms Inc Seaboard Corp., Tyson Foods.

The food industry includes the manufacture of beverages, branded food products in the packaging and non-branded (commodity) products. Beverages (non-alcoholic, low-alcoholic and alcoholic) in Khabarovsk territory are produced by PepsiCo/Wimm-bill-Dann, Heineken, Multon, Baltica and Novgorod Factory of Sparkling wines. Branded food products in the package are confectionery products, canned food and other products where the brand is a major factor in the choice of goods by a buyer. Such companies as Kraft Foods, Baskin Robbins’, Frito Lays, Valio, United Confectioners, Sormovskaya confectionery factory produce this kind of goods in the region. Production of commodity products (flour, frozen meat, sugar and other products used subsequently for other products) in the region is represented by the following companies: Smiethfield, Danish Crown, Hormel Foods, Surguchsky sugar factory.

In conclusion we note that the recovery of exports in the analyzed regions takes place during last 5 years, partly due to the crisis of 2008 and the recovery of agricultural production after this year. The main exports are soybeans and soybean products (soybean oil), corn, buckwheat, pork products and food products. Significant potential is in the production and export of rice, eggs, wheat products and deep processing of soybean.

2.4 CURRENT STATUS OF TRADES AND MARKET TRENDS IN NEA AGRICULTURE

2.4.1 China

2.4.1.1 Overall current status and trends in trades of agricultural products

In 2014, China's import-export volume of agricultural products was 194.5 billion US dollars between January and December, increasing 4.2% year on year. The export volume was 71.96 billion US dollars, growing 6.1%; the import volume was 122.54 billion US dollars, growing 3.1%; trade deficit was 50.58 billion US dollars, falling 0.9%.

Cereal

The total import volume of cereal was 19.516 million tons, growing 33.8% year on year; export volume was 0.769 million tons, decreasing 23.1%. The net import volume of cereal was 18.747 million tons, growing 38.0%, among which wheat import volume was 3.004 million tons, decreasing 45.7%; corn import volume was 3.599 million tons, decreasing 20.4%; rice import volume was 2.579 million tons, increasing 13.6%; barley import volume was 5.413 million tons, increasing as much as 1.3 times; sorghum import volume was 5.776 million tons, increasing 4.4 times. In addition, as corn products, the import volume of distillers dried grains with soluble (DDGs) was 5.413 million tons, increasing 35.3%.

Sugar

Between January and December, sugar import volume was 3.486 million tons, falling 23.3% year on year; total import volume of sugar was 1.49 billion US dollars, falling 27.8%. The average import price was 428.7 dollars per ton, falling 5.8%.

Cotton

The cotton import volume was 2.669 million tons, falling 40.7% year on year; total import volume of cotton was 5.16 billion US dollars, falling 40.9%. The average import price was 1931.9 dollars per ton, falling 0.3%.

Oil-bearing crops

Between January and December, import volume of edible oilseeds was 77.518 million tons, growing 14.3% year on year; total import volume of edible oilseeds was 44.51 billion US dollars, growing 7.5%; export volume of edible oilseeds was 0.872 million tons, growing 0.3%; total import volume of edible oilseeds was 1.43 billion US dollars, falling 9.0%. Among them, import volume of soybean was 71.399 million tons, growing 12.7%; import volume of rapeseed was 5.081 million tons, growing 38.7%.

Palm oil

Between January and December, import volume of edible vegetable oil was 7.873 million tons, falling 14.6%

year on year; total import volume of edible vegetable oil was 7.05 billion US dollars, falling 21.2%. Among them, import volume of palm oil was 5.324 million tons, falling 11.0%; import volume of soybean oil was 1.135 million tons, falling 1.9%; Import volume of rapeseed oil was 0.810 million tons, falling 47.0%.

Oilseed meals

Between January and December, import volume of oilseed meals was 0.928 million tons, growing 3.4% year on year and the export volume was 2.277 million tons, growing 66.2%.

Animal by-products and milk powder

Between January and December, import volume of animal by-products was 2.217 million tons, growing 13.6% year on year and the total export amount was 6.84 billion US dollars, growing 5.0%. Among them, import volume of pork was 0.564 million tons, falling 3.3%; import volume of haslets was 1.135 million tons, growing 0.2%; import volume of beef was 0.298 million tons, growing 1.3%; import volume of mutton was 0.283 million tons, growing 9.3%; import volume of milk powder was 1.054 million tons, growing 22.0%.

Vegetables

Between January and December, export volume of vegetables was 12.50 billion dollars, growing 7.9% year on year and the trade surplus was 11.99 billion dollars, growing 7.3%. Among them, export volume of garlic was 1.948 million tons, growing 7.6%; total export volume of garlic was 1.88 billion dollars, growing 3.1%; average export price was 962.7 dollars per ton, falling 4.2%.

Fruit

Between January and December, export volume of fruit was 6.18 billion dollars, falling 2.3% year on year; import volume of fruit was 5.12 billion dollars, growing 23.1% and the trade surplus was 10.06 billion dollars, falling 51.0%. Among them, export volume of fresh apple was 0.865 million tons, falling 13.0%; export volume of fresh apple was 1.03 billion dollars, falling 0.2%. Export volume of apple juice was 0.459 million tons, falling 23.8%; export volume of apple juice was 0.64 billion dollars, falling 29.6%.

Aquatic product

Between January and December, export volume of aquatic product was 21.70 billion dollars, growing 7.1% year on year; import volume of aquatic product was 9.19 billion dollars, growing 6.3 % and the trade surplus was 12.51 billion dollars, growing 7.6%. Among them, export volume of cuttlefish and squid was 2.42 billion dollars, growing 9.3%; export volume of prawn was 1.74 billion dollars, growing 1.2%.

2.4.1.2 NEA share in the trades

Status and trends of trades in agricultural products between China and Russia

Although the development of agricultural products trade between China and Russia started earlier, the trade scale and trade level still need to improve. Most of China's agricultural products exported to Russia were primary products, mainly on vegetable and fruit, and the product add-value was low. Russia was the fifth largest fruit consumption market in the world, and China became one of Russia's largest fruit importing country based on its advantages like great variety of fruit, convenient transportation and low price etc.

In Russia, 90% rice and 50% vegetable imported from China were from Heilongjiang Province. Between 2001 and 2010, in Heilongjiang Province, total export volume of agricultural products was 5.887 billion dollars,

among which the exporting rice was 1,274,000 tons and the export volume of rice was 0.398 billion dollars, 68.09% exported to Russia; the exporting fresh apple was 890,000 tons and the export volume of fresh apple was 0.36 billion dollars, 99.58% exported to Russia; the exporting frozen pork was 283,000 tons and the export volume of rice was 0.4 billion dollars, 41.25% exported to Russia.

By 2011, total of 0.08 million hectares vegetable export bases were established in each port city in Heilongjiang Province. In Heihe, planting area was 6670 hectares, reaching 13.67 million export trade in 2012 and export rate was over 50%; in Aihui district, vegetable planting area was 13.34 hectares, vegetables and fruits such as onion, potato, tomato, color pepper, carrot and strawberry were positively introduced and abundant achievement was gained in the export base.

However, small scale and unreasonable structure still remained in the trade between China and Russia, and the agricultural products trade accounts for the percentage of the total trade volume between China and Russia continuously declined. In light of the relations between China and Russia and their international status, Russia only acted as the ninth largest agricultural trade partner, therefore, the cooperation between China and Russia still needed to be further improved.

Status and trends of trades in agricultural products between China and Korea

In Korea, since domestic production cannot satisfy the huge demand of agricultural products, Korea needed to import cereal and processed food from overseas. The trade volume of agricultural products between China and Korea has grown steadily and mainly on agricultural products exported from China to Korea. Since the establishment of China and South Korea diplomatic relations in 1999, especially after China accessing WTO, the trade volume of agricultural products between two countries has grown rapidly. Between 2004 and 2014, the trade volume of agricultural products that China exported to Korea increased from 2.182 billion dollars to 5.082 billion dollars, growing 132.91%; the trade volume of agricultural products that China imported from Korea went up from 0.206 billion dollars to 1.032 billion dollars, growing 400.97%.

Status and trends of trades in agricultural products between China and Mongolia

At present, China is Mongolia's largest exporting country and the second largest importing country, therefore, Mongolia's largest trade partner country is China. Between 2004 and 2014, the trade volume of agricultural products that China exported to Mongolia increased from 24 million dollars to 109 million dollars, growing 354.17%; the trade volume of agricultural products that China imported from Mongolia grew from 35 million dollars to 242 million dollars, growing 591.43%. The development of economies and trade relations promoted the cooperation of two countries in agricultural field. The vertical trade structure of agricultural products trade between China and Mongolia was capable of high complementary, namely, products exported from China to Mongolia mainly on preliminary processed products, while products imported from Mongolia mainly on raw materials of agricultural products, such as wool and leather etc. The complementary of trade structure between China and Mongolia had laid an important foundation for bilateral agricultural cooperation. Especially after China gained access to WTO, better policy and market environment for developing agricultural trade between China and Mongolia were provided. Firstly, in the framework of WTO agricultural rules, reduction in tariff, expansion of market access and cancellation of quota restrictions had gradually realized in the two countries, offering a more relaxing trade environment for developing agricultural trade between China and Mongolia. Secondly, reduction of agricultural export subsidies was related to the agricultural resource advantage and agricultural technology in the two countries, effectively increasing efficiency of agricultural production and promoting optimal allocation of agricultural resource in the two countries.

2.4.2 Mongolia

Because of an increase in exports of mineral products, exports have been increasing in the last 5 years since 2010 and a share of agricultural products has been decreasing. In addition, an increase of imports of investment products makes the share of agricultural products drop compared to the years before 2010. Since 2006, exports have been increasing by 13.8% in average per year and imports by 14.1%, meantime imports of agricultural products have been increasing by 8.2% in average per year and exports by 1.9%. As shown in Table 7, Mongolia imports more than 50% of agricultural products from China, Russia and South Korea.

Table 7. Share of Imported Agriculture Originated Products

	China	Russia	Korea
2006	16.1	30.0	4.7
2007	12.7	29.7	6.7
2008	10.0	30.7	5.8
2009	17.3	32.2	6.6
2010	15.2	30.2	8.1
2011	15.5	24.7	6.5
2012	13.6	23.6	6.5
2013	15.7	26.1	6.3
2014	18.7	26.4	6.0

In 2014, Mongolia traded with 142 countries and of this, exported goods to 69 countries and the total exports reached USD 5774.3 million, which compared to 2013, were increased by USD 1505.3 million or 35.3 percent. Of the total 69 countries, to NEA countries, particularly to China USD 5073.4 million of goods, to Russia USD 61.6 million of goods and to Korea USD 13.5 million of goods were exported respectively. While in 2004 Mongolian exports to Korea reached USD 9.7 million, in 2005 it dramatically increased reaching USD 65.1 million accounting for 6.1% of the total exports. This was the highest amount of exports to this country in the period from 2004 to 2014. However, in 2006 the volume decreased to USD 21.4 million, in 2007 increased again to USD 41.5 million, in 2008 decreased to USD 29.9 million, increasing in 2011 to USD 37.9 million and since 2012 has decreased. Leading exports goods to South Korea include molybdenum ores and concentrates and in light of production of these products the exports to that country fluctuate.

While in 2004-2005, exports to Russia accounted for 2.4 % of the total exports reaching over USD 20.0 million, in 2008-2009 it accounted for 3.5 % reaching the highest share in the total exports since 2004. Although exports to Russia totaled USD 96.3 million in 2011, it accounted for 2% of the total exports. Within the goods exported from Mongolia into Russia, beef, horse meat, spar leucite, nepheline and nepheline syenites fluorspar comprise the leading share and since 2012, exports of these products has been decreased. Also, it relates to the fact that exports to the PRC and particularly exports of coal has dramatically increased.

Research made in the last 10 years shows that exports to the PRC comprise the majority of the Mongolian exports. For example, in 2004-2005 exports to the PRC accounted for 48% of the total exports, in 2006-2007 it increased to over 70% and in 2011-2012 to 92%.

Shares of iron ores and concentrates, crude oil, the Mongolian export products to the PRC, are increasing from year to year and exports of coal have increased dramatically in recent years. However, it can be seen that the decrease in shares of coal exports in 2013-2014 affected the exports to the PRC.

The table represents that top five export products of Mongolia in the period from 2004 to 2014 included mining and mineral products such as copper concentrates, coal, gold wrought and unwrought. While in 2004-2005, combed cashmere was down within the first five export products, in 2009-2010 it was exported in lesser volume compared to the mining products. As opposed, in 2012 washed cashmere was included in the top five export products.

2.4.2.1 Agriculture exports

Agriculture exports of Mongolia to foreign countries totaled USD 459.1 million in 2006 and accounted for 30% of the total exports. While in 2008 agricultural exports grew to USD 502.5 million, the share in the total declined to 20% and this continued to decline in 2010 to 10%, in 2011 to 6%, in 2013 to 8% and to 7% in 2014. Although this could relate to the fact that Mongolia has been exporting mining and mineral products in large amounts, on the other hand it could also happen because of drop in agricultural exports.

Table 8. Agriculture Exports and its Share

Year	Total Export mIn USD	Agricultural Export, mIn USD				Agricultural export share of total ex- ports, %			
		Total	Russia	China	Korea	Total	Russia	China	Korea
2006	1,542.00	459.1	26.3	280.3	0.8	29.8	1.7	18.2	0.1
2007	1,947.50	547.8	17.1	337.3	1.9	28.1	0.9	17.3	0.1
2008	2,529.00	502.5	22	26.8	1.4	19.9	0.9	1.1	0.1
2009	1,885.40	260.1	34.7	171.5	0.8	13.8	1.8	9.1	0.0
2010	2,908.50	297.2	26.9	2.8	1.2	10.2	0.9	0.1	0.0
2011	4,817.50	315.3	23.4	4.2	2.2	6.5	0.5	0.1	0.0
2012	4,384.60	273.9	7.2	3.3	2.1	6.2	0.2	0.1	0.0
2013	4,272.70	341.3	6.3	2.9	1.6	8.0	0.1	0.1	0.0
2014	5,774.60	397.2	7.4	2.5	0.6	6.9	0.1	0.0	0.0

In 2006, agricultural exports to the PRC reached USD 280.3 million and comprised 18% of the total exports, whereas in 2008 it dropped to USD 26.8 million and the share percentage decreased to 1%. However, in 2009 the volume reached USD 171.5 million, comprising 9% of the total exports. The share percentage has dramatically decreased from 2010 and dropped to 0.01% in 2014. It is related to declining of exports of unprocessed products such as uncombed cashmere and unprocessed fleece and increasing of exports in mining products, main export products of Mongolia.

While in 2006, agricultural exports to Russia reached USD 26.3 million accounting for 1.7% of the total exports, in 2007 it declined to USD 17.1 million comprising the share of 0.9% in the total. But, in 2009 agricultural exports totaled USD 34.7 million accounting for 1.8% in the total. Since then it has declined to USD 7.4 million in 2014, making up only 0.1%. Agricultural exports to the ROK in 2006 totaled to USD 0.8 million and accounted for 0.8% of the total exports, in 2011 reached the highest of USD 2.2 million with a share percentage of only 0.001% in the total though. Since then agricultural exports to South Korea have been declining.

In 2006, out of total agricultural exports, the exports to the PRC are comprising 61% or USD 280.3 million and exports to Russia 5.7% or USD 26.3 million, and to the ROK 0.2% or USD 0.8 million. In 2007, total agricultural exports reached USD 547.8 million, the highest of exports volumes made in the period from 2004 to 2014. The PRC comprised 62% or the majority of the exports that year, Russia 3.1% or USD 17.2 million and the ROK 0.3% or USD 1.9 million each. Agricultural exports have been declining since 2007 and totaled

to USD 397.2 million in 2014, where Russia comprises 0.2% or USD 7.4 million of agricultural exports, the PRC the 0.6% or USD 2.5 million and the Korea the 0.2% or USD 0.6 million.

Although the agricultural exports to the PRC in 2006, 2007 and 2009 comprised the majority of total agricultural exports or 61-66%, it has dramatically declined from 2011 and comprised less than 1% in 2013 and 2014. Such decline in the agricultural exports is associated with Mongolian exports of processed products rather than agricultural raw materials and a price increase of main products of agricultural exports in domestic markets etc.

Livestock meat: While in 2006, Mongolia exported a total of 11.7 thousand ton animal meat, out of total Russia comprised 99% or 11.5 thousand tons, in 2007 out of total 11.0 thousand tons 98% to Russia, in 2008 out of 10.3 thousand tons Russia accounted for 96% or 9.9 thousand tons, in 2009 out of 18.0 thousand tons of meat 16.6 thousand tons or 92%. As opposed, 1.1 thousand tons of meat or 6.2% were exported to the PRC.

In 2010, the largest meat export year in 2006-2014, a total of 26.1 thousand tons of meat was exported, out of this 14.0 thousand tons or 53% to the Russian Federation, 9.0 thousand tons or 34.4% to Vietnam and 991.0 tons or 3.8% to the PRC. In 2011, out of total 10.2 thousand tons of meat exported, 8.7 thousand tons or 85% exported to Russia and 295.0 tons or 2.9% to the PRC. However, total exports of meat have been declining since 2012. In 2012 exports declined to 3.1 thousand tons, in 2013 to 3.0 thousand tons, in 2014 to 2.3 thousand tons. This is connected to declining of beef exports, a main category of animal meat exports. Besides, it also associates with price increase of meat in domestic markets and the fact that price of export meat does not surpass domestic market price. For example, in 2010 or in the period of the largest meat exports, beef exports totaled to 3.8 thousand tons with export price of USD 2.1/kg and domestic price of USD 3.4/kg, whereas mutton exports totaled to 11.0 thousand tons with export price of USD 2.0/kg and domestic markets price of USD 3.0/kg. In 2012, the period of declining of meat exports, export price for beef was USD 3.4/kg, mutton USD 2.6/kg, whereas domestic market price of beef reached the USD 5.2/kg and for mutton USD 4.8/kg causing exports decline.

Sheep wool: as to sheep wool, one of the basic agricultural export products, the highest exports or 44.1 thousand tons of wool were exported in 2006, out of this 38.8 thousand tons to the Russian Federation, 5.3 thousand tons to the PRC. From 2007 the sheep wool exports have been declining and the total of 9.0 thousand tons were exported and out of this, 92% or 8.31 thousand tons to the PRC and 673.7 thousand tons to the RF. Starting from 2009, the majority of the total exports of sheep wool has been exported to the PRC. For example, out of total, the sheep wool exports to the PRC comprised 94.5% in 2009, 92.0% in 2010, 92.4% in 2011, 86% in 2012 and 77% in 2014.

Combed cashmere: as to combed cashmere, one of the leading agricultural export products, a total of 1.4 thousand tons of cashmere were exported in 2006, and out of this 50% or 710.7 tons to the PRC and 33.6% or 448.8 tons to Italy. In 2007, the year of the highest export amounts in the period from 2006 to 2014, a total of 2.0 thousand tons of cashmere were exported and out of this, 43% or 832.7 tons to the PRC and 38% or 726.0 tons to Italy. However, from 2008 cashmere exports have dramatically been declining and by 2010 totaled to 1.2 thousand tons, by 2011 to 778.8 tons and by 2012 to 646.5 tons thanks to the Government's programme to support domestic cashmere processing industry. In spite of this, cashmere exports increased in 2014 and out of total 803.7 tons of exported cashmere, the majority were exported to Italy and 13.2% or 106.8 tons to the PRC. While cashmere exports to the PRC have been declining since 2007, the exports to Korea and Russia has been increasing reaching in 2013 9.4% or 78.8 tons to the RF, 11% or 93.4 tons to Korea. However, in 2014, exports of cashmere to Russia and Korea were declined totaling to 5% or 39.9 tons to the ROK and 3.0% or 28.0 tons to Russia.

Raw hides and skins: raw skins of large cattle are exported 100% to the PRC. For example, in 2006 a total of 306.5 thousand pieces of hides of cows and horses were exported, the quantity decreased in 2007 to 237.0 thousand pieces though. In 2009 264.8 thousand pieces, in 2010 345.1 thousand pieces, in 2012 200.7 thousand pieces, in 2013 350.2 thousand pieces and in 2014 240.0 thousand pieces were exported to China. Such fluctuations can be explained by the Government interventions to support the domestic processing industry through lending the soft loans to the domestic processors or purchase of the raw materials.

Tanned or crust hides and skins of bovine/equine animals: The tanned cow and horse skins, the main export products, a total of 277,200 m² were exported in 2006 and out of this, 72% or 199,500 m² to China. But, in 2009 out of total exports of 233,700 m², 88% or 207,200 m² to China and 0.01% or 34,200 m² to Korea; in 2011 out of total exports of 669,100 m², 41% or 279,000 m² to China and 1.2% or 8,200 m² to Korea. Thereafter, tanned cow and horse skins were not exported. In 2014, out of total exports of 584,500 m², 30% or 173,700 m² were exported to China.

Tanned or crust skins of sheep and lambs: the majority of tanned skins of sheep and lamb or 94%, as an average of 2006-2014, are exported to China. For example, out of total exports of 1.5 million m², in 2006, 79.8% or 1.18 million m², in 2007 out of total of 1.8 million m² 88.4% or 1.59 million m², in 2010 out of total of 1.5 million m² 95.6% or 1.44 million m² and but, in 2013 100% of total exports of 1.62 million m² and in 2014 out of total of 1.10 million m² 98.5% or 1.08 million m² were exported to the PRC. In 2010, 94,100 m² and in 2011, 35,200 m² of tanned skins of sheep and lambs were exported to the ROK.

Also, the majority of exports of tanned hides/skins of goats and kids or 80% as an average of 2006-2014 are exported to China. For example, in 2006 out of total exports of 541,500 m² 79.8% or 518,800 m², in 2007 out of total of 362,800 m² 97% or 352,200 m², in 2010 out of total of 1.06 million m² 64% or 678,400 m², but in 2013 out of total of 921,400 m² 70% or 644,800 m², and in 2014 out of total of 1.29 million m² 78% or 999,900 m² each were exported to the PRC. As to the ROK, in 2010 59,300 m², in 2011 60,300 m², in 2012 51,200 m², in 2013 14,900 m², and in 2014 69,000 m² of hides and skins of goats and skins were exported.

2.4.2.2 Imported Products

In 2014, Mongolia made international trade with 142 countries around the world. Imports of goods originated from 140 countries, which amounted 5,236.7 million dollar has declined 17.6% comparing to last year i.e. 1,121.2 million dollar goods less imported according to last year's number.

In 2006, Mongolia imported 1,435.1 million dollar goods. Since then, this number had grown and reached 3,244.6 mln \$ in 2008. However in 2009, the import decreased and the import number reached 2,137.7 mln \$. In 2011, the volume of import increased twice and its number reached 6,598.4 mln \$ thanks to the increased investments in mining sector. But in 2013 the import of goods decreased and in 2014 its number reached 5,236.6 mln \$.

Agricultural product import: Total import of agricultural product in 2006 was 714.0 million USD. In 2007 it increased by 33.4% and reached 1017.8 mln USD. In 2008 it reached to 1770.0 million USD. However from 2009 agricultural import significantly decreased by 5 times and dropped to 311.9 million USD. On one hand it decreased because of successful implementation of "Crop Rehabilitation Program" to be self-sufficient for the wheat, potato and vegetable crops by domestic production. On the other hand agricultural import from China decreased.

However, in the next three years, agricultural import started increasing and reached 387.2 million USD in 2011, 568.7 million USD in 2012 and 585.8 mln USD in 2013. But in 2014, the import dropped to 542.7 million USD, decreased by 43.0 million USD in comparison with 2013.

It can be seen about 30 percent of import of total agriculture products is from Russia, for example: 30% in 2006 and 32.3% in 2009 and 26.1% in 2013 and 26.4% in 2014. However, the share of agricultural import from China was 16.1% in 2006 while total agricultural import reached 714.0 million USD, 12.7% in 2007 from total of agricultural import - 1071.8 million USD. But in 2009, when agricultural import dramatically fell, the share from China was 17.2% out of 311.9 million USD. From 2010, there was a significant decline in agricultural imports from China and its share reached 0.1% of total imports of 387.2 million USD. Though agriculture import increased to 542.7 million of USD in 2014, the total share remained as 0.1%. The amount of agricultural product, imported from Korea is relatively constant; its share is about 6%.

According to the table above, import of chocolate, food items containing cocoa, sugar, cigarettes, noodles, dumplings and vinegar products has increased but import of wheat flour, wheat, candy, food seasoning, tea, and food products other than the processed food has decreased. For example, in 2006 import amount of food items, containing chocolate was 16.8 million USD and since then it has been growing every year, in 2014, it reached 50.7 million USD. But the flour import in 2006 was 24.9 million USD, in 2014, its import decreased by 4 times and dropped to 6.5 million USD.

In 2006, Mongolia imported a total of 35.6 m.t. of potatoes, which were 100% from China. In general, large proportion of potato import has been made from China. For example, in 2007, 30.1 thousand m.t. imported, 35.2 thousand m.t. in 2008, 23.1 thousand m.t. in 2009 and 7.9 thousand m.t. in 2010, 29.7 thousand m.t. in 2013 and 5.4 thousand m.t. imported in 2014. The reason of dramatic drop of the potatoe import from 2010 is due to increased potato production in Mongolia, that meets its domestic demand.

For example, in 2006, a total of 4.3 thousand m.t. of onions, garlic, 0.6 million m.t. of root and seed vegetables like carrots, beets were imported. Whereas, in 2011, 15.2 thousand m.t. of onions, garlic, 20.6 thousand m.t. of root and seed vegetable were imported. It shows that the import of onions, garlic increased by 10.9 thousand m.t. and the import of root and seed vegetable increased by 20,0 thousand m.t.. In 2014, the import of onions, garlic increased and reached 17,8 thousand tons, while the import of root and seed vegetable decreased and dropped to 8.9 thousand mt.

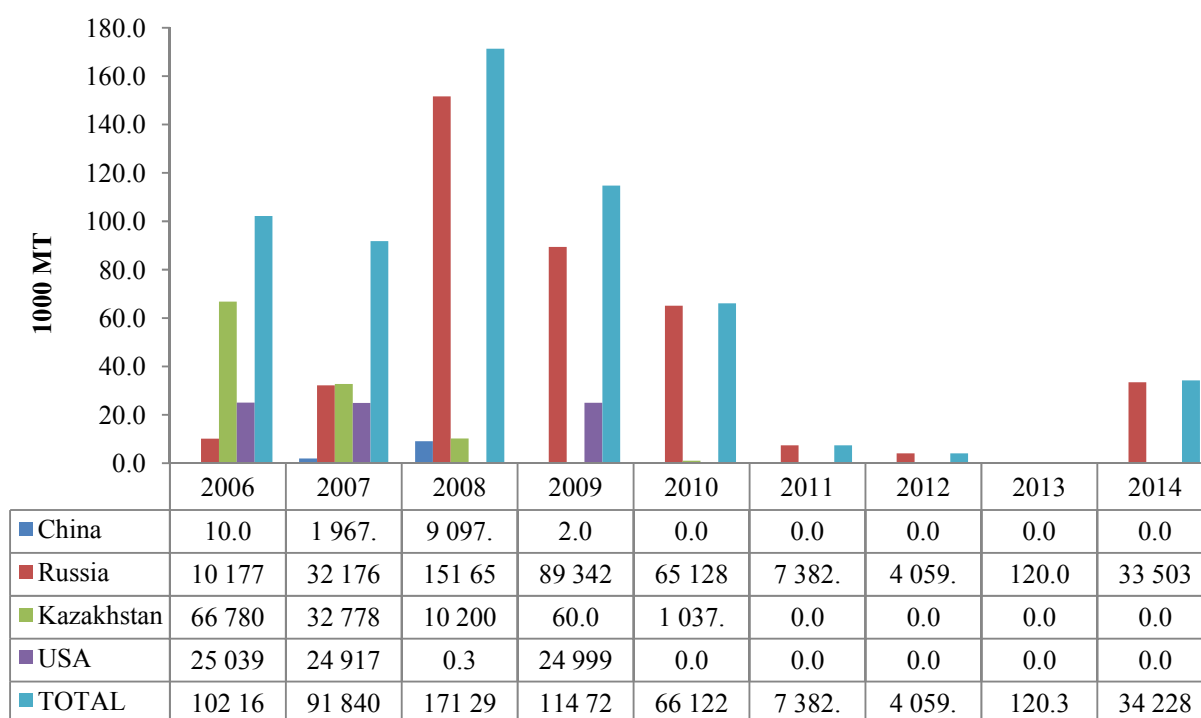


Figure 9. Wheat import

In spite of the import of potatoes and vegetable, the import of wheat, which has been identified as the one main strategic food product, has been decreasing since 2008. For example, 102.2 thousand mt. of wheat in 2006 and 171.3 thousand mt. of wheat in 2008 were imported. But in 2013 only 120.3 mt. was imported. It shows that in this year the government provided its domestic need (see harvest statistics). However, in 2014, 34.2 thousand mt of wheat was imported. The reason of this import was to maintain strategic food reserve and renew of wheat seed (“Law on Custom tax exemption”, 2014-01-16: <http://www.legalinfo.mn/law/details/9691>).

Although livestock farming is prominent, Mongolia still imports factory processed milk and dried (dry) milk powder. For example, in 2006, 741.5 thousand litre factory processed liquid milk, in 2008, 4849.9 thousand litre milk, and in 2014, 191.5 thousand litre milk were imported respectively. In 2006-2012, the majority of the liquid milk import was made from Russia, but from 2012 the majority of the import switched to China. This decrease of fluid milk import was due to the increase of domestic milk processing factories. Increased production of milk is also connected with an increasing import of dry milk powder. According to a survey conducted by the MFA, 60% of processed milk and dairy products made from dried milk production. It is because, according to the survey conclusion, Mongolia has nomadic animal husbandry and seasonal fresh milk supplied.

Majority portion of dry milk powder import has been made from New Zealand. However, the amount of milk powder imported from Russia is relatively small with 283.0 mt. in 2006, 448.5 mt. in 2008, 620.8 mt in 2009, 258.9 mt in 2010, 299.5 tons in 2012 and 548.7 mt in 2014.

Over the years, with increased agriculture production, total quantity of imported food products has been decreased and the future, the Government policy targets to replace the imported products by the domestically produced products.

2.4.3 Korea

2.4.3.1 Current Status of trades in NEA agriculture

The total export amount of agricultural products to China is 0.99 billion USD in 2014, which is continuously increasing from 0.95 billion USD in 2013 and 0.91 billion USD in 2012. When fishery products are included, the amount reached to 1.3 billion USD in 2014. Major agricultural exports to China include fruits, Ginseng, and vegetables. The export amount of food products to China are more than agricultural products in terms of the values. The main food product exports to China include dairy products, noodles, and liquors.

Korean import of agricultural products from China is much larger than the export. Major agricultural imports are vegetables, meals, food grains, oil crops, and so forth. Pepper and Kimchi are the main import products among vegetables. About 30 million USD of garlic was imported in 2014, which is almost all of the total garlic import to Korea. Kimchi is imported all from China. Soy meals are of top import in terms of individual import value.

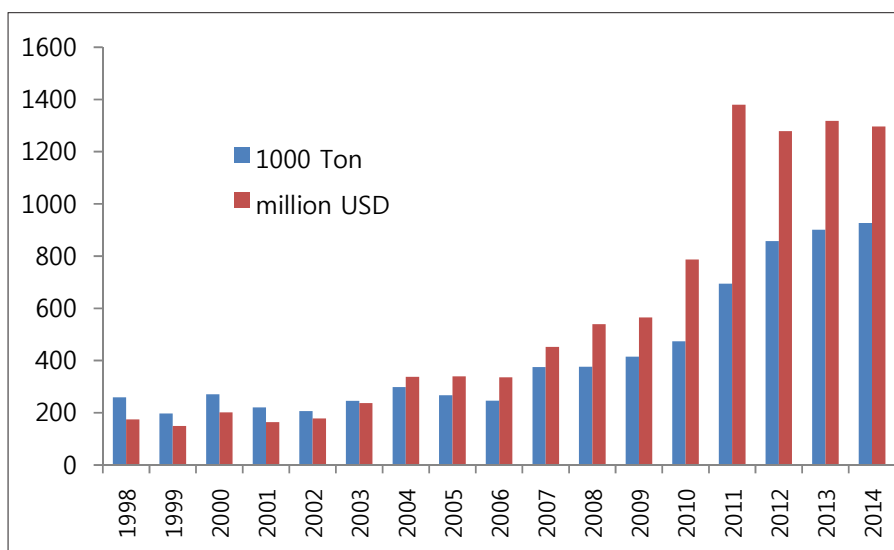
Major exports of agricultural products to Russia include fruits and vegetables while major imports are sauces, snacks, and tobacco. In terms of the value, food products are much greater than agricultural products. Based on a statistical report, the export of food and agricultural products to Far East region of Russia are continuously increasing although the total amount is not significant. Notable agricultural exports to Russia include cymbidium and cherry tomatoes. The amount of beverage exports to Russia is about 22 million USD in 2014, consisting of milk, carbonated drinks, and coffee products. Main imports from Russia are of fishery products in about 0.7 billion USD. Deer antlers and wood products take the main agro-forestry imports from Russia.

The trade with Mongolia is relatively small compared to other NEA countries. The total amount of exports to Mongolia is about 40 million USD in 2014, mostly agricultural and food products. Meanwhile, the import from Mongolia is of about 1.5 million USD, mainly forestry products. Major top exports to Mongolia are tobacco, beverages, ramen, and beer. These products take about half of the total amount of exports, followed by fruit and coffee products, and chocolate. Major imports from Mongolia are fur, broth, antlers.

2.4.3.2 Market trends in NEA agriculture

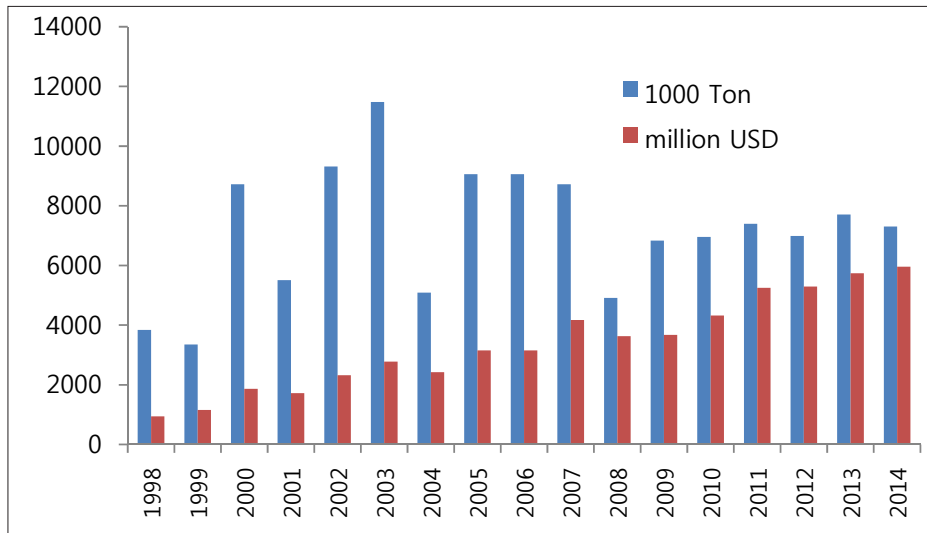
Since 2006, the export from Korea to China is increasing continuously in both quantity and the amount. The amount of export in recent 4 years shows significant increase due to the increase in exports of fishery products. In 2011, total exports of fishery products increased by about 100% compared to the previous year. The export of fishery products increased to 465 million USD in 2011, from 231 million USD in 2010. The export of agricultural and food products also increased to 816 million USD by about 83% from 447 million USD in 2010.

The import from China also shows steady increase in the amount while the weight of import rather decreased. Food grains such as wheat and corn were the main agricultural imports. In 2003, 7.7 million tons of corn was imported, which was about 0.9 billion USD. Wheat was also 800 hundred tons in about 95 million USD. As food grains were imported from other countries, the total weight of import reduced although the total amount of import continuously increased. Based on the statistics on import and export, the trade is expected to continuously increase between Korea and China.



Data source : Korean Statistical Information Service (<http://kosis.kr>)

Figure 10. Changes in agricultural and food products export to China (including fishery products)

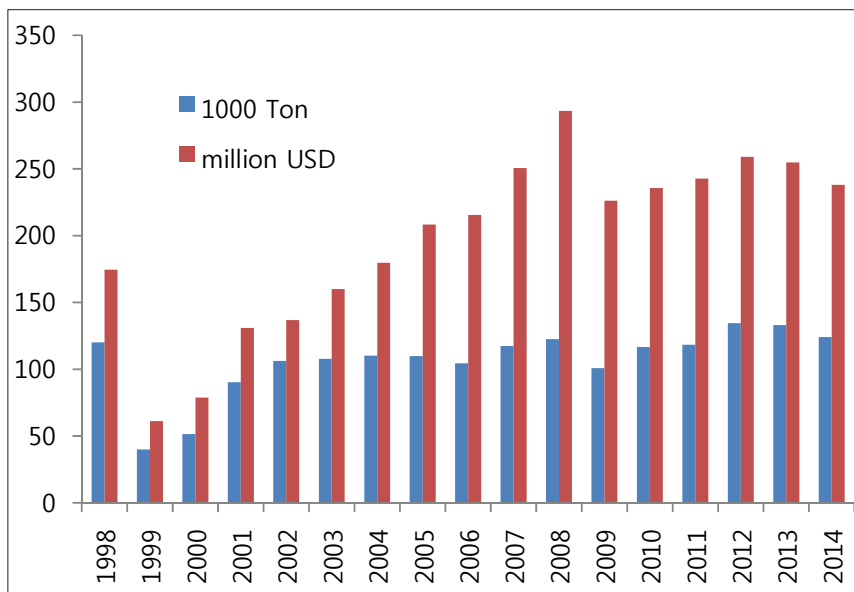


Data source : Korean Statistical Information Service (<http://kosis.kr>)

Figure 11. Changes in agricultural and food products import from China (including fishery products)

The import from Russia to Korea is also continuously increasing in terms of the amount. During the 2000s, the import from Russia was mainly forest products like timbers and wood products, resulting the weight reached to over 1.5 million tons. Since late 2000's, the imports of forest products have decreased while the amount of the total import continuously increased. The import in 2014 shows sudden increase in terms of weight. The total amount of import also increased by about 25% since about 750 thousand tons of corn was imported for animal feeds.

The exports of agricultural and food products to Russia showed steady increases over 2000's until the year of 2008. The weight of exports was rather stable unlike the amount. The amount of total export to Russia was reduced by about 23% in 2009 compared to the previous year. Main reason of reduction in exports to Russia is decrease in exports of fruit products and vegetables. Exports to Russia are expected to be stable based on the statistics.

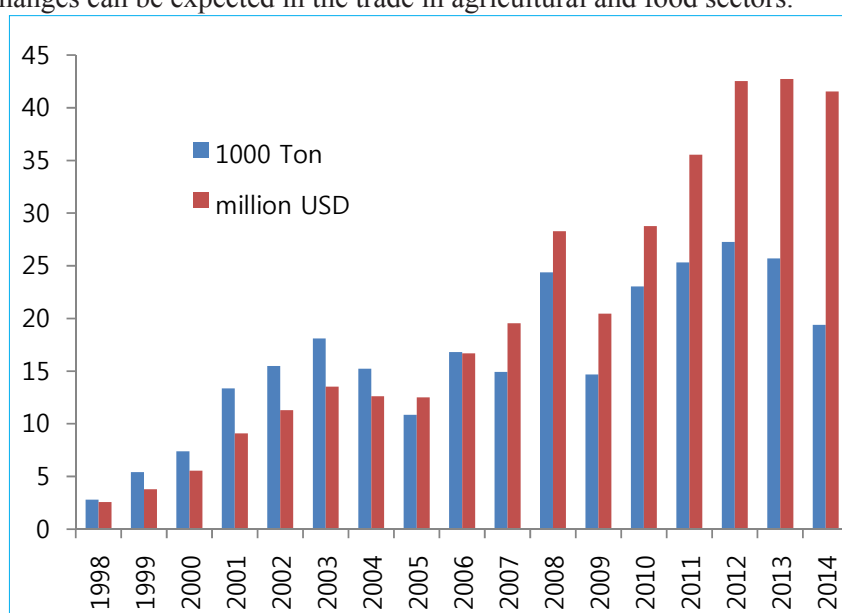


Data source : Korean Statistical Information Service (<http://kosis.kr>)

Figure 12. Exports of agricultural and food products to Russia

The trade between Korea and Mongolia is relatively small compare to other GTI member countries. The exports of agricultural and food products to Mongolia have grown for last 16 years continuously. The amount of export increased from 5 million USD in 2000 to over 40 million USD in recent years. The demand of food products and fruits are continuously increasing from Mongolia.

Meanwhile, the imports from Mongolia do not show substantial changes over last decade although some increase is observed in the import amount in recent three years. During the year of 1999, the import from Mongolia is notable compared to other periods, mainly due to the import of large amount of potatoes. Potato dominated almost all of the imports from Mongolia in 1999 alone. Since then, the imports were decreased for several years. The amount of import form Mongolia surged up to over 3.4 million USD, mostly due to the increased import of furs. The amount of fur imports was over 2 million in 2012. The fur import decreased by about 70%, resulting reduction in total imports by about 57% in 2013. The statistics indicate that the trade between Korea and Mongolia continue to have such trends in near future with no substantial changes. When multilateral or bilateral cooperation in agriculture starts to result in the increase in agricultural production in the future, some changes can be expected in the trade in agricultural and food sectors.



Data source : Korean Statistical Information Service (<http://kosis.kr>)

Figure 13. Exports of agricultural and food products to Mongolia

2.4.4 Russia

The leading countries of the northeast Asia are among the largest trading partners of Russia (China is in first place in terms of trade, Japan – on the ninth place, the Republic of Korea - on the twelfth place). Mongolia and KPDR are not attributed to major trading counterparties of Russia but mutual trade with these countries is of particular importance in the context of Russia’s integration in the Asia Pacific region.

For Russia, the countries of northeast Asia are strategically important partners. In particular we have an opportunity to actively increase the export of oil, gas, coal, wood to China. In addition to raw energy recourses, China is interested in the import of Russian steel products and increasing exports of light industry products and goods with high added value including agricultural products.

In 2011, the volume of Russian-Chinese trade reached a historic maximum of 83.5 billion dollars, the volume of Russian-Japanese trade reached pre-crisis values – 29.7 billion dollars, trade with the Republic of Korea has also reached the maximum values - 25 billion dollars.

China's share in Russia's foreign trade turnover in 2011 amounted to 10.2%, Japan - 3.6%, Republic of Korea – 3%. Among the foreign trade partners of China Russia takes 10th place, Japan - 14th, South Korea – 13th.

The main imported goods from the countries of NEA include: light industry (mainly in China), electronic equipment, products of general machinery, road construction machinery, motor vehicles for the transport of goods and parts, steel products; electrical appliances, cars and trucks and others.

Food products and raw materials from China constitute 3.5%, from Japan - 1.5% and from Korea - at the same level. With regard to agricultural exports to China, Japan and Korea, these numbers correspond to 2.5, 1.4 and 8%. In 2013 Russia exported 81.6 thousand tons of soybeans. It is, by estimation of "AB-Center", 31.8% less than the year before. The value of soybean exports reduced by 29.2%. Key area of soybean exports from Russia in 2013 was China, where we shipped over 83% of all exported soybeans. We also exported big amounts to Spain and Kazakhstan.

According to experts China, Japan and the Republic of Korea today need 30 million tons of grain and 50 million tons of soybeans. Thus, priority for Russia is to trade with countries in northeast Asia: China, Republic of Korea and Japan that is based on the geographical location of countries, a significant need for agricultural products, a high potential for agricultural production and mutually beneficial cooperation.

III. IMPORTANCE OF AGRICULTURAL COOPERATION IN NEA/GTR

3.1 COMMON BACKGROUND OF AGRICULTURAL COOPERATION IN NEA

3.1.1 Backgrounds for the cooperation

3.1.1.1 Chinese perspectives

Russia is China's important political and trade cooperation partner, China and Russia have a long history of agricultural cooperation. Since the second half of the 19th century, Russia Far East area has attracted lots of Chinese farmers. Although, urgent issues remain in the cooperation, such as difficulties in raising development capital, trade barriers on agricultural export products, inefficient communication of agricultural information etc, space of agricultural cooperation is still very wide.

In recent years, Chinese government has positively signed inter-government agreement of overseas agricultural development and cooperation with state governments and district governments of Russia, driving the "going global" strategy in agribusiness, farmer, agricultural technology, equipment and means of production, and actively carrying out regular exchange and communication on agricultural cooperation between two countries. With the jointly efforts of China and Russia, China's advantages of sufficient capital in agricultural production and abundant labor, as well as Russia's resourceful land were integrated, so as to give play for the complementary superiority for both sides and achieve breakthrough in agricultural cooperation. By 2014, the scale of labor cooperation between China and Russia has reached 20,000 people per year, more than 4 billion dollars in agricultural import-export volume, more than 0.4 million hectares of agricultural contracted land in Russia, and the cooperation in agricultural technology has promoted steadily.

China and Korea are geographical neighbors and boast high industry-complementary. According to China's statistics, in 2013, trade volume between both sides reached 274.2 billion dollars. China acted as Korea's largest trade partner country and the largest targeted country for investing for several years. While Korea also ranked the third place in China's trading partners. Due to the difference in economic development level, industrial structure and natural endowments, presently, China and Korea are still in a different place in global value chain and boast high economical complementary. China supplied labor-intensive product and intermediate product to Korea, while Korea offered industrial products and high-end consumer goods to China. Therefore, huge development space remained in both sides' economic and trade relations. Before, leaders of China and Korea have reached an agreement that bilateral trade volume of 300 billion dollars would be achieved by 2015.

In recent years, exchanges and cooperation in economy and trade between China and Korea have carried out more frequently; China has become one of Korea's largest trading nations, while Korea is one of the important trading partners for China. In the aspect of agriculture, agricultural structure, mode of production,

and diet culture are very similar in both sides. The difference of agricultural species is not very marked. China's agricultural production costs low, making China's domestic market price of agricultural products much lower than that of Korea.

Mongolia is a friendly neighbor of China, the two countries have 4676.9 km common boundary. Although the two countries belong to developing countries, there is a big difference of national condition in both sides. From the perspective of Mongolian Plateau's history and geography, both sides have shared lots of cultural and historical resources in the process of historical development in country formation, formation of nationality, as well as interaction between pasturage and farming. Meanwhile, exchanges and cooperation in aspects of politics, economy, culture and social life have increasingly promoted the consensus and complementary between China and Mongolia. Mongolia is rich in natural resources, especially mineral resources, fuel and the resources of farming and animal husbandry (including agriculture and animal husbandry), providing a material basis for agricultural cooperation between China and Mongolia.

Enterprises' Foreign Agricultural Investment Practices in NEA/GTR

Statistic from Foreign invested enterprises registration system of Ministry of Commerce shows, by 2013, 31 Chinese enterprises have conducted direct agricultural investment to Korea, and accounting for 54.8 per cent, the enterprises from Shandong are in the majority. There are two enterprises from Liaoning Province and one enterprise from Jilin Province as well. By 2013, six Chinese enterprises have directly invested into Mongolia agriculture, and enterprises from Shandong accounts for fifty per cent. There is also one enterprise from Liaoning Province. By the end of 2013, there are 77 Chinese agricultural enterprises which have conducted direct investment in Russia. Among them, there are 60 planting enterprises, 8 service enterprises for agriculture, forestry, animal husbandry and fishery, and 7 animal husbandry enterprises.

South to South Cooperation between China and Mongolia

Since 1996, China has actively taken part in the South-South Cooperation (SSC) under the framework of the Special Programme for Food Security (SPFS) launched by the Food and Agriculture Organization (FAO) of the United Nations. By the end of June, 2012, the Ministry of Agriculture of China, on behalf of the Chinese government, had signed 20 agreements in support of SSC and fielded 935 agricultural experts and technicians to 23 countries to implement the SSC programmes.

In September 2008, the Chinese government announced to donate US\$30 million to FAO for setting up a Trust Fund in support of SSC within the framework of SPFS. This step marked a new stage of SSC and was well received by the developing countries as well as the international community involved in food and agriculture. On October 15, 2014, Premier Li Keqiang announced in the speech delivered at Food and Agriculture Organization (FAO) headquarters that China government will devote 50 million dollar to FAO in developing agriculture South-South cooperation in next five years. This decision symbolizes that China will take part in agricultural multilateral South-South cooperation under the framework of FAO in order to enter into new development.

3.1.1.2 Mongolian perspectives

According to the UN FAO Food Price Index that provides an overview on world food supply and consumption, food price has generally increased and in 2008 and 2010 reached all-time highs. Key factors of this soaring food price include increases in world population as well as in food consumptions.

Considering the world situation and the further trends, neighboring countries in North Asia have the needs and opportunities to cooperate in agricultural industry. In other words, it should be viewed as development opportunities for agricultural industry, which relates to, from the one side the market or consumer and from the other side the production that is directly dependent on natural resources. As mentioned before, Mongolian agricultural industry has developed in a relatively traditional way and been not able to use high-end machineries and technologies in productions and had negligible supplemental inputs into productions compared to other leading export countries. This shows that opportunities are existing to further substantially increase production of the industry.

Another factor is that living standards of the population have increased and future opportunities are still out there to satisfy the consumer needs that head towards using more natural products and preferring for safety and quality of food products through proper management of the specific factors of Mongolia, which has land and natural resources that are not affected by decades in chemical inputs and intensification. With regard to territory, being adjacent to each other will lend big economic and time advantages and opening or boosting cross border agriculture cooperation that has not had developed well enough, border points that continue hundreds and thousands kilometers can be considered as another possibility.

Cooperation with China

An agricultural cooperation between the two countries in the past 10 years was assessed during the 6th meeting of the Working Group of the Ministries of Agriculture of Mongolia and China held in November, 2014 in Beijing and further, it was agreed to implement projects on transferring technologies, organizing practical trainings to strengthen human resources capacities, expanding cooperation in veterinary sector, establishing a direct cooperation between the concerned agricultural institutes of two countries and implement a joint research project.

Cooperation with Russia

A modern cooperation between Mongolia and Russia in the agricultural sector has started by Soviet Union's assistance in a virgin lands campaign in Mongolia for the first time. Furthermore, the Russian side worked to support in successful implementation of the 2nd and 3rd Virgin Lands Campaign (Crop Rehabilitation Programme 3) conducted by the Mongolian government in years of 1980 and in 2008.

Goals to meet domestic needs of wheat, one of the staple food products, through revitalization of agricultural production have been set and the 3rd Crop Rehabilitation Programme has successfully implemented in 2008 to 2011. Financing necessary for upgrading agricultural tractors, combines, machinery and equipment within the framework of the campaign has been resolved by opening a credit line between commercial banks of the two sides. As a result, large-size tractors and combines supplied through opening the credit line of USD 11.6 million.

Export products into the Russian Federation such as meat, meat products, sheep and camel wool, goat cashmere knitted garments, furs, fur boots, clothes, leathers, sheepskins, souvenirs, and Mongolian nomadic tents are in greater demand in the markets of Irkutsk, Buryatia, Tuva, Kalmyk, Inner Baikal and Altai Krai, which are either neighboring regions or have similar temperate climate. As to meat exports, Federal Service for Veterinary and Phytosanitary Surveillance of Russia has been assigning a risk assessment team to conduct certification of slaughtering plants. According to the certification, in each of 2012 and 2014, exports of frozen and canned beef, horse meat, meat products were enabled, the trade is limited though because of a price issue.

Cooperation with Korea

Mongolia and the Republic of Korea established diplomatic relations in 1990 and bilateral cooperation in agricultural sector in the past has been quite limited though. In consideration of this, the Ministry of Food and Agriculture of Mongolia and the Ministry of Agriculture and Forestry of Korea signed a Cooperation Protocol in Agricultural Sector in 2003 to further expand, formalize and bring the cooperation of Mongolia and Korea in food and agricultural sector to a new level. With the purpose of implementing the Cooperation Protocol, an Inter-ministerial Joint Committee for Agriculture has been established and holds its meeting every 2 years to negotiate the cooperation areas, joint projects and measures. The cooperation between the MFA and the Rural Development Administration of Korea in introducing and adapting of Korean advanced agricultural technologies into Mongolia has enhanced and several projects and programs have been implemented successfully.

Multilateral cooperation

A number of projects and programs have been implemented in agriculture, food and natural resource sectors with support from foreign donors and international organizations, including FAO, IFAD, Asian Development Bank (ADB), World Bank (WB), UNDP, Japan, KOICA, China, Russia, EU, Switzerland and others as a grant aid, technical assistance and soft loan in livestock, crop production, food processing and environmental protection areas. As indicated in the FAO CPF programme, it was reported that total funding of the projects and programs implemented in the food and agriculture sectors reached approximately over 72 million of US\$. The cooperation between FAO and Mongolia solidified upon establishment of a dedicated FAO Mongolia Office in Ulaanbaatar. In recent years, FAO has been further assisting the Government following its decision to make sustainable agricultural development in Mongolia a top priority. FAO is focusing specifically on enhancing food security, rural development and natural resources management. Since FAO office's establishment in 2009, FAO has implemented about 20 mln USD through types of projects in the area of agriculture and sustainable natural resource management in Mongolia. Mongolia is a member of the Central Asia Regional Economic Cooperation (CAREC) Program, which is a proactive facilitator of practical, results-based regional projects and policy initiatives that foster trade expansion and sustainable development. The Program promotes and facilitates regional cooperation in the priority areas of transport, trade facilitation, trade policy, and energy.

Multilateral cooperation potential in the Eastern Region

As for the eastern region of Mongolia, agricultural industry, particularly grain cultivation has rapidly been increasing in recent years reaching the level to satisfy, the needs of the eastern region. Then the need duly arises to export products as the next step. Many opportunities arise along with the development of crop farming: production of animal feeds, intensified livestock production and cultivation and acclimating of new crops. Through developing the region, prerequisites are created for opening a gateway to supply markets of neighboring countries with agricultural products.

3.1.1.3 Korean perspectives

Backgrounds

Northeast Asian countries are facing risks of food shortage problem and they are the major importers in the world grain market. Particularly, Korea and Japan have about 30% of self-sufficiency in food supply. China is also interested in maintaining self-sufficiency and safety of food as important issues, showing more interests in agricultural cooperation together with Korea, Mongolia, and Russia. As world food market has been fluctuating due to increased demand of bio-fuels, Korea and China are taking stable supply of grain foods as an important issue. Meanwhile, Russia has increased production of grains in Far Eastern region and seeking stable market

of the products. Agricultural cooperation between Russia and Korea is important since Korea has a large stable market.

Since 2000', the price of major food grains such as corn, soy bean, and wheat has been increasing due to several reasons, including new demand from bio-fuel production in addition to animal feed, export tax to agricultural products, increased demand from China and India along with economic development. Korea is importing most of ingredients for animal feed, such as corn, wheat, soy bean. Unstable price of the food grains in world market affects the cost and competitiveness of livestock production. Increased use of corn in bio-ethanol production resulted in the corn price in the United States. This price changes resulted in increase in the price of major ingredients for animal feed such as soy meal. These market changes brought about the difficulties in both feed industries and animal farms. Fortunately, the demand of corn from bio-ethanol production was dropped and resulted in relatively stable grain market mainly due to the stable price of oil recently. World food situation is expectedly facing higher demand due to climate changes and population increase, and stagnant productivity in agriculture. Since free trade environment of agricultural products under WTO and FTA, agricultural production in most developing countries have been facing difficulties in increasing domestic production capability except for some export countries. These raise the necessities in agricultural development and cooperation in Northeast Asian region.

Supply and demand of food in NEA

Improved medical technologies and services resulted in longer life expectancy of people, in both developed and developing countries. Increased population requires higher demand of food grains. Rapid economic developments in China, India, and some other developing countries lead to higher demand of better quality of foods as well as the increased food consumption. Transition to meat consumption from vegetables is one of the examples. Higher demand of meat causes higher demand of grains. These changes deteriorate the situation of supply chain of grain foods. China had been a major exporter of food grains. She became an importer in mid 1990's.

Farm land is the main key in increasing food grain productions. Developed countries that are exporting food grains are limiting the cultivation land to prevent the price reduction of food grains. Meanwhile, many developing countries are facing the limit of further development of farmland. Korea and Japan show the continuous decrease in farm land due to the demand of land from other sectors. There are certain limitations in increasing total production of foods through increasing production rates. Research and development for crop productivity requires time and budget which many developing countries are not easy to take. Unlike the past, chemical inputs such as fertilizer and pesticides in crop production are not welcoming with concern about environmental deterioration nowadays. Climate change is also one of the factors that affect the stability of food supply. Shortage of irrigation water is one of the main concerns in agricultural sector affected by climate change. World grain market is dominated by a limited number of large grain companies. They are known to control over 80% of grain supply in the world. Most of grain importers are developing countries and vulnerable to the instability of grain prices. The grain prices are volatile in that the amount of grain traded in the market is relatively small and slight shortage of supply can trigger surge of the price.

When food crisis occurs, many exporters are limiting food exports. Even WTO does not have any measure to force to lift the limits for stability of food grains. The United State allows limiting exports of agricultural products through related acts. EU applies taxes to wheat and barley exports in order to stabilize the price of food grains. .

Northeast Asian countries have weakness in supplying grain foods due to several reasons. They have the highest population densities. About 24% of world population is living in the Northeast Asian counties while

they have only 10% of land and 7% of arable land area in the world. Both Korea and Japan have the lowest self-sufficiency of food grains. It is expected that China is also facing food shortage due to economic development and changes in food preferences. As mentioned in the previous chapter, Korea is importing about 80% of food grain from the US. Korean imports of corn and soy bean are dependent on the US by 90%. China and Japan are also importing major food grains from a limited number of exporter such as the US, EU, and Australia.

Necessities

Food security of one country is directly linked to the national security. Not only Korea and Japan that are facing chronic food shortage, but China needs to prepare potential food shortage problems. These emphasize the importance and necessities of cooperation in agricultural development in this region. The potential of resources in GTR is enormous and can be utilized to efficiently solve the food related insecurity. The cooperation can be achieved in mutual supplementary ways. Mongolia and Russia have a great potential for developing additional arable land. China has both natural resources and financial capability for the cooperation. Korea can provide financial and technical input for the cooperation in the agricultural development. Agricultural development programs can alleviate poverty in rural area. Since the market of the agricultural products is already available in the region, the cooperation is expectedly highly successful. Further, the cooperation can provide North Korea with chances of the participation in some projects. North Korea will also benefit from the cooperation in improving food stability. In the long run, the cooperation will provide foundation to improve the relationship between two Koreas.

Participants

Both private companies and governments should play specific roles for the cooperation. There are a number of steps to realize successful cooperation either mutual or multilateral. When initiating and planning the cooperation, the role of governments is extremely important in that they set up the direction of cooperation, prepare legal and political arrangements, and coordinate networks among relevant experts and institutions. Public companies, non-government organizations, and farmers union are other groups to participate in the cooperation. Private companies, then play the important roles in agricultural cooperation.

Advantages in agricultural cooperation in GTR

Within the region, trade is quite easy and efficient in that they are close geographically. As mentioned in above, NEA countries are importing 60 to 70% of agricultural products from the US and Australia. Agricultural products from Northeastern part of China and Far East region in Russia are advantageous in terms of transport. When North Korea's participation and Japan's food demand are considered, the potential of cooperation is quite huge.

In addition, there is a large arable land area in GTR. The development of the area provides all the participants with mutual benefits. Increased agricultural production provides farmers with additional income through exports and stable food supply to importing GTR. Considering salaries of farm workers in the exporting GTR, GTI cooperation in agricultural sectors benefits rural economy. When considering North Korea's participation, the cooperation may further increase the efficiency in utilizing human resources as well as political and military stabilities in the region.

Direction to the cooperation

Agricultural Committee of GTI is the main driving body for agricultural cooperation. The board defines the direction of agricultural cooperation and supports various projects. Each government should support the board

through legal and political measures. Financial support is also an important factor. International organizations may be financial sources for the cooperation. Asia Infrastructure Investment Bank, a recently launched international bank could be a good source for the projects of cooperation.

When the agricultural board of GTI is initiated, the board needs to define the objectives of agricultural cooperation and establish several task forces or divisions for specific projects or tasks. These require specialists and experts on agriculture related fields from universities and research institutes.

3.1.1.4 Russian perspectives

The year 1997 is the beginning of a new period of inter-regional and cross-border relationships with China and this cooperation continues until present time. Despite the general decline in interstate trade of both countries, the goods turnover of Heilongjiang province with Russia began its growing again. At the end of 1997 the province adopted the strategy of «three breakthroughs» in relationship with Russia: to increase the volume of trade transactions and improve the quality of products, to expand the areas of trade and economic cooperation, and to implement major projects.

The increase in cross-border cooperation was continuing in 2008 (January-July, 2008, the increase in goods turnover amounted to 29%) but by the end of the year the growth rate decreased. This fact is conditioned by the global financial crisis as well as by certain stagnation, problems, lack of new cooperation forms in Chinese-Russian trade and economic relations.

The basic premises for the active foreign trade relations in Far East of Russia are the geographical location and abundance of natural resources. The remoteness from the major most inhabited areas of Russia complicates the trade exchange with them. At the same time, the availability of fuel and energy, forestry, marine biological resources makes Far East attractive for foreign investors particularly from Asia-Pacific Region.

The liberalization of foreign trade offers an opportunity for Far East to change economic relationships and to find new possibilities of East Asian neighboring countries to export raw minerals, forest, fish and seafood within a short time as well as to expand imports of industrial plant equipment, consumer items and food supplies from the countries of Asia Pacific Region.

The foreign trade of Far Eastern Federal District is mainly focused on the countries of Northeast Asia – Japan, China, and the Republic of Korea. Their share in foreign trade turnover of the region exceeds 85%. This value is 2.5 times more than that one of Siberian Federal District and almost 7 times more for Russia in gross.

The total foreign trade turnover of Far East Federal District amounted to 18.285 billion USD in absolute measures in 2007. The goods turnover of Japan was 32.5%, Korea – 29.3%, and China – 23.3% (data of Far East customs administration). Taking into account that China took the first place (33%) in the imports of the region and third place in the exports of the region, it is necessary to specify the features of the exports structure in China: 57% is accounted for rough timber, 14% for petroleum and petroleum products. Imports of goods from China and in general Russian-Chinese trade goods turnover increased by 1.5 times due to the growth of the supply of trucks, bulldozers, and excavators.

Primorsky territory occupies one of the leading places in FEFD by the number of participants of external economic activity and also by foreign trade turnover, the volume of which ran up to 5,347 USD billions in 2007 which amounts 29.2% of foreign trade turnover of FEFD. The main partners of the region for the past ten years are the PRC – 38% of external economic activity, Japan – 30%, Republic of Korea – 14%. The main exported products of the region in the PRC are: wood (37%), fish and seafood (24%), rolled steel (23%), ferrous metals (11%), petroleum and petroleum products (10%). The main imported products are: footwear (30%), food (15%), land transport vehicles (6%), plastic products (5%).

The industrially underdeveloped areas of province Heilongjiang are on the border of Khabarovsk territory; with these areas the trade is conducted and agricultural projects are held on the territories of Bikinsk, Vyazemsk, Khabarovsk administrative districts by means of Chinese labor power. In the 1990s the share of China in the trade with the territory changed from 7% to 64%. Since 2002 this share stabilized at the level of 45-50%.

The territory carries out international trade transactions with more than 80 countries. The volume of foreign trade amounted to 2808 USD millions. The three largest trading partners are China – more than 45% of the overall value of foreign trade turnover, Japan – 18.6%, and the Republic of Korea – 9%. China has also exported round wood (2,853.2 thousand cubic meters), petroleum products (278.7 thousand tons), fish and seafood; main imported goods – textile, clothing, footwear, technical equipment, vehicles, articles made from stone, cement, chemical products.

The trade and economic relationships with the neighboring country are especially important for boarder Amur region. From 1993 until the present time Chinese share in total volume of exports and imports of the region has been ranging from 29% to 99%. The volume of import operations reduced significantly, and the number of export operations increased after the crisis of 1998. The imported products were dominated by food products (fruits, vegetables, meat products, cereals) and in the exported products were timber and soybeans. The trade turnover of the region with China reached the maximum value – 370.3 USD millions in 2007 (75% of total volume of foreign trade), an increase of 6.2 times, compared to the year 2000. Unfortunately, the raw material exports (hydrocarbons, petroleum, bio-resources, and wood) have only intensified. The share of wood and wood products increased from 32.6% in 2000 to 56.5% in 2007. The exports of precious stones, precious metals and products made from precious metals increased by 2.7 times, compared to 2006.

Bilateral and multilateral cooperation

In order to coordinate efforts for the implementation of strategies of regional development of Russia and China and activity for the implementation of the federal target program “Economic and social development of Far East and Zabaikalie until 2013” and “Program to revive the North-Eastern areas of China”, and in accordance with paragraph 8, section I of the Collective Declaration of the Russian Federation and People’s Republic of China from 26 March 2007 (Moscow) and in accordance with the Plan for implementation of the Treaty on good neighborliness, friendship and cooperation between the Russian Federation and People’s Republic of China (2009-2012), there has been development of the Program of cooperation between the districts of Far East and Eastern Siberia of the Russian Federation and the North-Eastern part of People’s Republic of China (2009-2018).

The LIST of key cooperation projects between the districts of Far East and Eastern Siberia of the Russian Federation and the North-Eastern part of People’s Republic of China includes 57 projects, and 22 of which are implemented. The investments of China are carried out in 11 projects. The following projects are determined for agriculture and food industry: **Zabaikal territory** – farm land lease to Chinese Zole Resources Investment; **Amur region**: 1) modernization of Belogorsk packer; 2) organization of sugar production and related products in Ivanovo region; 3) project for cooperation in the sphere of agricultural crops production; **Jewish Autonomous region**: 1) creation of the enterprise for deep processing of soybean in Birobidzhan-city 2) construction of pig farm in pos. Smidovich, 3) reconstruction of Bidzhansky and Teplovsky salmon hatcheries 4) project for cooperation in the field of agriculture; **Khabarovsk territory** – no; **Primorsk territory**: Project for cooperation in the field of agriculture.

The project implementation of the building of high-tech factory of mineral fertilizers in Nakhodka was started in concert with the department of civil engineering activity and ecology of corporation from the Republic of Korea (Hyundai Engineering & Construction Co., Ltd). The first commercial production turnout is scheduled

for January 2018. The plant must be put into use totally during the year of 2019 and the capacity of plant will amount to 1 million tons of methanol, 2 million tons of carbamide and 1 million tons of ammonia. Starting two plants of production will create about 3.500 high-paying jobs in Nakhodka-city.

3.1.2 Protocols and existing mechanisms for the cooperation

3.1.2.1 Chinese approaches

Multilateral Cooperation Mechanism: The Shanghai Cooperation Organization

Although Shanghai Cooperation Organization (SCO) started from safety cooperation, the good-neighborly political relationship developed in the long time can lay solid foundation for developing economic cooperation. The regional economic cooperation has born member attention, and gradually the important cooperation content under the framework of SCO, so the agricultural cooperation has produced and made considerable progress. In November, 2007, the Meeting of the Council of Heads of Government of SCO urged to launch and develop member agricultural cooperation of SCO. Therewith, the first Meeting of Agricultural Executives will be held in November this year. In October, 2009, the Meeting of the Council of Heads of Government of SCO emphasized the significance of developing agricultural cooperation and obliged to accelerate preparation of first Meeting of Agricultural Ministers and research the *Draft of Agricultural Cooperation Agreement of SCO*. In June, 2010, they signed the first *Draft of Agricultural Cooperation Agreement of SCO* in Tashkent Summit which confirmed the important areas of SCO agriculture cooperation in the next five years, including plantation, animal husbandry, research and promote scientific results of biochemical method of plant protection, beekeeping, veterinarian, cross-border animals and plants epidemic disease prevention and control, seed breeding, soil improvement and agricultural irrigation, agricultural product procession and trade, agricultural machine manufacturing, agricultural scientific research, agricultural new technology research and promotion, invest and establish agriculture joint enterprise, agriculture experience communication, and agricultural management ability training and improvement. In October of the same year, the First Meeting of Agriculture Ministers of SCO was held in Beijing, which developed further negotiation in the privileged direction and detailed ways of regional agricultural cooperation. They signed the Meeting Minutes of Agriculture Ministers of Shanghai Cooperation Organization, constructed regular meeting mechanism of Agriculture Ministers of SCO, passed work regulations of permanent agricultural expert groups of SCO, and affirmed agriculture trade promotion, information communication, animals and plants epidemic diseases prevention and control, agricultural technology transfer, capacity building, and other cooperation prior fields.

The successful Beijing Summit of SCO in June, 2012, President Hu jingtao proposed once again that the SCO members should reinforce the cooperation in establishing grains safety cooperation mechanism, seed bank, and agricultural demonstration and promotion base. It has been clearly pointed out in the press communiqué released during the Summit that we should promote the Agricultural Cooperation Association of SCO Members signed in June, 2010, to take effect as soon as possible, in order to improve agricultural cooperation efficiency. The *Interim Development Strategic Planning of SCO* proposed by China has been passed in the Summit, which confirmed comprehensive promotion in key fields, privileged direction, and related implementation measures of multilateral cooperation in the planning, including some economic projects benefiting livelihoods of member nations which ensure the future development direction of SCO.

Multilateral Cooperation Mechanism

China-Japan-South Korea Cooperation Mechanism

China-Japan-South Korea Cooperation is the sub-regional cooperation organization of China, South Korea, and Japan. In 2012, Foreign Ministry has drawn up the China-Japan-South Korea Cooperation (1999-2012)

White Paper, which involves some important content of agricultural cooperation. There are gaps in agricultural operation scale, agricultural natural conditions, and economic development level of China, Japan, and South Korea, so agricultural cooperation enhancement has not only contributed to promoting agricultural development of three countries, but also served to improve the welfare of three nations' people and protect grains safety of Asia and the whole world.

In the Second Leaders Meeting of China, Japan and South Korea in 2009, the three leaders reached the consensus of discussing the establishment of agricultural cooperation mechanism in the three countries. The First Agriculture Ministers Meeting of China, Japan and South-Korea was held in Korea in April, 2012. Han Changfu, Chinese Minister of Agriculture, Suh Gyuyong, Korean Minister of Agriculture, Forestry, Aquaculture and Food, and Michihiko Kano, Fisheries Minister, would lead their respective delegation to the conference. The agriculture ministers exchanged in-depth views in agriculture safety, animals and plants epidemic diseases prevention and control, agricultural partner relationship establishment, and other global and regional food and agricultural hot issues, and they commonly announced the joint communiqué. The meeting was held successfully, which indicates the perfection of trilateral agricultural cooperation mechanism and improvement of depth and extent of trilateral agricultural cooperation.

Bilateral Cooperation Mechanism

China and Russia jointly released the *Joint Sino-Russia Statement* in March, 2007, which focuses on industrial manufacture and cooperation, including energy, agriculture, medical treatment, machinery manufacturing, aviation and automobile manufacturing. In order to jointly promote scientific achievements, the first step is to achieve the saving technological results of energy and resource, attract Chinese enterprises to contract to the Russian buildings and agricultural product project, and expand the publicity and promotion of enterprises from the two nations.

China-Russia Agricultural Cooperation Mechanism

Chinese Ministry of Agriculture and Russian Department of Agriculture have established agricultural cooperation mechanism on the basis of many bilateral mechanisms including BRICS, APEC, SCO, Conference on Interaction and Confidence-Building Measures in Asia (CICA), and Regular Meeting Mechanism of Chinese and Russian Leaders. Through implementing the agricultural cooperation agreement reached in the leaders meeting, the two nations have promoted multilateral and bilateral agricultural cooperation. The Agricultural Ministry of China and Russia held the bilateral meeting during the multilateral meeting, such as the Second and Third Meeting of Agricultural Ministers of BRICS in 2011 and 2013 and the Second and Fourth Ministers Meeting of Food Security of APEC.

China-Korean Agricultural Cooperation Mechanism

In the *Action Plan to Enrich China-ROK Strategic Cooperative Partnership*, China and Korea have clearly stated positive evaluation for the well operation for current relevant negotiation mechanism of fishery issues in June, 2013, for example, Joint Fishery Committee of China and Korea. They welcome to regular fishery problem meeting led by Chinese and Korean diplomatic service. The two nations have decided to continuously enhance communication and cooperation, reinforce cooperative mechanism of joint supervision and management in bilateral fishery and aquaculture and relevant departments, develop Chinese and Korean fisheries cooperative research mechanism, and expand personnel and technological exchanges including aquaculture high-level meeting.

They agreed that the signed high-level and comprehensive China-Korea Free Trade Agreement will contribute to establishing relevant institutional arrangement of trade and investment and meet the demand of future bilateral economy and trade cooperation and strategic mutual trust development. The two nations will make

more efforts to promote negotiation to make progress. Besides, they can make more close cooperation in Asian economic integration through China-Korea FTA, Regional Comprehensive Economic Partnership, First Agreement on Trade Negotiations among Developing Member Countries of the Economic and Social Commission for Asia and the Pacific, Greater Tumen Initiative (GTI), and Round Huanghai Sea Economy and Technology Communication Meeting of China, Korea and Japan.

China-Mongolia Cooperation Mechanism

In accordance with development of bilateral agreement and economy and trade relationship, the two foreign ministers re-signed the *Broader Ports and Management System Agreement of China and Mongolia* in July, 2004 based on the bilateral broader trade agreement signed in 1985, which made two nations open 13 permanent and seasonal ports, so this policy has paved a broader channel for bilateral economy and trade communication and personnel exchange. There are nine ports in Inner Mongolia of China and six provinces of East and South Mongolia, and four ports in Xinjiang Uighur Autonomous Region of China and three provinces of West Mongolia. In the light of cargo and personnel flow, five pairs of ports open all the year round. During the economy and trade cooperation and personnel exchange of China and Mongolia, the broader port plays an important role. In the 21st century, China-Mongolia bilateral trade relation has developed rapidly, so the bilateral trade statistics improved stably, and the overall operation situation appears a good trend.

Regional Cooperation Mechanism

Local governments in China especially Heilongjiang and Xinjiang rely on the geographical advantage and also actively carry out agricultural cooperation with the SCO countries, including the construction of agricultural technology Demonstration Park, development of overseas agricultural resources and so on.

3.1.2.2 Mongolian approaches

Principles, Processes, Investments, Sharing the Profits

Currently, the cooperation in an agricultural sector with partner countries and international organizations is conducted through implementation of technical assistance and soft loan projects and programs. However, long term investment oriented projects and programs that are oriented for profit sharing basis are not yet being implemented at the bilateral government cooperation level. Regarding private sector, principles of conducting activities on direct investment and in an business area will be regulated by the Mongolian Law on Investment, which was revised and approved in 2013, and related legal information are briefly included in the following part. One feature of this law is that investments will not be distinguished as domestic or foreign. Depending on size, location and industry of a particular investment, a Stabilization Certificate will be issued to keep a tax stabilized.

The Ministry of Food and Agriculture of Mongolia has signed cooperation agreements and protocols with all three countries to promote intensive agriculture cooperation and to facilitate active export and import trades of agriculture originated products between countries. In the below table signed cooperation protocols, agreements and MOUs are listed, of which majority of them are in the area of sanitary and phytosanitary fields.

Promoting investment in Mongolia

The Government of Mongolia has consistently pursued policies that improve the business environment and increase the country's competitiveness. Economic and business activities in Mongolia are regulated by a variety of laws, including the Company law of July 2, 1999 (revised substantially on September 13, 2007), the Civil Code of January 10, 2002, the Law on Investment of October 4, and many others. Mongolia is party to

many international treaties in various areas, from the protection of the environment to free trade, the protection of foreign investments and the avoidance of double taxation. Mongolia has been a member of WTO since 1997. Mongolian legislation recognizes the primacy of International Treaties in cases of conflict with domestic legislation. With respect to the foreign investment, Mongolia is signatory to the Washington Convention on the Settlement of Investment Disputes between the State and National of another State (1965, joined in 1996), which provides settlement of international investment disputes. It is also signatory to the Seoul Convention on Investment Guarantee Agency (MIGA) since 1999, which ensures the eligibility of foreign investors for risk insurance through MIGA.

3.1.2.3 Korean approaches

Crop production for food security

Considering current situation in GTR, the cooperation for crop production needs to be planned. The cooperation for crop production may take 3 phases; 1) Development of industrial farm, 2) Development and management of distribution firms for agricultural products, 3) Promoting food production industries.

Development of industrial farms: The first step in agricultural development is farm development. For efficiency, agricultural development for the food crop production needs a large scale farm development in arable land or unfavorable area. Mongolia and Russia have large areas for farm development. Once candidate areas are defined, then detailed survey should be conducted regarding natural resource and agricultural environments. Survey and data collection for natural resources and agricultural environments should cover the followings,

- Meteorology : temperature, precipitation
- Agricultural Environments : soils, seeds, irrigation and drainage
- Other supports : fertilizers and pesticides, farm machinery, related legal system
- Living environment : labor costs, price of farm products,
- Administrative : legal processes in importing/exporting agricultural products, local administrative supports to international cooperation

In many cases, local farmers own and manage their farms in the project areas. Then project should take care of the farmers through compensation, participation, or renting in the projects. Agricultural research and extension services are also important in large scale agricultural development. They need to provide high quality seeds or improve crop varieties. Farm machinery and inputs like fertilizer and pesticides are also important.

Development and management of distribution companies: When food grain is produced, post-harvesting process is also important. Drying and storage are important in the process. Large scale facilities are required for the process. In order for the competitiveness of the distribution companies, efficient transportation may need to be carefully prepared for the cooperation. The distribution companies will be located near industrial farms and take care of exports to neighboring GTR and even to other region outside GTR

Food processing: As the third phase, food processing industries can be participated in the cooperation. Food production adds values of agricultural products produced in near farms. The companies should follow local and international standards in order to access both local and international markets. The companies producing wheat flour or soy bean products are some examples of the food processing companies. Duties for processed foods are normally lower than agricultural products, implying more profits and convenience to import to Korea. The cooperation for food processing may require defining target market of the products. Then companies from the country that has target market may invest to found the new food processing plants.

Sustainable development of rural area

One of purposes of GTI cooperation in agricultural sectors is to develop or improve the economy and living life in rural areas. Development and operation of large scale industrial farms and industries related with the crop products should contribute to employment and improve living environments in neighboring rural areas. When it comes to Mongolia, official development assistance (ODA) programs have been provided by Korean government for years. Agricultural development cooperation in Mongolia can be jointly prepared with the ODA programs that are to be planned for improving living in rural areas. Private joint companies, research and extension service centers will also be necessary elements in the cooperation for strengthening sustainability of rural areas.

3.1.2.4 Russian approaches

Protocols of cooperation:

The cooperation between Russia and the Republic of Korea is based on the annual protocols of the meetings of the Russian-Korean joint commission on economic and scientific and technical cooperation. The fourteenth meeting was held in 2014. The first meeting of the subcommittee on agriculture of the Russian-Chinese commission for preparing regular summits took place in the same year. At once the protocol of the 18th meeting of the Russian-Mongolian intergovernmental commission on trade and economic, and scientific and technical cooperation was adopted.

The principles, processes, investment, profit distribution

Among border regions of Far Eastern Federal District, Amur region occupies the second place in terms of accumulated investments volume conceding Khabarovsk territory. The share of Amur region in total volume of foreign investments into the economy of border regions of FEFD is 37.8 per cent.

Summarizing the results of 2009, the economy of Amur region got the investments from 4 countries of the world. The largest part of the investments were done from the UK (66.1%) addressed to the exploration and mining of natural products particularly to the gold mining. A significant volume of foreign investments were from Cyprus (29.2%).

The share of the debt of foreign capital of China bordering with Amur region was 3.4% in 2009. The debt of foreign capital from China in regional economy as of 1 January, 2010 amounted to 15871.9 thousands USD. The capital from China is directed mainly in the lumbering branch, trade of wood, and construction work. Among the regions of Far Eastern Federal District, Amur region takes the third place in terms of investments from China conceding Primorsky territory and Sakhalin region. The share of Amur region in a volume of investments from China to the regions of Far Eastern Federal District is 16.1%. The volume of investments from China amounted to 7277.1 thousand USD in 2009 having increased in comparison with 2008 by 53.8%. Despite this fact the share of capital from China in the total volume of the foreign investments remains not great.

The direct Chinese investments are dominated in the volume of the received investments from China (summarizing the year of 2009, the entire amount of received investments from China are direct investments). In 2005 almost the entire volume of investments (97.5%) to the economy of the region from China was received as contributions to the nominal capital of joint and foreign enterprises established on the territory of the region. In 2009, 67% of the foreign capital inflow from China is accounted for loans from foreign co-owners which return a profit to Chinese businessmen.

The active borrowing from Chinese co-owners is connected with lower cost of capital in China compared to the interest rates in Amur region and in Russia in general. The priority spheres of activity for investors from China are manufacture of bricks, tiles and other articles of burned clay, general construction works on building production, cultivation of oil crops, lumbering, collection of wild fruits and berries. Over 200 enterprises with Chinese investments (from 450 enterprises with foreign capital) work on Primorsky territory, the main fields of their activity are trade, construction, cargo transportation, food services, hotel business, agriculture and timber processing.

Nowadays, 197 enterprises with Chinese investments work on Khabarovsk territory (43.2 % of total number of enterprises with foreign capital). The main directions of their activity are trade, food services, production of building materials and construction.

Based on the results of 2009, 115 organizations with foreign capital worked in Amur region and 83 of them (72.2%) were the enterprises organized with the capital from China. The profit which the participants (participant) of an enterprise get with foreign capital may be distributed among them by the decision of the members meeting.

3.2 ANALYSIS OF AGRICULTURE AND RELATED INDUSTRIES CONSIDERING THE COOPERATION

3.2.1 China

3.2.1.1 China-Russia

Considering that China's advantaged agricultural products and their processed products and other labor intensive products are confronted with more and more trade barriers in traditional export markets, it is very difficult to expand export. In addition, with resource constraint, food security is increasingly severe, and import demand of food, cotton, oil materials and other land intensive agricultural products is increasing year by year. Therefore, the complementarities between China-Russia agriculture are remarkable. In the field of agriculture and processing, a series of import-export products related at present are as follows. In case of distinction by general types, China shows cooperation advantages in plant products, food, beverage, textile raw materials and textile products; Russia has advantages in live animal, animal and vegetable oil grease, wax, prepared edible fats, fertilizer, etc.

3.2.1.2 China-Korea

China and Korea has strong complementarities in agricultural products and processing. China has obvious advantages in export of live animals, fish and other invertebrates, plant products, animal fat, fertilizer, fodder and leather, etc. while Korea is advantaged in process of agricultural products. Types of products that China and Korea have conducted trade cooperation include a wide range of agricultural and food products.

3.2.1.3 China-Mongolia

There is a big difference between China's and Mongolia's agricultural resources, and their agricultural products have strong complementarities and big technical differences. Now the two countries mainly cooperate in planting industry, animal husbandry and agricultural machinery. In the future, they will conduct wider cooperation in agricultural technology, including agricultural management department, agricultural products storage and transportation and deep processing. Compared with Mongolia, China is advantaged in crops planting, cultivation

technology, livestock breeding, breeding, epidemic prevention technology and agricultural equipment, such as small and medium-sized tractor, seeder, weeding machine and water-saving irrigation equipment, as well as high-tech management technology for agricultural modernization, low cost storage technology for agricultural products and deep processing of agricultural products. Therefore, China can teach its agricultural technology which is suitable for Mongolia to Mongolia's agricultural technicians. Mongolia uses modern agricultural production technology, water-saving irrigation technique and agricultural machinery to produce high-quality agricultural raw materials, which can, on one hand, meet demand of Mongolia's domestic market, and on the other hand, provide high-quality raw materials for China to develop deep processing industry agricultural products and lay a foundation of improving added value of agricultural products.

3.2.2 Mongolia

3.2.2.1 Food production industry

As Mongolia has a relatively small population and market, market competition is rather strong, although capacities of plants are large, they are not able to operate at full capacity. Particularly, Mongolian consumers consumed imported food products for over the past 20 years which affects domestic producers. Therefore, the government takes certain actions on some staple products. The objective is to produce imported food products internally and furthermore, support production of export goods are being accomplished under implementation of a national programme "National Food Security Programme" approved by the government in 2009 within the framework of the Comprehensive National Development Policy based on Millennium Development Goals of Mongolia and Mongolian Government Action Plan 2012-2016.

Production of milk and dairy products

Potential milk resources supplied by agriculture have totaled 530 million liters and of these, 420.0 million liters have been delivered from milking cows, 1.9 thousand liters from female camels, 42.3 thousand liters from mares, 11.3 thousand liters from sheep, and 54.3 thousand liters from goats. A dairy product demand of Mongolian population was 452.6 million liters in 2014, meanwhile a supply of milk and dairy products, domestic and imported, processed at plants are 19%, 31.2 million liters of milk used in production of milk and dairy products manufactured in a traditional way in rural areas, 31.2 million liters of milk in production of butters and in addition, over 260 million liters of milk are being supplied to markets without records.

Nationwide, there are over 100 milk plants and shops with processing capacity of over 230.0 million liters per day and of these, 45 plants are based in Ulaanbaatar. There are 8 major plants with capacity of processing 50-200 liters of fluid milk per day and of these, capacity utilization rates are 30-50%. Hardly 10% of the plants operating in city of Ulaanbaatar are working steadily throughout the year and using up to 40% of their capacity (including plants for production of ice-cream).

In order to increase processed milk production and dairy products, an investment loan of ₮43.5 billion from the fund raised through government bond trading are being issued to enterprises through Golomt bank and of this, as of today, a total of ₮28.2 billion loan has been issued to 39 projects. Of this, a total of ₮8.5 billion was issued to 4 milk processing plants, ₮ 17.4 billion to 22 intensified livestock farming projects, and ₮2.1 billion to 16 milk processing shops projects.

Meat Processing Industry

Meat plays an important role in the diets of the majority of Mongolians. Due to Mongolia's extensive livestock husbandry system, meat preparation process is seasonal. Nationwide, annually about 10 million livestock are consumed and approximately 200 thousand metric tons of meat produced to provide domestic needs.

For instance, according to preliminary result of December 2013, 10.2 million livestock consumed and 238.2 thousand metric ton of meat prepared by agriculture sector, 22.1 thousand metric ton of meat processed by meat factory and 3,0 thousand metric ton of meat exported. Meat prepared in agriculture increased by 17.8 thousand or 7.4%. Meat products processed by factory increased by 5.7 thousand metric ton or 34.7% comparing to the previous year .

Flour Production Industry

The domestic flour production has almost been reaching the level to supply domestic demands for the last 2 years and Crop Promotion Fund has been continuing to issue wheat incentives to crop farmers. Within the government program for stabilizing price, flour plants will have access to the soft loan sources to purchase wheat stored at the Crop Production Supporting Fund, thereby will reduce the flour price and stabilize the price in markets showing positive outcomes. Private companies and enterprises of the flour and flour products industry are making technological innovations and constructing major plants through their own investment and commissioning in main crop farming regions and major cities.

3.2.2.2 Agro-chemicals

Fertilizer

Production levels have increased significantly in recent years but without supplementary fertilization, crop rotations or management of crop residues for soil enhancement. As a result, soil fertility is declining because current practices are “mining” the soil of its nutrients. This combined with levels of soil erosion pose a serious risk to the long-term productivity of the crop sector. Development of domestic fertilizer industry is proposed in the Government action plan and so far the action has not been taken. Although crop producers are aware of importance of fertilizer application, they are reluctant to apply it due to the increased production cost. Starting from this year, the Ministry of Agriculture will introduce the system that will impose crop producers to start fertilizer application, based on which “wheat awarding money” will be released to farmers. In this regards, it is expected to increase fertilizer import from China and Russia, as mentioned before, there is not yet a mineral fertilizer manufacturing factory in Mongolia.

Pesticide Application

Lately, an agricultural production has been intensively developing, meantime the type and quantity of pesticides have been increasing year by year. Pesticides are 100% imported. Out of the total pesticides used in agricultural purposes, 70% is imported from China and the rest from Russia. However, a small quantity is being imported from other countries such as Germany, Korea and Japan. On average, 800-1000 tons of pesticides of around 100 types are annually coming in via imports. Herbicides and roundups account for the majority of the pesticides being imported, because of an excessive use of a chemical fallow treatment by companies in order to protect the soil from erosion. A consumption of pesticides is expected to further increase.

3.2.2.3 Farm equipment, and financing

Agricultural machinery and equipment

Third Crop Rehabilitation Programme implemented towards revitalization of agricultural production and meeting needs in grain, potatoes and vegetables through domestic production has set goals to mechanize crop production, particularly potatoes and vegetables production and upgrade the technology and equipment being used in grain production. As a result, currently, the technical innovation of grain production achieved 50-55% i.e. is fully mechanized, meantime 70% of potato production and 30% vegetables are mechanized.

Furthermore, under the implementation of the Technical Reform Policy the Government is following the direction to introduce tractors, combine harvesters and other agricultural machineries and equipment that would fit to Mongolian soil and climate conditions, have a design and functions that comply with the crop production technological and quality requirements, lower operating costs, high level of reliable operation and lesser adverse effects on environment.

Grain machinery innovation

Under the influence of global warming and climate change the annual precipitation has been reduced and soil moisture has been decreased due to the change of the precipitation pattern. In this regard, the technological steps will be taken such as superficial germination, scarifying, and creation of a cover on a surface area and the policy will be exercised to select seeders for a soil wind erosion and moisture conservation and machineries for soil processing. Attention will be paid on improving supply of machinery and fleet use of enterprises in order to stabilize the grain production level once achieved and generate growth.

Potatoes and vegetables machinery innovation: In potatoes and vegetables production, it is optimal to apply and introduce the machineries that till the soil by turning it over, combine 3-4 actions in one trip, and which would have harrows with a knife placed on the rotating shaft combined with other equipment. Following measures will be considered in the future machinery supply:

Supply of storages for agricultural products: As of the first half of 2014, over 3600 storage units of 182.2 thousand tons were used nationwide. In 2014, a total of 254.2 thousand tons of potatoes and vegetables (154.7 thousand tons of potatoes, 100.2 thousand tons of vegetables) were harvested and if compare the total storage capacity to the harvested crop the storage capacity in 2014 equaled to 71.5% (Source: MFA Crop Department). In many cases, there are three types of storages for potatoes and vegetables namely dugout, regular and mechanized storages. The dugout storage units are hand operated and in most cases there is a natural ventilation and regulation of heat, whereas regular storage units regulate ventilation using both natural and forced methods such as making a fire.

Supply of grain elevators: Since 2010, to improve quality of seed storage, 60 pieces of 100 tons each, 25 pieces of 300 tons each, 25 pieces of 500 tons each, vertical metal cabinets with total capacity of 26.0 thousand tons were purchased from state budget and supplied to entities of the crop sector. Many farmers are recovering threshing floor models: ZAV 10 and ZAV 20 and initiating to build mechanized closed threshing floors equivalent to these. Nationwide, over 20 elevators with total capacity of 450 thousand tons, both state owned and private, are in use. State owned elevators for creating a strategic reserve of wheat for food belong to Agriculture Support Fund (ASF) of the Ministry of Food and Agriculture that targets to increase wheat capacity of ASF to 180.0-200.0 thousand tons.

Agriculture Financing

In Mongolia, there are two major types of state financial supports in agriculture sector, one is the direct Public Sector Expenditure and other one is the Subsidies through different Government led Agriculture sector programs. Since transition, to the late 2000, there was limited Government financial support in the agriculture. However, since 2008, a global, regional (the drought in Russia, and Kazakhstan, the two main suppliers to Mongolia), and the national food production shortfall sent domestic wheat prices soaring to record levels. Wheat production had reached an all-time low during the years 2005 to 2007. Consequently, subsidies to crop, livestock, and agro-processing sectors have increased since 2008, and there are implemented through several programs.

Agriculture's share of the national budget has been fairly stable over the period 2004-2013, and has averaged only 2.4 percent, 1.7 percentage points less than mining, manufacturing and construction (4.1 percent). It is higher or equal to energy and heating (2.4 percent), greater than transport and communication and housing and community amenities by 1.1 and 1.4 percentage points respectively.

3.2.3 Korea

3.2.3.1 Food Industries

Korean food industry has increased continuously based on stable demand. Total production amount increased by 70% from 2.56 billion KRW in 2000 to 4.35 billion KRW in 2012. Except for the global economic crisis in 2010, Korean food industry did not stop the growth. Meanwhile, the share of food industry in total GDP decreased from 4% in 2000 to 3.2% in 2012. The share of food industry out of total manufacturing GDP decreased from 15.5% in 2000 to 11.2% in 2012, indicating that growth rate of food industry is relatively slower than other industries.

Total production amount of food industry including beverage was 7.5 billion KRW in 2012, with the annual increase rate of 9.3% since 2007. Number of companies increased to about 4.4 thousands and monthly employments was 179 thousand persons in 2012, which are 3.9% and 96% increase compared to those in 2007, respectively. The total production and added values in food industry between 2007 and 2012 increased by 56.1% and 34%, respectively while those in entire manufacturing increased by 59.6% and 46.1%, respectively. However, employment increase rate by food industry was higher than that of the other manufacturing industry. As of 2011, the total trade amount of food reached to 23.9 billion USD, about 60% increase compared to that of 2010 due to big increase in food imports.

3.2.3.2 Agro-materials

Agro-materials include farm machinery, pesticides, fertilizer, seeds, and supplies for livestock farms. Agro-materials industry is important in maintaining or improving productivities in agriculture. In Korea, agro-materials industry has been grown by government support for supplying agro-materials to farmers as cost compensations. Now, the production of the agro-materials industry exceeds the domestic demands. This implies that the cooperation for agricultural development in GTR can utilize the production capacities in Korean agro-materials industry. Recently a report on fertilizer production in Korea indicated that annual operation of Korean fertilizer plants is about 70% of the full capacity. When the GTR agricultural cooperation needs the fertilizer supply, Korea can supply the chemicals with no additional construction of the plants through just running the plants with full capacity.

3.2.3.3 Farm machinery

As Korean agriculture matures, the demand of farm machinery became stagnant only with replacement demand. Domestic demand of the farm machinery fell after 2000, showing the weakness of domestic market. The total number of farm machinery supplied in 1996 was 280,000. The number fell to less than 100,000 in 2001 and dropped about 54,000 in 2013. In addition to the saturation of the market, there are some other causes for the decreasing demand. One is rental projects driven by local governments. Most of local governments purchased major farm equipment and rented them to farmers who do not own. As farmer are getting older, they hired farm workers who efficiently operate their own farm machines. They become free from both farm works and necessity of farmers' owning their machines. In addition, recent farm machines have more power and capacities to finish farm works in one path, in other words they can finish harvesting, chipping, raking, baling in one path.

Since 2000, tractors became the main farm machinery being sold, taking about 50~60% of the total sales. The demand of combine harvesters and trans-planters are just from replacement of existing old ones. The domestic market size of farm machinery is 1.4 trillion KRW in 2013. About 65% of the total sales was made by loan programs, and a quarter was sold directly to farmers. The others was purchased by farmers with subsidies of local governments. Fortunately, export of farm machinery has been rapidly growing. The amount of farm machinery exports increased from 10 billion KRW in 1990, 170 billion KRW in 2000 to 919 billion KRW in 2013. The export of farm machinery is forecasted to continuously grow. The government is expecting the export of farm machinery reaches to 1 billion USD in 2015 and 2.5 billion USD in 2020. Up until now, the export of the farm machinery is mostly to North America. The companies are making effort to diversify the export markets including Southeast Asian countries, particularly linked with ODA projects.

The strength of Korean farm machinery comes from their products' value. Compared to the products from developed countries, Korean products has lower price with similar performances and can adapt changes in future demand more rapidly than bigger companies in developed countries. The increase in exports and diversifying foreign market implies the potential of Korean farm machinery industry. Although Korean farm machines are relatively behind the level of technologies in designing, automatic control, human engineering, they can be overcome by the cooperation with information technology and automobile industries which have global competitiveness. For instance, the trade of automobile parts with Japan shows the export amount is slightly larger than the imports from Japan.

3.2.3.4 Agro-chemicals

Fertilizer

Korean fertilizer market size is about 2.2 trillion KRW in 2012. Chemical fertilizer takes about 60%, 1.33 trillion KRW and organic fertilizer including compost does 40%, 0.84 trillion KRW. Chemical fertilizer was sold to domestic market about 64% and the rest for export. Chemical production of fertilizers is one of heavy industries that require high initial investment. Top 8 companies produce about 90% of the total amount. Currently, the operation rate is about 70% of the full capacity of production. Raw materials for fertilizer production are mostly imported and the cost competitiveness is not high. Ammonia, phosphate, and potassium chloride are the major raw materials imported to Korea for the production of chemical fertilizers

The consumption of chemical fertilizers is continuously decreasing due to government policies and increase of environment friendly agriculture or organic farming. The export of chemical fertilizers is not optimistic either. The demand of chemical fertilizer continuously decreased from 1.7 million tons in 2005, 0.96 million tons in 2010, and 0.873 million tons in 2013. Chemical fertilizer application rate was 340~380 kg/ha in early 2000's, dropped 240~270 kg/ha in late 2000's. The export of chemical fertilizer was reduced from 1.77 million tons of 425 million USD in 2007 to 1.28 million tons of 357 million USD in 2013, although they are larger than 1.34 million tons of 190 million USD in 2000. Quite a few countries are making efforts to reduce the amount of chemical fertilizer applications.

Organic fertilizer market is growing unlike the chemical fertilizers. Korean government is encouraging the use of organic fertilizers through various supports, resulting in the reduction of chemical fertilizer applications. The total amount of organic fertilizer consumption increased from 2.8 million tons in 2005, 4.2 million tons in 2010, and to 5 million tons in 2013. Government subsidies for organic fertilizer production increased from 135 billion KRW in 2012 to 145 billion KRW in 2013. The total number of companies that produce organic fertilizers is 1,612 in 2012, mostly utilizing animal waste or manure as raw materials. The number of companies that produce organic fertilizers from imported meals increased from 183 in 2002 to 445 in 2012. The companies to produce organic fertilizer by composting waste residues increased from 923 to 1,355 during the same period of time.

Pesticides

As of 2010, the market size of pesticides is 1.28 trillion KRW, consisting of 62% for domestic and 38% for imports. Almost all are for domestic consumptions and only 3% of the total, 41 billion KRW is for exports. Raw ingredients for pesticide production are mostly dependent on the import. Due to the size of domestic market, research for developing substitute chemicals is not economic and competitive. It takes over 10 years and 250 billion KRW to develop new pesticides. The import of raw ingredients for pesticide production has been continuously increased from 39% in 1990, 71% in 2000, 86% in 2005, and 91.1% in 2010. The import amounts were 330 million USD for raw materials for pesticides, 66 million USD for pesticide products in 2013.

The peak pesticide supply was 28,218 tons in 2001, and decreased to 24,506 tons in 2005, 20,431 tons in 2010, and 19,061 tons in 2013. Pesticide application rate per hectare was reduced from 13.5 kg/ha in 2001 to 10.9 kg/ha in 2013 due to expansion of organic farms and environment friendly farming. The total production of pesticides in 2000 was up to near 30,000 tons, decreasing to near 20,000 tons in 2013. The export of pesticides in 2010 was 34 million USD which is about 36% greater than that of previous year. Most of the export is raw materials for producing pesticides rather than pesticide products. The countries of the exports include Thailand, Japan, and China. Recently, Korean raw materials for pesticides are losing their price competitiveness by Chinese and Indian products.

Considering current situation of Korean agro-chemical industries, Korea has a capability of supplying chemical fertilizers and pesticides. The production capacity of fertilizers is twice of domestic consumptions and operation rate of the facilities is about 70%. When the agricultural development cooperation is initiated, Korean agro-chemicals are available in GTR. As far as the pesticide is concerned, its contribution potential seems relatively low, except for a limited number of raw materials that have economic competitiveness.

3.2.4 Russia

3.2.4.1 Fertilizer

According to the data of the Russian Academy of Sciences it is necessary to apply 650 million tons of organic fertilizers annually for deficit-free humus balance in the soil of cultivated lands. At the present time, wastes from livestock industries do not cover the required amount of organic fertilizers which are at an average 450 million tons.

In 2014 the agricultural producers acquired 2.44 million tons of active ingredients and it represents 13.3% of the produced volume in Russia. In terms of 1 hectare of sown area 33.5 kg of active ingredient of mineral fertilizers were applied (according to other sources 37 kg/ha) on average in Russia in 2014. For lack of fertilizer applying the negative balance of nutrients was observed in agriculture. The removal of fertilizers amounted to approximately 10.4 million tons of nutrients, and only 4 million tons including organic fertilizers were applied.

According to the agricultural administrative bodies of A.I.C. of territorial entities of the Russian Federation 2.6 million tons of active ingredients are to be applied in 2015 for the seasonal field works. On Primorsky territory of Russia the gross grain harvest will increase to 495.2 thousand tons in 2020 in comparison with 230.5 million tons in 2011, or is in 2.1 times. Improvement of the use of agricultural lands, introduction of more productive varieties and hybrids, and increase of mineral fertilizers use up to 80-100 kg of active ingredient per 1 ha of sowing will contribute to the yield increase.

In 2011 36.4 thousand tons of active ingredients of mineral fertilizers were acquired in Far Eastern Federal District, this figure is 8.6 thousand of active ingredients more in comparison with the last year including Primorsky territory – 15.0 tons of active ingredients of mineral fertilizers (4.3 thousand more than last year). The sown area was about 350 thousand hectares. Currently 40-60 kg/ha of mineral fertilizers were in the use.

Construction of the plant for production of mineral fertilizers and chemical products is suggested close to Nakhodka-city to increase the volume of mineral fertilizers use. The company «National chemical group» is going to put into operation the first plant in 2017 (also noted 2018 and 2019). The project is realized in close cooperation with «Gazprom», two big companies from Republic of Korea, one company from Japan and one more company from Italy are ready to participate in the tenders for construction.

3.2.4.2 Pesticides

For the first half of 2014, 23.8 thousand tons of pesticides were applied in the Russian Federation, the consumption of chemical crop protection products amounted to approximately 23.3 thousand tons or 97.9% of their total use. In 2013 on the territory of the Russian Federation 53.88 thousand tons were used including 52.88 thousand tons of chemical pesticides, which are amounted to 98.1% of the used quantities of chemical crop protection products. In 2012 53.6 thousand tons of pesticides were applied. The consumption of chemicals was about 52.7 thousand tons or 98.1% of the total amount of used pesticides. The minimum amount of pesticides was recorded in Far Eastern Federal District and it constituted 2 thousand tons in 2012 and 2013, and 0.5 thousand tons in the first half 2014.

The most wide-spread pesticides are *herbicides*. For the first six months of 2014, 14.3 thousand tons (or 60% of the total amount) of herbicides were used. In 2013, 31.1 thousand tons of herbicides were spent that represents 57.6 % of the total amount, and in 2012 more than 31.3 thousand tons (or 58.4%) of the total amount of used pesticides were applied. The consumption of *fungicides* for the first half of 2014 was 4.12 thousand tons, or 17.3% of the volume of used pesticides. In 2013, 8.4 thousand tons of fungicides were used, which was 15.6% of the total amount, and in 2012, 7.3 thousand tons or 13.6% of the total amount of used pesticides. For the first half of year 2014, 1.98 thousand tons or 8.3% of the total amount of *insecticides* were applied. In 2013, the consumption of insecticides amounted to 5.5 million tons, or 10.2% of the total volume of applied plant protection products, and in 2012 5.77 thousand tons or 10.7 % were applied of the total volume of used pesticides.

For the first six months of 2014, more than 2.7 thousand tons of disinfectants were applied. In 2013, the consumption of disinfectants was 4.9 thousand tons, insecticide – 0.56 thousand tons, fungicidal – 3.8 thousand tons, and in 2012 this figure was 4.8 thousand tons: insecticide – 0.46 thousand tons, fungicidal – 3.95 thousand tons. For the first half of 2014, 0,025 thousand tons of desiccants and defoliant, 0.38 tons of rodenticides, and 0,28 thousand tons of growth regulators were also used.

Three thousand tons of desiccants and defoliant were used in 2013, and 3.7 thousand tons were used in 2012. The consumption of rodenticides was 0.5 thousand tons in 2013, and 0.33 thousand tons in 2012. The volume of the use of growth regulators was 0.3 thousand tons in 2013, and 0.24 thousand tons in 2012. The efficacy of insecticides use was 88% on average in the Russian Federation in 2013, the best figures were observed in Far Eastern Federal District: the minimum is 68%, and the maximum is 100%.

3.2.4.3 Farm Machinery

The energy supply of agricultural organizations of the Russian Federation in 2014 compared with 2013 decreased on 1% and amounted to 147.9 H.P. per 100 hectare of arable land. With regard to the availability of



agricultural machinery units in 2014, the negative dynamic is observed as for tractors and forage harvesters. This is partially compensated by the acquisition of more powerful models. It should be noted that 62.1 % of tractors, and 48.9% of grain and 45.1% of forage harvesters are used for more than 10 years.

This year, the acquisition of 45.5 thousand of agricultural machinery units is planned to be done and 80.1% of this equipment is Russian-manufactured. The highest percentage of foreign equipment that is planned to acquire is on sugar beet harvesters and complexes, and it represents 65.3% of imports, potato harvesters and complexes – 46.9%, and sprinkler irrigation machines – 36.6%, plows, cultivators, tillers, fertilizers – 34.9%.

Primorsky territory has a total of 3230 tractors but only 1300 units are working, and only 498 units are operable out of about 900 harvesters. Generally the existing park of agricultural machinery went out of date in moral as well as in physical meaning, and also it significantly limits the technical ability of agricultural producers and, consequently, reduces the productivity of labor. The problem solving lies in the frame of the technological and technical modernization of agriculture and the increase of the level of mechanization and automation of agricultural production.

According to the data of 2014, the availability of foreign tractors, plows, seeders and cultivators is 70-78% of the total amount. The document “The program of agricultural development and market channels on Primorsky territory for the period 2013-2020 is expected : 1) to increase the productivity of labor at least two times; 2) to buy at least 1,000 harvesters, 2,000 tractors and more than 1,000 units of technological equipment during the years of the program implementation; 3) the creation on the area of Primorsky territory at least three assembly plants for the production of new agricultural machinery and equipment with delivery of agricultural machinery and equipment to 435 units per year until 2020.

3.2.4.4 Projection and Analysis

The development of food industry is as strong as production of agricultural goods. According to the development programs, the increase in production of deep processing products assumed to be by 25% until 2020. As it was already noticed, the plant for production of mineral fertilizers (Primorsky territory) is in the process of construction on the given area. Starting three assembly factories on the production of new agricultural machinery and equipment which are capable to produce agricultural machinery and equipment up to 435 items per year is to be done by 2020 (Primorsky territory).

Strengths: 1) availability of processing companies for agricultural and fishery production; 2) relationship of producers and processors; 3) availability of raw material base for production of mineral fertilizers; 4) significant territorial potential for development; 5) agreements on cooperation between regions.

Weaknesses: 1) low level of technological equipment; 2) real deficiency of companies for the fertilizers production, plant protection products and agricultural machinery; 3) under-population and labor shortage; 4) considerable distance and underdeveloped road infrastructure 5) low provision of modern agricultural machinery, etc.

Potential: 1) implementation of plant construction project on mineral fertilizer manufacturing in Nakhodka; 2) creation of the cluster of soybean processing; 3) development of the project for the plant construction for the production of agricultural machinery (in Irkutsk region there is the setting of harvesters).

3.3 AVAILABLE RESOURCES AND EXPECTATIONS IN AGRICULTURAL COOPERATION

3.3.1 China

3.3.1.1 China-Russia

China and Russia have strong complementarities in agricultural cooperation and signed a series of cooperation opinions in recent years, further expanding mutual benefit and use in resources. China is connected to Russia in land area and they share a 4,300 km border line, where border line in Heilongjiang Province is 3,045 km long, including 2,300 km in Kanggye. They have 25 national top ports and 10 border trade zones with well-developed traffic. Transportation of fresh fruits and vegetables in the adjacent area is characterized by “short distance, low cost, little loss and quickly meeting market demand” without complex preservation treatment. At the same time, the two countries are similar in natural conditions and weather conditions and enjoy exceptional advantage in agricultural cooperation. Russia has the biggest area of black soil in the world with 0.22 billion hectares agricultural lands, accounting for 24.93% of the total land area, of which 0.34 billion hectares cultivated lands, accounting for 8% of the total of the world with 0.87 hectares of per-person cultivated land area, and it is about 8.88 times of Chinese and the far eastern and Siberia land resources advantages are more apparent. There are 10 federal subjects in Russia far eastern area with 6215.9 thousand sq. km total area and 2.3 million hectares abandoned lands.

According to the statistics by Russia, there was 0.1433 billion permanent resident population living in Russia in January 2013 with 26% of agricultural population. Labor resource was lacked around the country especially in the eastern and far eastern region and the proportion of rural population in far eastern area in 2012 was 25.1%, a downward trend year by year. Except Altai Republic, the state of agricultural labor force in the five Russian federal subjects which share borders with China is not optimistic. Compared with Russia, the quantity of surplus rural labor force in Northeast China is very huge and has competitive advantages to be the backbone of the agricultural labor cooperation between the two countries.

Russia can only supply 3 months fresh fruits and vegetables every year with 2,500,000-3,000,000 tons annual fruits production and the self-sufficiency rate is less than 10%. Because the long cold winter and short frost-free period, Russia can mainly plant crabapples, sorbs, amur grape vine and vegetables are limited to potatoes, onions, tomatoes and carrots and the country needs to import a large number of anti-season vegetables. The agricultural machinery manufacturing industry has been in trouble since economic transition occurred in Russia, especially in Siberia where the strong seasonality has high requirements on agricultural technical equipment, but the level of agricultural equipment there is lower than the average level of Russia. In recent years, China has actively taken various measures to develop the Russian market and the agricultural machinery shows a rising tendency clearly. Take Manzhouli land port for example, it exported 3,228 tractors to Russia in 2011 and achieved 7,931,000 dollars of foreign exchange. Russia is not only a large production country of fertilizer but also a big exporter. 80%-85% fertilizer is for export and the export volume of nitrogen is No.1 in the world with No.2 of phosphate fertilizer and No.5 of potash fertilizer. China is a large country of fertilizer consumption and a big importer. The Northeastern China is an important grain production base, but the self-sufficiency rate is only 54.18% for lacking of fertilizer resource, therefore there is a huge potential of cooperation in adjacent areas of China and Russia.

Policy promotion

The China-Russia Prime Ministers' Regular Meeting Committee was established in 1996, which is a consultation system with the highest standard, the most complete organization structure and involving most widely fields,

including 11 sub-committees and covering agriculture, economy and trade, currency exchange, animal and plant quarantine and food safety, transport, science and technology and other fields to provide guarantee from multi-angle for the both countries' agricultural cooperation.

The 17th meeting of China-Russia Prime Ministers' Regular Meeting Committee decided to establish China-Russia Agricultural Cooperation Sub-committee under the Committee's frame in October 2013. In the witness of two heads of China-Russia, the two ministers of Ministry of Agriculture of the two countries signed Protocol for Agreement between Government of the People's Republic of China and the Russian Federation on Establishing Regular Meeting System for Chinese and Russian Prime Ministers and the Organization Principle on May 20, 2014 in CICA Summit, which marked the formal establishment of Agricultural Cooperation Sub-committee under the China-Russia Prime Ministers' Regular Meeting System and two countries established bilateral mechanism of agricultural cooperation. The meeting will be held alternately by China and Russia once a year according to the Working Regulations of Sub-committee signed by both countries in September 2014.

Agricultural cooperation with Russia is an important part in the strategy of "One Belt, One Road" which refers to the New Silk Road Economic Belt and the 21st Century Maritime Silk Road. President Xi paid a visit to Russia from May 8th to 10th in 2015. During the visit period, heads of the two countries cosigned and announced China-Russia Joint Declaration on Deepening Comprehensive Strategic Cooperation Partnership and Advocating for Win-win Cooperation and Joint Declaration on Construction of Silk Road Economic Belt and Matchmaking Cooperation of Eurasian Economic Union.

Russian grain production capacity and its export capability are relatively strong and its haul distance is relatively short. Taking balanced trade and market diversification into consideration, importing grain products needed from Russia provides a new choice for Chinese importing grain. After the accession of WTO, the transparency and impartiality of animal and plant inspection and quarantine in Russia would be increased, which are good to promote the trade of Sino-Russian agricultural products.

3.3.1.2 China-Korea

China-Korea agricultural cooperation is relatively complementary; since South Korea is highly industrialized while its agricultural resources are relatively weak, there is room to expand for the two countries in mutual use of resources. Heilongjiang Province enjoys relatively good natural resources and is a resources repository after Russian Siberia and the Far East areas in northeast Asian areas whose mineral resources, land resources and water resources all have certain foundation of development. The province now has cultivated land of 9.905 million hectares whose soil organic matter is higher than that of the rest of the nation; its black soil, chernozem, meadow soil and so on account for over 60% of the cultivated land which is one the three most famous black soil belts in the world. Heilongjiang Province abounds in soybeans, wheat, corns, potatoes, rice and other food crops and beet, flax, flue-cured tobacco and other economic crops. Songnen grassland is one of the three fertile grasslands in the world and is an ideal production base of agricultural products with great agricultural development potential which has greatly attracted Korean enterprises to invest in agriculture. There is huge potential in Korean labor market. According to Korean official statistics, Heilongjiang Province is rich in labor forces. In 2008, there were about 30 million labors alone in rural areas, among which 16 million labor are the surplus ones. Apart from that is the fair amount of surplus labor in cities. These labors are highly proficient and skilled with cheap price which is a big attraction to Korean enterprises.

Policy Promotion

In 2007, Heilongjiang Province implemented Opinions of the People's Government of Heilongjiang Province on Promoting Strategic upgrade for Korea's economic, trade, scientific and technological cooperation, which

requires to focus on science and technology development, take the opportunity of the nation's old industrial base revival strategy in Northeast China and South Korea's outward investment, give full play to advantages and further exploit potentialities; endeavor to expand the scope of cooperation, completely promote grade and level for Korea's economic, trade, scientific and technological cooperation, and assist in good and fast development of the whole province.

From 1970s to 2012, Korea developed more than 100 overseas agricultural projects totally. In order to meet the demand of domestic food production, Korea can cooperate with China through cooperative farm investing and building, food crop planting and carrying the grain back to home. China and Korea are close neighbors, so the transportation time is short and the cost is relatively low.

In the respect of finance and banking, Korea government has recently formulated policies supporting overseas grain production. Overseas agricultural development loan fund is to mainly assist in overseas agricultural development project of Korea enterprises, and the government can provide 70% of funding amounts at most, calculated against a low year interest of 2-3% which can default in 5 years and repay in a period of 10 years. Overseas Agricultural Development Service Center (OADS) and Korea Overseas Agricultural Development Association are public service institutions that support Korea to invest in China. Besides, Korea government actively formulates Guide for Overseas Investment in Agricultural which include adding agricultural production plans in objective country and introduction of the relevant laws and regulations, to stimulate the nation's investment in overseas agricultural cooperation.

On February 25, 2015, China and Korea initialed the whole text of free trade agreement (FTA) and confirmed the relevant terms and conditions, which marks an end of the FTA negotiation. 20 years after the commencement of FTA, Korea will eliminate 92% of the product tariffs that come from China, and China will also eliminate 91% of product tariffs that come from Korea. The Agreement introduced conditions of regional economic cooperation innovatively, clearly designate Weihai and Inchon as regional economic cooperation demonstration zones, which is included in the Agreement and is one of the significant breakthroughs since the negotiation of the free trade agreement.

3.3.1.3 China-Mongolia

China and Mongolia own great complementarities in agricultural cooperation. Mongolia is rich in livestock products, while China has great demand for milk and goat milk products which leave an expanded space for mutual resource utilization. There are more people and less land in China, while Mongolia has more virgin soil but less labor recourses. Under this circumstance, it is better to integrate Mongolia's remaining farmland with China's market demand and available resources, conduct business in Mongolia by way of direct or indirect investment.

Animal husbandry is a characteristic industry in Mongolia, the two countries can reach cooperation in this filed, invest and construct livestock breeding base on the basis of good varieties, mutually breeding livestock and increasing mature ratio with scientific feeding techniques?. Meanwhile, China and Mongolia will conduct livestock disease prevention and controlling activities and enhancing capacity-building of veterinary system. In addition, the two countries will build a group of food processing factories; carry back and sale fine products in Mongolia that directly processed from meat and milk with China's food processing technology and labor resources, and further increase the added value of agricultural products. However, it is necessary to enhance cooperation in cross-border animal epidemic disease joint control and prevention, to increase the safety standard of livestock production and products quality.

Policy Promotion

Medium and Long-term Development Plan of strategic partnership between People's Republic of China and Mongolia proposes cooperation in regards of agricultural and other industries including cooperation assistance and cooperation in agricultural and animal husbandry. China will continue to assist Mongolia to the greatest extent and enhance efforts in various talents training. Both countries will strengthen cooperation level, communication and coordination to improve assistance efficiency and effectiveness provided by China.

3.3.2 Mongolia

During transition period of Mongolia to a market economy, for more than twenty years, modern technology, innovation and changes have been taken place in different fields. But agriculture sector was slow comparing to the other sectors and had a poor performance of implementing of new technology. In addition to that there was not strong support from the government and investment from private sector. However, in recent years there were significant progresses in this sector and an increased support from the government, which see this sector as foundation of development of economy, increase of employment opportunity and improvement of livelihood. Moreover experienced agriculture companies have expanded their operations and large business groups started investing into this sector. In other words, this period is defined as time of further development and the newly drafted Food and Agriculture Sector Policy Documents have been drafted within this scope.

The biggest resources and advantage that Mongolia has are a vast land where we can run agro industry using rich natural resources. In other words, if the current Mongolian agricultural sector with limited technology has reached current level of producing present agricultural products then it is clear that how much opportunity this sector has in case of it can introduce certain level of increased agricultural if the following measures are carried out in a wider range: attracting a sector-specific domestic investment, enabling very soft loan with longer maturities, equipment leasing, or ware house financing to introduce high-tech, advanced approaches and standards, creating favorable tax and rebate conditions to promote foreign investment, opening export markets and facilitating trade. Today more than one hundred fifty thousand households engaged in nomadic livestock and about 30 percent of the total labor force is in this sector. In other words, livestock sector has enough human resources to be trained in new business practices to be more efficient in their livestock husbandry and in new, different skills to be more productive in their business field. In addition, intensive dairy and meat farms started developing in a classic sense and it is expected to have an increasing number of the export portion of the agricultural products from these farms.

Improvement of fertility of the soil is one of the vital issues and in order to take timely action upon this issue, Ministry of Food and Agriculture urges entities to use fertilizers in order to maintain soil fertility balance. Therefore, it has been discussed that wheat rewarding will be distributed to the entities based on soil fertility monitoring analysis. As result of this action, it is expected to increase harvest and also give opportunity to croppers to maintain long term sustainable production. Current wheat yield is up to 1.5 mt/ha. Additional increase is possible with improved soil management techniques, improved weed control and new seeds and improvements in production management. New seed varieties from Plant Science and Agriculture Research Training Institute could increase yield by an additional 13 percent to 56 percent over 2012 average yields. This would be near average dry land yields in western Canada with are 2.7 mt/ha for wheat, 3.4 mt/ha for barley and 1.4 mt/ha for canola. Increased consumption of fertilizer will give opportunities for opening of importing mineral fertilizers in Mongolia, since there is no fertilizer factory except small production of organic fertilizer in Mongolia. However, within the near term agriculture policy and plan, it has been discussed to build fertilizer plants.

Because of extreme weather in Mongolia and few months of short warm season, crops should be harvested in short period and stored. Thanks to government measures to minimize a loss of crops after harvest, vegetable storage issue has been improving. However, vegetable storages of the farmers are located far from the market and there is poor possibility of the storage of their vegetables in the big storages built in Ulaanbaatar. In other regions, there is no implementation of management system linking vegetable or crop harvest, owner of storages and market and there is no experience in that field. Because of that, the arising issue has not been solved yet.

There are a few important issues to improve the competitiveness of the country's livestock sector and one of these issues is to improve the health of livestock. Thus, the first, it will increase profit from livestock and improve financial status of herders, the second, it will help us to have an opportunity to sell our products in the world market by meeting the requirements of livestock products and WTO's Sanitary and SPS agreements, the third, it will reduce the risk of TAD, spread over the borders of neighboring countries. Therefore the government always paid close attention to this issue. However, there are still outbreaks of infectious diseases such as FMD, listed in highly infectious disease list, being detected. Therefore so far Mongolia cannot export raw meat and meat products to the targeted countries. However, in recent years, the Government made some changes in the previously pursued policy such as setting disease free healthy zones within the country rather than targeting certification of disease free status for whole country and exporting heat processed meat products.

To improve foreign trade, especially in agricultural products export and import trade, the border quarantine control system has to operate acutely within the framework of agreement within the neighboring countries. However, due to the different development level of the countries, the current border capacity is not developed to the required level. This gives negative consequences on import and export trade and negative effects on allowing low-quality products and pest organisms to be on quarantine list. In the coming years, there is expected rapid growth of export and import trade flow between neighboring countries that would require being well prepared to conduct timely inspection that shouldn't harm trade expansion and ensures safety of products according to the existing laws and regulations. Currently, in the area of trade facilitation and strengthening border inspection control system, CAREC regional program is being implemented among member countries, which include Mongolia and China. Therefore, it would be the best to streamline border control inspection related activities along with the CAREC regional program and use the regional project as the stage for open discussion, exchange of information and source of assistance to bring up an existing capacity to the next level.

In order to increase export of agricultural products, the Ministry of Food and Agriculture proposes to set up border free zones and encourage in opening gateways of cross border trade of agricultural products. Mongolia is a vast country and has borders with two neighboring countries that stretch many thousand miles. But it has limited trade with these two countries especially along the border areas. In recent years, in the south Gobi region, a border capacity started improving because of the development of infrastructure in the region followed by dynamic development of mining industry. In this case we also have to seek possibility of best use of such development to bring the exporting potential of agricultural products.

There is a possibility to support Khalkh Gol-Agriculture Free Zone project in the eastern part of Mongolia with participation of China and Korea, which are supporting the projects from the initial phase under the Agriculture Rehabilitation in Khalkh Gol region project. First of all, the export of agriculture products from the local area to Chinese Khulunbuir provinces as well as the other part of China could be the goal of the project and the project can be implemented independently. With regards to this project, master plan for agriculture sector development in Khalkh gol region was developed with detailed study and a model investment company was established, founded by Korean KOICA. In few years, Mongolian large companies invested in this area and agriculture production has developed fast enough and reached a regional self-sufficiency. Under the external cooperation, Khulunbuir district officials from China proposed to start active agriculture cooperation and expressed their willingness to import meat from the Khalkh gol region through the nearest border point. If Khalkh gol project

implements successfully and reaches its goal to supply agriculture products through the nearby border points to the Chinese market, it could be acting as a pilot model for the following projects, to boost cross border agriculture cooperation.

According to food and agricultural sector policy, for the next ten years, technology-based knowledge will be introduced in intensive agriculture production. This will increase productivity and improve competitiveness in agriculture sector and increase harvest yield. However, in order to achieve this goal, contribution of the agricultural research institutions, scientific institutes play important role. Having a joint project with research institute on transfer of the technology and locate the technology and produce new products such as new crops and new varieties develop agriculture production based on knowledge and technology. As a result, there will be a benefit from the increased production of agro products that would result mutually beneficial trade and producing Mongolian brand and introducing Mongolian specialty to the domestic market in neighboring countries.

China and Russia provide the greatest export market potential owing to their size, proximity, and established trading relations. The growing urbanized middle class of China is shifting the structure of the Chinese diet with more and higher quality food being consumed including dairy, meat and wheat products. Increased meat consumption is associated with a greater need for feed grains. Per capita meat consumption is projected to reach 52 kg by 2020. While domestic pork and chicken production will keep pace, beef and mutton imports are expected to grow. Imports of wheat and barley are expected to increase. Mongolian meat producers can add value and marketability to its products by modernizing butchering and packaging methods that will allow for the sale of boxed primal cuts rather than carcasses. Breaking down the carcass into separate cuts allow for market segmentation and price differentiation. This allow the total value of the carcass to be maximized. Sales of specific products and by products can be made to a range of export markets depending on the specific demands of each country.

If crops with short vegetative period have been cultivated because of a Mongolian special climate, lately greenhouse farming has intensely been developing. Implementation of greenhouse farming and technology transfer projects of South Korea in rural areas has contributed to get it skillful from year to year in developing of greenhouse farming and some major entities are newly building greenhouses that are permanent i.e. operational for four seasons and developing it as a diversified business trend. Crop varieties are spawning depending on market demand and specially, cultivation of fine /exotic/ vegetables such as Korean kimchi cabbage, white carrot can make it possible to supply Korean market in just a few years. Some fruits and berries supplied to the Mongolian market are transported by plane and therefore, expensive though customers are available and therefore, as opposed, there could be a possibility of transportation from Mongolia to Korea.

3.3.3 Korea

3.3.3.1 Human resources

Korea has experiences in developing agriculture and rural development for over 60 years. These experiences are referenced from many developing countries, particularly those in ODA programs. The agricultural experts even after their retirement are still working under the projects related with agricultural development. RDA (Rural Development Administration) is the largest government institution in charge of the agricultural research and extension services. It has 5 different national institutions including NAAS(National Academy of Agricultural Science), NICS(National Institute of Crop Science), NIHH(National Institute of Horticulture and Herbal Science), and NIAS(National Institute of Animal Science).

NAAS consists of 6 departments and 1 center, with over 500 staffs. The six departments include 1) Agricultural environment, 2) Agricultural biology, 3) Agro-food safety, 4) Agricultural engineering, 5) Biotechnology, and

6) Agro-food resources. National Institute of Crop Science(NICS) under RDA is an institute responsible for the researches on the stable production & provision of food and the enhancement of value-added crops. The researches on crop science had paved the way for the success to enter into the era of national income up to \$20,000 per capita with the development of “Tong-11” rice in the 1970s. Since then, NICS has contributed to the enhancement of income of farmers and life quality of our nation through developing the novel, safe, functional and high-quality cultivars responding to the various demands of farmers and consumers, and their cultivation technologies. Recently, NICS is concentrating the efforts in enhancing agricultural competitiveness with the cutting-edge agricultural technologies in the era of free trade among countries and ‘Low-carbon and Green Growth’ while making efforts for overcoming the worldwide crisis in natural resources through the development of green manure crops for chemical fertilizers and bio-energy as clean energy for the next generation.

In addition to RDA, each province has its own agricultural research and extension services and districts also have their own extension service centers. Universities are also available for the cooperation of agricultural development in GTI. Gangwon, Gyeongsangbuk, and Busan have national universities that have agricultural colleges. In relation with human resources for international cooperation in agricultural sector, Korean government started offering training programs for large scale farm managers, which are aiming to provide young agricultural specialists to the companies which are planning to start agricultural projects abroad.

3.3.3.2 Agro-materials

Agro-materials such as farm machinery and fertilizer are the other resources available in the GTI cooperation of agricultural development. Korean farm machinery has competitiveness in their values even over those from developed countries although the capacity of the machinery is relatively smaller. They have the capability to easily adapt to changes in market demand. The farm industry is expected to contribute in providing farm equipment to the GTI agricultural projects. As mentioned in the previous section, Korean chemical fertilizer production capacity is over twice of domestic demand and the average operation rates of plants are about 70%. When the GTI agricultural cooperation commences to produce crops in a large scale, Korea can contribute fertilizer supply through running existing facilities to full capacities. The production of chemical fertilizers is known to be underdeveloped in Far East region of Russia and the transportation cost is high from Western Russia. China has the world top capacity in producing chemical fertilizers. Since China is sometimes applying export taxes for fertilizer or limiting the amount of exports for controlling the costs of agricultural production, alternative supply of chemical fertilizer should be prepared.

3.3.3.3 Expectations

Securing Food supply

Both Russia and Mongolia have a great potential in developing arable lands. The land resources are still unused due to several reasons such as lack of labors and other resources. Korea is highly dependent upon import for food grains. This is why main objective of Korean overseas programs for agricultural development is alleviating dependency on import of major food grains. Korea will provide various resources in agricultural cooperation in the region when it results in securing stable supply of major food grains. Russia and Mongolia can expect greater agricultural production and rural development in the region. China is also preparing against possible food shortage. Increased agricultural production in GTR will help every participating country experience improved security of food supply and economic development. Further, it will help increase the stability of food supply in the world.

Employment

Agriculture is one of the industries that generate more employments than other industries. Existing farmers will benefit from the new projects in near their farms. Agricultural development programs will generate new jobs and require additional labors. GTI cooperation for agricultural development includes development of clusters which consist of food production plants, various institutions, social functions such as banking, retailing of supplies, and so forth. Therefore, the potential of new employment is great. In addition to the region for the GTI project areas, each country can experience more activities in economy. For example, new demand of agro-materials can be expected from agricultural projects in GTR. Although North Korea is not included in GTI, the labor forces from North Korea could give a good chance to utilize lower labor costs in the cooperation. The participation of North Korea to GTI agricultural project may contribute to ease tensions between two Koreas.

Improvement of agricultural productivity

Korea has a good experience and technology in increasing agricultural productivity of crops. Based on the experience and technology, improved seeds and varieties can be developed with local experts in project areas. It may take a long time and efforts to develop new more productive ones. Joint research programs will be required for these. In addition to the improvement of seeds, infrastructure such as irrigation and drainage facilities, farm roads are essential in improving agricultural productivity.

Regional development

Agricultural cooperation is not limited to agricultural production alone. It should include processing of agricultural products, food productions, supply business for facility and farm machines. Then the project area should have various components in well-established rural society. In other words, the GTI agricultural projects will result in drawing peoples to the area.

Economic developments and stabilization of food price

Through the cooperation of agricultural development, it is expected to have increased production of agricultural products in Russia, Mongolia, and some region in Chinese GTR. When the agricultural products from GTR are available to GTI countries, the vulnerability of food supply can be reduced in that dependency to a limited number of exporters is relieved. In the long run, it will contribute to increase the stability of world food prices. Agricultural cooperation in GTR is not limited to agriculture alone. When the price of food grain is fluctuating, stable crop production in GTR will ease price risks of food supply. Korea is importing a large amount of meals for animal feeds as mentioned in previous sections. GTI agricultural cooperation can also contribute to stable supply of soy meals and other animal feeds in Korea.

3.3.4 Russia

There are enough land and human resources in touched areas to implement the projects of agricultural production, food, plant construction for fertilizer manufacturing and setting industries of agricultural machinery on Primorsky territory. In the case of the plant construction the maximum number of workers can run up to 12 thousand people. The projects funding is covered by development of agricultural programs. Moreover, besides federal and local budget funding it is essential to have investments to implement the programs, which make 10-15% from total expenses. That's why for increasing the manufacture and processing the products for FEFD and Zabaikal territory at level of 3-4% annually and at level of 5-7% on Primorsky territory, the following aspects are necessary: 1) support of agricultural producer using federal and local funding at planned level; 2) scheduled investment support; 3) enhancement of technical re-equipment; 4) realization of

technical requirements (fertilizer norms, chemical defense equipment, expediency of action implementation; 5) determination of market channels; 6) receipt of funds for further agricultural development, etc. Expected are the creation of jobs, increase in crop yields/production, food provision of region and district, increase in exports, enhancement of cooperation with other countries, etc.

3.4 IDENTIFICATION OF EXISTING BARRIERS IN AGRICULTURAL COOPERATION

3.4.1 China

3.4.1.1 China-Russia

Existing Barriers

There are several barriers to be considered in agricultural cooperation between Russia and China based on previous experiences. The first one is that agricultural policies and regulatory environment of Russia is relatively hard to predict. It is difficult to handle labor card and there is restriction on low-grade labor entering Russian labor market. Cost of land and labor increases, which is also highly limited locally. Tax cost of enterprises in customs clearance of materials and operating locally is too high. Russia's poor infrastructure constrains agricultural cooperation and development. Russian monetary and financial system provides less support for agricultural development. When it comes to China, there are six aspects to be improved, 1) There is a lack of macro and integrated guidance and enterprises have a low organizational degree, 2) It is short of support fund for overseas development, which is difficult for enterprises in financing, 3) Enterprises have a poor awareness of social responsibility, which has an influence on their sustainable development, 4) Enterprises conduct unordered and fierce competition without united coordination, 5) Agricultural information cannot be communicated smoothly, 6) Agricultural technology is relatively poor.

Options and Recommendations

In order to overcome the difficulties in agricultural cooperation between Russia and China, several recommendations can be proposed. 1) Make full use of coordinated development of governments at all levels, 2) Civil coordination system must be created to lead the enterprises to orderly development, 3) Cooperation platform should be erected to strengthen cooperation in trade of agricultural products, 4) Improve and perfect the cooperation between governments and banks; broaden the financing channels, 5) Strengthen the regional agricultural technical cooperation between China and Russia, 6) Develop green agriculture actively and set up base of food deep processing, 7) Strengthen information exchange, 8) Promote the establishment of free trade zone of Sino-Russian agricultural products actively, 9) Establish the system of dealing with technical barriers.

3.4.1.2 China-Korea

Existing Barriers

Based on previous experiences, current barriers between Korea and China are green trade barrier of Korea's agricultural products and the protection of Korea Agricultural Co-operation Organization for local agriculture. As for China, there are the large gap in economic development between northeast provinces and Korea, and the low standard of safety quality for agricultural products.

Options and Recommendations

With the gradual opening of Chinese markets and implementation of the strategy of “promotion of the northeastern old industrial base”, the scheme of “green northeast” will enter the startup phase and the cooperation between agriculture and ecological fields will increase, which will gradually change the discriminating trade policies implemented by Korea to northeast agricultural products and greatly promote the economic and trade cooperation of China to Korea.

One is to strengthen multilateral areas cooperation. Further promote the cooperation of China and Korea’ Ministries of Agriculture in G20, FAO, APEC, 10+3 and under the agriculture ministers system of China, Japan and Korea and exchange opinions in terms of hot issues such as international and regional agriculture and food safety and coordinate both countries’ positions to strengthen the understanding and support each other.

The second one is to strengthen the agricultural science and technology cooperation. Fully play the role of the meeting mechanism of China and Korea Agriculture Committee to strengthen the agricultural science and technology cooperation between China and Korea and take agricultural science advantage to accelerate the development of united laboratory and carry out pragmatic cooperation in information interchange, cooperative study, capability building and other aspects.

The third one is to strengthen animal disease prevention and cooperation. Strengthen cooperation in major animal diseases prevention and control fields such as foot-and-mouth disease and bird flu to promote the communication and cooperation of veterinary education and scientific research institutions of two countries and strengthen the coordination of the positions of multilateral veterinary occasions such as OIE.

The fourth one is to promote the cooperation of agricultural products quality. Both countries shall communicate and cooperate in the risk assessment of agricultural products quality safety, inspection and checking, standard establishment, quality tracking, information sharing and other aspects to promote the agricultural quality safety cooperation in two countries.

The fifth one is to promote the trade cooperation of agricultural products. Further strengthen the agricultural production of two countries and markets information exchange, encourage the powerful enterprises in both countries to carry out agricultural investment cooperation and increase research of the agricultural products markets, trades and policies in two countries and convey relevant information to enterprises.

The sixth one is to establish a quick and effective promoting system. Establishing a quick and effective trade and economic cooperation system shall be specifically carried out to establish a work leading group to deepen the economic and trade cooperation to Korea and a project special promotion group, which will be responsible for the formulation of the whole province project of economic and trade cooperation to Korea, advocacy and promotion, organization and implementation and other work. Establish a special promotion group for agricultural cooperation to be responsible for the agricultural trade to Korea, cooperation of labor service and construction of agricultural production base. Each special promotion group shall formulate a detailed implementation solution respectively and clear responsibilities and duties to decompose into tasks. Each city which takes the Northeast as representative shall also study to formulate a development plan to deepen the economic and trade cooperation to Korea according to its actual situations and take effective measures to ensure the completion of each aim and task.

3.4.1.3 China-Mongolia

Existing Barriers

When considering agricultural cooperation between Mongolia and China, existing barriers may include 1) the unstable policy and poor infrastructure of Mongolia, 2) the lack of support from Mongolia policies, 3) the low-level cooperation, small scale and single form of Mongolian agriculture, 4) the corporate strength of enterprises invested in Mongolia by China is not strong with lacking of stamina, 5) further strengthen to make use of China-Mongolia geographic advantages.

Options and Recommendations

1. Take food security as an entry point, and determine the main theme of China-Mongolia agricultural cooperation. China attaches great importance to food production which has excellent variety, advanced technology and first-class agricultural technical personnel, while Mongolia is badly in need of increasing food production capacity. Thus, take food security as an entry point and determine the main theme of China-Mongolia agricultural cooperation, which is highly appreciated and well received by Mongolian, lays a foundation for multi-sided cooperation in agricultural field.
2. Make appropriate arrangements in the key industries of China-Mongolia agricultural technical cooperation.
3. Encourage China agribusiness companies to go to Mongolia and make investment
4. Establish intermediary service institutions toward investment in Mongolia.
5. Make good use of the two countries geographic advantages

3.4.2 Mongolia

One can say that agricultural cooperation of Mongolia with neighboring countries for the last 20 years was not very active and this can be seen from assortments and quantities of agricultural export products. As for import market share with a neighboring country and the ROK, Mongolia has a relatively small production capacity and so far, product assortments and quantities being exported are limited. Therefore it is complicated to compare and assess. However, considering that 50% of imported agricultural and food products into Mongolia are supplied only from the China, Russia and Korea, one can conclude that goods are supplied to the extent possible.

As agricultural industry is generally not intensified, too dependent on weather and nature, and based on traditional model and with low productivity, the following domestic factors undermined the competitiveness of the industry itself: total products outputs being produced are not much and impossible to make a sustainable supply to a market, seasonal or products are supplied in few months of fall, and until today no established value chain system has been developed for supplying products to markets. As market capacity is limited, a livestock turnover is slow. As production is being run to increase numbers today Mongolian livestock totaled to 51,9 million heads, grazing capacity is exceeded by over 20% nationwide. This affects animal feed supply, nutritional quality and increase the risk of natural disaster. Therefore, in Mongolia dzud occurs after the highest number of livestock with a frequency of 7-8 years. Therefore, in order to accelerate livestock turnover the government has been paying attention to opening exports markets and based on state policy and support in agricultural industry, development of private businesses and needs to expand markets there will be changes in near future.

In order to intensify agriculture, technology transfer is essential. Many of the private companies suffer from lack of resources that enable private industry to transfer technologies into their production and agriculture practice. Therefore, one way to solve these challenges is to implement projects and programs that should target

only to the technology transfer or product development that would meet the requirement of the market in the exporting country. Also, under such program, a mechanism could be set up to link the producers with market recipients in the importing countries. In other words, partners that have knowledge about market demands of a particular country and sale network or contact with neighboring aimags etc. will give quick and practical results in the short run. In a globalized economy, we will have to compete with leading manufacturers of the world such as the US, Canada, Australia and New Zealand in the same market and must remember that these countries have not only strong production system, but also other supporting system consisting of professional teams specialized in contracting, marketing and sales and etc.

Today agriculture production is fully based on the private sector and dependent on financial abilities of entrepreneurs. Unfortunately, for the last 20 years of the market economy, government supports and loans from financial organizations were negligible. According to the World Bank study, Mongolia spends a smaller percentage of its GDP (2.4% of national budget and 1.1% of GDP) on agriculture than comparable middle income countries in Asia such as China, Philippines, Namibia and Sri-Lanka despite its relatively higher agriculture value added of 17 percent GDP. Then according to information provided from commercial banks and financial organizations only 2% of the total loan is allocated to agriculture. The loans issued by these commercial banks have 15-20% interests and maturity up to 2 years. This tells that creation of a condition for long term and realistic financial sources are essential to support industry entrepreneurs.

Although Mongolian agricultural production is directly dependent on nature, it is relatively well adapted. But, since 1990, though dzud occurs with a frequency of 5-6 years, livestock head has been reduced by 10 million or 20% of the total livestock. In light of this, recommendations are provided to get herders able to overcome the harsh winter, i.e. get them prepare enough hay and feed, pay attention to quality but not quantity, work strictly adhering to a grazing plan etc. As for crop farming industry, droughts, severe cold weather etc. natural phenomena could lead to crop losses. Therefore, the government and the private sector have invested a lot to develop irrigated crop production. Risk management in agriculture sector is very important because not only the incidence of shocks to livestock production is relatively high, but also because it accounts for three quarters of the value of agricultural output, and employs about one quarter of the total workforce. But, to overcome risks the needs arise to intensify grazing livestock production, increase livestock turnoff rate, market value, i.e. create export demand.

Cooperation with agricultural ministries and quarantine agencies of neighboring countries to negotiate the terms of agreements is underway and further, remove the terms that hurdle the trade or establish a joint working group of 3 to 4 countries on permanent basis to create a mechanism that works promptly to change conditions that may hinder trade of one partner country will be effective. As Mongolia has no access to the sea, by rail via territory of China to reach Tianjin port and from there transportation to all countries of the world is done in waterways. In this regard, there is no specific agreement on trans boundary transportation of livestock products with the PRC and that led to some issues arising on some transportation. The part "Cross border cooperation" of this report mentioned actions taken by the Mongolian government to facilitate exports and imports trade this year and a rule was approved on conducting a risk-based assessment inspection.

An issue of tariff concessions on agricultural products for imports has to be discussed and solved with the RF as soon as possible. An increase of meat exports has been talked for many years and reaching some solutions, though an increasing domestic meat price makes it impossible to export because of the price. Currently, the following tariffs are in effect: 40% tax is imposed on fresh, chilled and frozen beef, and an additional fee of not less than € 0.53 per 1 kg, 15% tax is imposed on fresh, chilled and frozen mutton, goat and horse meat and an additional fee of € 0.15 and 20% tax is imposed on canned beef and an additional fee of not less than € 0.5. As for exporting agricultural products, the biggest challenges include non-tariff barriers or adhering to international standards and sanitary and phytosanitary standards of an importing country. Particularly, this

problem arises on meat, an agricultural product of Mongolia with the most export potential. According to WTO SPS agreement and OIE standards, Mongolia does not meet the requirement “free from highly infectious animal diseases” and meat processing factories are required to introduce HACCP and under current agreement terms, the right to export will be opened after experts’ team comes and takes examination. An issue of “Establishing a Healthy Zone” needs a further discussion at government level and relaxing the requirement, i.e. propose alternative solutions such as establishing healthy zones in the Mongolian territory (this term is agreed with the Russia), reduce risks introducing vaccination program. But, there is an urgent need of strengthening HACCP introduction internally within the framework of the Law on Food Safety. As a result, the rights to make exports of heat treated meat will be open to all meat exporting companies. Recently, the MFA informed that 64000 tons of heat treated meat and meat products are going to be exported into China.

3.4.3 Korea

3.4.3.1 Institutional aspects

Agricultural projects require long and stable supports and investments for their success. Initial investment amount such as purchasing farm equipment is quite large. It takes some time to acquire land ownership or permit to crop production. When started harvesting, the products should have accessibility to both domestic market and exports. The accessibility may be different by countries.

In Korea, financial support or loan for overseas agricultural development is available to the companies that are enlisted in the Ministry of Agriculture, Food, and Rural Affairs (MAFRA) and able to show security for the loans. When the security is not provided, the company is not eligible for the loan. Currently, the condition of loans to the companies for overseas agricultural development is 2% of interest with 5 year of grace period and payable in 10 years.

Korean companies that already started farming in China and Russia are expressing the difficulties in investment environment. It may be common for foreign companies to experience many difficulties in many countries. These may be the results from that the companies did not understand legal systems and institutional processes in local area. Sometime, they are lack of understanding and communication with local authorities with respect to their agricultural projects. The survey to the companies that are running agricultural projects in Primorsky shows several solutions for helping the company.

- providing local information such as legal systems on agricultural development and investment
- providing services for the companies to settle : permissions and legal services
- helping purchase agro-materials from home country
- providing information on local and export market

Agricultural cooperation under GTI should guarantee that participating corporations are not discriminated in running the business by the counterpart country. This may be resolved by GTI agreements for agricultural cooperation.

3.4.3.2 Infrastructure for large scale farming

New agricultural development in Russia and Mongolia requires large amount of agro-materials. When the project area is large, the supply planning should be well prepared. There is no plant for producing chemical fertilizers in Far East region of Russia. Appropriate planning to supply fertilizers either from China and Korea should be prepared. Labor force is also a factor to consider in preparing the agricultural cooperation. As mentioned before, labor forces from North Korea can be an option and it could be an opportunity to bring North Korea back to GTI.

In GTR, transportation infrastructure is not favorable for agricultural cooperation. Large scale agricultural production requires appropriate transportation systems such as roads, railways, and harbors. In addition, elevator system for loading in harbor is important for efficiency. Disinfection facilities are also required when epidemics like foot and mouth disease is spread as in Russia. When export of roughage is considered, baling with high pressure is desired to increase density and reduce the unit cost of shipping. These additional facilities are required in harbors. The cooperation for agricultural development needs to be prepared for the schedule of construction of related infrastructures.

When large scale farms are developed for the cooperation, all the resources needs to be prepared including specialists for large scale farm management, appropriate farm machinery, and storage and post-harvest processing. When farm machines are not properly maintained, the grain losses increased up to 30%.

3.4.3.3 Customs procedure

Customs procedures are different among GTI countries. Complexity in customs procedure is one of the hurdles in facilitating trades among the countries. Basically, the customs procedure includes document preparation, declaration, examination of cargo, payment of duties, customs clearance. Although the procedure is almost the same, documents required in each step and guidelines are different from each other. Payment methods in Russia and Mongolia are quite limited compared to those in China and Korea. It is recommended that inspection steps should be reduced and clear. GTI countries have more inspection steps than in OECD countries. Customs automation is the application of information and communication technologies for the entire customs clearance process including lodging, acceptance and processing of cargo and foods declarations, payment of duties, even up to release of the goods from customs control. Customs automations show differences among GTI countries, resulting in additional burdens to both importer and exporters. Pre-shipment inspection may help prevent arbitrary classifications in customs procedure. Arbitrary classifications of goods are often considered to cause complaints of both importers and exporters in Northeast Asian countries. Pre-shipment inspection has not been adopted in Mongolia yet. Inspection steps should be more simplified particularly in trades among GTI countries. Additional efforts for simplifying customs procedures are recommended in Russia and Mongolia, such as Authorized Economic Operators (AEO) and Mutual Recognition Arrangement (MRA). AEO is a party who was approved by customs administration as complying with World Customs Organization (WCO) or equivalent security standards. When AEO is used, the customs procedure is more simplified. MRA is an international agreement to recognize conformity. The mutual recognition of AEO within GTI countries will facilitate the trade of agricultural products significantly. The single window system is also a trade facilitation way. The system can be adopted within GTI member countries, although its construction takes time and budget.

3.4.3.4 Understanding of natural resources and conditions

Climate changes may provide warmer climate in cold regions such as Mongolia, Far Eastern region of Russia, and Northeast provinces of China. Still adverse climate conditions continue and agricultural production in these regions will not be easy tasks. Heavy rains in May and early start of snowfall give high risks of reductions in harvests. There exist natural conditions to overcome for agricultural development in marginal or undeveloped area. They include poor drainage, cold weather, soil characteristics, etc.

New variety or seeds adaptable in these region and large farm machinery are two of solutions against the natural conditions. Selections of higher yields or new varieties in the region are necessary for greater productivity. This takes time and efforts of experts in the fields. Bilateral or multi-lateral collaboration of experts for the research and development for higher yield variety is absolutely necessary. Appropriate nursery station and seed production field are required for stable supply of high quality seeds. Larger farm machinery is desirable for timely cultivation and harvesting since the operation time of the machines are quite limited.

3.4.3.5 Sanitary and phytosanitary measures

Sanitary and phytosanitary (SPS) measures are a big issue of international trading of agricultural products. SPS measures are important to protect domestic plants and animals, even human health. Many countries have experiences of disease outbreak or foreign insects included in imported agricultural products. Larger amount of agricultural products are being traded, more outbreaks occur. SPS measures are employed not only in developed countries but also in developing countries like India. GTI agricultural cooperation assumes the trades of the products within the region. An acceptable common SPS measures should be prepared and applied in GTI countries for effective cooperation for agricultural development. Based on the Korean measures, hays from China and Russia should be disinfected to prevent food-and-mouth disease from spreading.

3.4.3.6 Protection of domestic agriculture

“Overseas Agricultural Development Acts” enacted in 2012 points out that overseas agricultural developments should not conflict with domestic agricultural productions. For example, rice is the crop that the loans or other support is not eligible to the projects for which companies apply to government loans. The financial support however, is available for corn, soy beans, and other non-conflicting crops. The other crops or products that are in competition with domestic products may be desirable to be excluded from or minimized in the imports to Korea. This will help reduce negative view of farmers on international cooperation in agricultural sector. Various crops and products may be in demand from local market near the cooperation project areas. When agro-industrial clusters including food production plants are established, various agricultural products are needed from the plants, including imports of raw materials.

FTA between Korea and China was officially signed in June, 2015. Although the agreement is accepted as a turning point to help both countries contribute economic developments, there exist objections against the agreement especially with China in such sectors that are expecting to lose competitiveness in Korean domestic market. Agricultural sector is one of them. Under Korea-China FTA, goods are classified into “normal track”, “sensitive list”, “highly sensitive list”. For the goods in normal track and in sensitive list, tariff is lifted within 10 and 20 years, respectively. And those in highly sensitive list will be in tariff rate quota, reduced tariff rate, or exclusion in the list. Among the all 1,611 agricultural goods, 36.1% is in highly sensitive list, 27.4% in sensitive list, and the rest of 36.6% in normal track. The number of goods in sensitive and highly sensitive lists is much more than previous FTA’s with other countries. Agricultural and food products excluded in FTA with China are rice, meats and animal products like eggs and milk, major fruits and vegetables, and traditional sauces. This agreement will be a good reference in planning agricultural cooperation in GTI since it tells what should be taken into account for protecting domestic agriculture.

3.4.4 Russia

3.4.4.1 Barriers and constraints

The main problems of trade cooperation between Russia and Northeast Asia are : 1) structural problem, 2) poorly diversified export, import of goods with high added value and high-tech products, 3) negative balance in the trade of Russia with the countries of Northeast Asia, 4) large volumes of illegal trade (especially with China), 5) insufficient complementarities of different economics, 6) lack of harmonization of regulatory rules, 7) insufficient size of the market, 8) country risks such as internal political conflicts, drug trafficking, etc.

Moreover, it is necessary to take into consideration the presence of infrastructure constraints particularly in energy and transport sectors; low environmental sustainability of local ecosystems requiring additional environmental costs; significant underdevelopment or absence of production which provide comprehensive

and non-waste processing of raw materials; considerable lag in labor productivity in most natural resource industries from the developed countries of Asia-Pacific Region. To this point the crudity of the tariff policy is added, it does not stimulate the development but incites the “meridional” interception of trade flows (goods from the center of Russia which are delivered to Far East are unprofitable and goods from China, Japan, and South Korea are profitable); and real rupture of economic links of the Far East with the rest part of Russia.

3.4.4.2 Legal infrastructure and finance

The protection rules and policies for agriculture sector are enshrined primarily in the document «STATE PROGRAM of agricultural development and market regulation of agricultural products, raw materials and food for 2013 - 2020 years» of region and district programs. There is a sub-program «Implementation of State program of agricultural development and market regulation of agricultural products, raw materials and food for 2013 - 2020 years» in the Programs of agricultural development and federal targeted programs. The program provides the increase in spaces which are significantly insured from risks compared to 2012. As for Amur territory this figure is 3.7.

The financial policy concerning sustainable production of agricultural products is included in district and region subprograms «Development of financial and credit system of the agro-industrial complex» and valid financing of individual agricultural sectors that are stated in the subprograms.

It is obvious that on the territory of Far East Federal District and Zabaikal territory extreme natural phenomena are observed. The example is the rain flood on the Amur river in 2013 when many farms of Far East lost a significant amount of production. Especially soybeans were produced almost 4 times less than next 2014. Meanwhile, the significance of the territory reduces natural risks because it is possible to get low level of harvest in one part and to get high level of harvest in another part. Moreover, in this case the variety of manufactured products is important because the same natural factors have different impacts on the yield of any given crop.

One of the issues related to further strengthening of trade relations is the possibility of creating a free trade zone (FTZ) in Northeast Asia. The FTZ is the first step to the international economic integration which implies the abolition of customs duties, taxes and charges, and quantitative restrictions in mutual trade of the member countries. In relation to other countries, the participating countries may hold different foreign trade policy. For partner countries, the FTZ can provide several advantages that are able to change quantitatively and qualitatively their mutual trade and increase the volume of trade flows, to create the necessary competition for the development of certain regions, to develop the infrastructure, to expand the market for many types of products.

An important condition for the creation of FTZ is approximate similarity of participating countries by different development levels and economical structure. This fact enables countries to add more effectively the economic potential of each other creating conditions for strengthening cooperation. It is also important to note that there are no significant controversies and challenges between participating countries.

According to the ratio of the intensity of bilateral goods flows of the country the main trading centre in Northeast Asia is China. As for China, this ratio in trade with all countries of Northeast Asia is a little more than 1. Three countries: China, Japan, and Republic of Korea have the ratio of the intensity of bilateral trade of more than 1 in trade with each other and this fact indicates the solid foundation of their economic relationships.

Russia has the lowest ratio of intensity of bilateral trade among the countries of Northeast Asia: it is 0.84 with the Republic of Korea and it is 0.55 with Japan i.e. this ratio does not reach 1. It shows the low intensity of

bilateral trade of the Russian Federation with other countries of Northeast Asia, low importance of countries of Northeast Asia for Russian export. However, in recent years the increase of this ratio is observed in the trade with Japan and the Republic of Korea.

Each of the NEA countries has deficit production factor in other countries: Russia has natural resources and minerals, China has low-cost labor, Japan and the Republic of Korea have modern technology and advanced developments. Of course, every country in order to strengthen its economic power and independence tries to ensure stability in the development and in supply of these factors therefore the creation of the FTZ throughout the entire territory of all countries may be inappropriate. The northeast Asia countries need to develop their model of their existing advantages.

The first stage is to pay attention to the maintenance of border trade in the region and this fact should stimulate the intensification of integration processes. In addition, it will be possible to identify the features and problems of integration in the region, to evaluate the possible negative consequences basing on such local processes.

3.4.4.3 Other considerations

The market protection and mutual cooperation are defined by the protocols of bilateral meetings, programs and agreements. As for the relationship with the veterinary quarantine, there is a defined subprogram «Provision of the epizootic and veterinary and sanitary safety on the territory» in the regional programs. One of the directions aimed at preventing the spread of disease is the establishment of the customs and logistics infrastructure. This problem is especially urgent for Mongolia. According to the protocol of the 18th meeting of the Russian-Mongolian intergovernmental commission two countries agreed on the establishment of the draft program in order to revitalize the Mongolian cattle in 2015 and inspect Federal Service for Veterinary and Phytosanitary Surveillance enterprises for cattle slaughtering and meat processing.

3.4.4.4 Options and recommendations

To establish the documents for the development of agricultural territories, the creation of expert group is recommended based on agricultural universities in every region with the attraction of experts of scientific research institutions and representatives of regional agricultural ministries. The economically sound projects are discussed with business representatives to develop practical solutions. The proposals on formation and implementation of projects are directed by the sub-commission to interested foreign companies. The collective discussions determine the need of the project realization. For the development of such projects, the ministries of regions of Russia allocate funding. Similarly, the foreign partners implement their vision of the project at their own expense. The implementations of the project and the distribution of profits are determined by the agreement of two parties in the framework of the legislation of the participating countries.

One of the projects may create a cluster of corn production on Primorsky territory where Korean company Hyundai Khorol Agro is one of the investors working in the village Voznesenka. The project can be developed under the scheme. First, the analysis of possibilities of agricultural producers of different categories on the area of Primorsky territory and the selection of farms for the project realization is offered. Secondly, the assessment of the dynamics of grain production is not below the values set in the regional program of agricultural development and markets for 2013-2020. Thirdly, the definition of target values of gross production for the next year of the given period is the increase in productivity under the influence of technical and technological development. Fourthly, the definition of resource costs concerning the local climatic and economic conditions. Fifth, the identification of risks and the optimal harvest plan. Sixth, the definition of storage technology and transportation of products abroad. Seventh, the analysis of the results and definition of reserve for improving work efficiency.

IV. APPROACHES AND RECOMMENDATIONS TOWARD AGRICULTURAL COOPERATION IN GTR

4.1 FRAMEWORKS FOR AGRICULTURAL COOPERATION IN NEA/GTR

4.1.1 Introduction

The agricultural cooperation among the GTI member countries is expected to improve the food security and economic development in Northeast Asian region. However, the international cooperation in agriculture and food sector is not easy to implement due to a number of challenges such as conflicts between domestic agriculture, trade regulations on agricultural products, higher risks on long term investments, and so forth. In spite of the difficulties, all GTI member countries are acknowledging the importance and potential of the agricultural cooperation in this region. A reasonable and practical framework should be prepared for successful agricultural cooperation in GTR. The framework for the agricultural cooperation may consist of the Agricultural Board and networks of agricultural experts. In this section, described are the framework for the agricultural cooperation and the procedure recommendations for the project developments and implementations. Currently, the Democratic People's Republic of Korea (DPRK) is not a member country of GTI. In spite of current status, DPRK is quite important in realizing GTI projects due to its potential contribution and role in cooperation in GTI umbrella. Therefore, it is recommended that GTI should encourage DPRK to re-participate in GTI in order to maximize the effects of not only agricultural cooperation but also in other sectors.

4.1.2 Agricultural Board

4.1.2.1 Construction of Agricultural Board

Agricultural Board is proposed as a core body for decision making for agricultural cooperation in GTI. The main objective of the board is to improve food security and agricultural development in GTR, through increasing agricultural production by the cooperation among GTI member countries. The Agriculture Board is expected to upgrade current level of the agriculture cooperation among GTI countries to the next level, in result of which there will be increased share of the agricultural products in the total turnover of the import and export trades between four countries. It is expected to coordinate to solve cross-border issues, to promote trade liberalization and facilitation, to direct the promotion on agricultural investment cooperation.

The Agricultural Board consists of one senior government official and two other officials from each GTI member countries. The officials are recommended to come from the offices in charge of international cooperation in the Ministry of Agriculture or equivalent Ministries. Director Generals are preferred for the senior officials in the Board. Although the membership of the Agricultural Board would be limited to the GTI countries, interested governments and international organizations, and international financial institutions can participate in the board as in observer status under the unanimous invitation of the GTI countries.

Table 9. Construction of Agricultural Board

Ministry in charge	Ministry of Agriculture or equivalent Ministries
Senior official	Director General or an equivalent from each country
Working officials	Two from the office for international agricultural cooperation
Observers	Interested governments International organizations International financial institutions An official from DPRK

4.1.2.2 Duty and Activities

The board will be in charge of planning and implementation of agricultural projects as the administrative body, to achieve the objectives of the GTI agricultural cooperation. The agricultural board’s duty is planning and administrating agricultural cooperation. The board is expected to the following but not limited to;

- 1) Set up overall objectives of GTI agricultural cooperation
- 2) Administrative coordination of sub-bodies for GTI agricultural cooperation
- 3) Planning of collaborative agricultural development,
- 4) Establishment and running specific committees or task forces,
- 5) Execution and assessment of cooperation projects,
- 6) Promotion of agricultural investment,
- 7) Cooperation with other sectors such as transportation and trade facilitation.

The overall objective of GTI agricultural cooperation may include improving food security and increasing agricultural production through the cooperation projects. The objective should be described in specific numbers, such as a new development of 1 million tons of corn or soybean production area in 10 years. The board will play key roles in making the cooperation projects successful through various activities in major phases of each cooperation project. Some of notable activities are;

- Establishment of platform for facilitating agricultural cooperation
- Creation and keeping networks with international organizations and groups of specific experts
- Monitoring and identification of the issues related with food security and agriculture
- Development of agenda for encouraging agricultural cooperation in GTI
- Planning and provision of programs for agricultural innovation and trainings
- Feedback in planning new projects based on accomplishments, continuously reflecting needs of member countries

During the activities, the board will rely on the outcomes from the GTI expert networks of agriculture and related fields such as food production and agro-materials. The board may assign specific tasks to develop or analyze cooperation projects, and review the outcome of the results for further actions. The agricultural cooperation covers not only agricultural production but rural development and new development of agro-industrial clusters. Therefore, it is important to work together other GTI sectors such as transportation, energy, and even tourism.

4.1.2.3 Structure and governance

The Agricultural Board is supported by three sub-bodies such as joint research centers, project managing office, and specific committees. Research centers can be operated either in new installation or exchanges among existing national or provincial centers that GTI member countries already have. Special committees or task forces will work on specific agenda for GTI cooperation for agricultural development, including planning and economic analysis of projects, project development, and monitoring and assessment of on-going projects

or finished ones. Special committees or task forces consist of either permanent or temporary ones. The committees for planning, development, and monitoring are permanent. Temporary ones will be in charge of short-term projects. Project managing office is in charge of implementing projects that are identified and selected by the board. The board may have an advisory group in pursuing its activities to get additional expertise from different areas.

Creating networks among experts in different fields and institutions is very important in initial stages in GTI agricultural cooperation. It is recommended to include national institutes and universities for major fields of agriculture such as specific crops, livestock, farm machinery, and irrigation and land reclamation. The networks will play a role in creating specific committee or task forces. Later, included are private sectors including farmers, farm enterprises, and food production and processing companies.

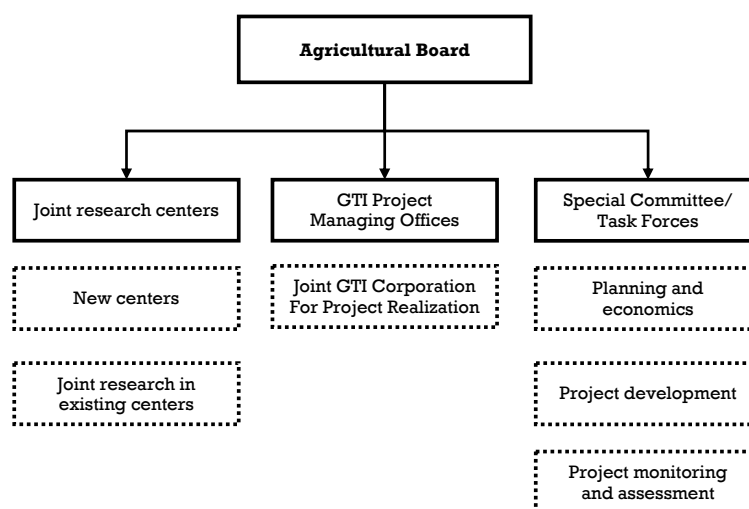


Figure 14. Structure of Agricultural Board

The board has an annual or regular meeting in places located in GTR and can call additional meetings by requests of member countries or on urgencies of agendas. In the annual meeting, the board performs such activities as approval or decision making of cooperation projects, hearing of outcomes from expert network, assignment of research projects to expert networks. The board may consult and identify the priority areas to intensify agriculture cooperation within the GTR regions through increased cross border cooperation.

Each member country may establish a national board for GTI agricultural cooperation, consisted of senior and working officials of GTR provinces. The national board can propose provincial agendas for GTI agricultural cooperation and deliver local needs to GTI Agricultural Board.

4.1.3 Networks among agricultural experts

When considering multi-national cooperation particularly in agricultural development, the preparation stage is utmost important to realize successful cooperation or projects. This preparation process can be achieved by creating active networks among research and technical institutions. The network may consist of major research institutions and universities located in GTR although national institutions can be included for effectiveness. For successful networking, private corporations should also contribute to the activities of the network. The corporations have a number of technical challenges in improving productivities. When the corporations do not have their own research and development capability, the role of network becomes more important.

The first step for successful cooperation in GTI agricultural development is to understand current situation that member countries are facing. The current agricultural situation is described in previous chapters. When planning specific projects for the cooperation, deeper understanding of agriculture and domestic markets of each country is required. Various networks can be proposed from different fields such as

- Research
- Academics
- Officials
- Agricultural specialists and enterprises
- Private sectors related with agro-materials, food production, etc.

In this report, the network for GTI agricultural cooperation is proposed to have four fields, 1) Agricultural Economics and Policy, 2) Crop Science and Technology, 3) Animal Science and Technology, 4) Agricultural Engineering. Agricultural economics and policy network deals with planning and assessment of agricultural cooperation, development of protocols of cooperation projects, and recommendations for facilitating agricultural cooperation and trading of products as cooperation outcomes.

GTI cooperation for agricultural development is linked with new development of crop land and improvement of productivities in existing cultivation systems. Crop Science and Technology network covers the demand raised from the objectives such as development of higher yield varieties and crop management technologies. The network takes the research needs from farmers or industrial farms and provides solutions through their research activities. It could provide new crops suitable to local climate and soil conditions. Energy crop such as miscanthus is one of the examples. Lignocellulosic biomass from miscanthus can be used for direct combustion as solid fuel or producing bio-ethanol.

Considering the livestock farming in GTR, animal science and technology network is expected to play an important role in meeting the demand from the livestock farms and meat production industries. The network could contribute to providing technologies for not only higher productivities but also veterinary measures. The network should also establish communication channel with the crop science and technology network when discussing about the production and distribution of animal feeds.

A network for agricultural engineering is also important in that it covers farm machinery and agricultural infrastructure such as irrigation systems, farm roads, and rural development. Climate conditions require timely planting and cultivation during a short period of time. Sufficient level of mechanization is required to solve this problem and further increase the productivity. China, Korea, and Russia have a potential to manufacture the fame equipment required in this region. The network can contribute to both improving agricultural production and commercialization of new farm equipment well adapted to GTR. When a new large scale development of crop production is considered, precision farming is a good technology to adopt. The precision farming allows farms to produce crops more efficiently using variable applicators. In addition to farm machinery, agricultural engineering network deals with soil and water conservation, irrigation, and other infrastructures for agricultural production. Environmental management in crop production is also important and covered by this network. Sustainable agriculture and rural development are also the fields covered by the network.

Interaction with private sectors is equally important in networking for agricultural development in GTR. Farms and food production corporations always require continuous supports from expert groups of research institutions. They will ask the solutions of technical difficulties in their activities. Agricultural industries or corporations include individuals and corporations in the fields of agricultural production, agro-material production, farm equipment, and public corporations that plan and design agricultural infrastructures. Korea Rural Corporation (KRC) is one of the examples of the public corporation for planning and management of rural infrastructures in Korea.

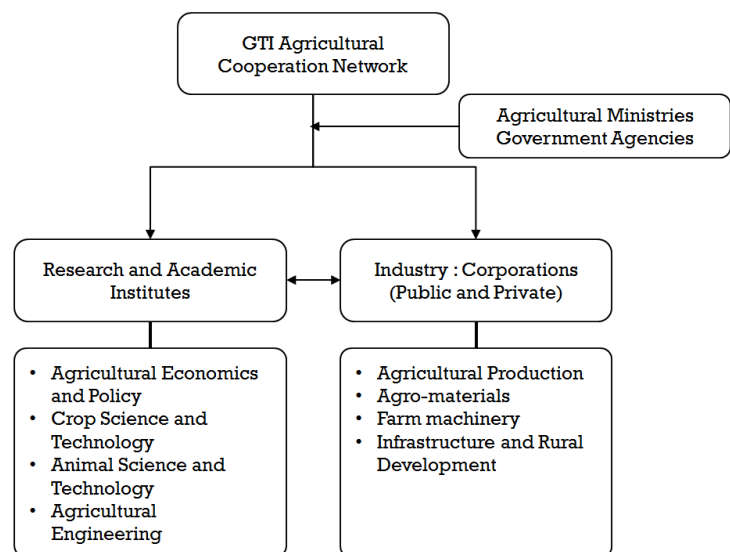


Figure 15. Network for research and academic institutions in GTI

Major tasks of networking are to prepare the realization of cooperation projects and to provide expertise for each field in GTI agricultural cooperation. Each network by fields conducts collaborative researches for specific topics. There are a number of research or academic institutions for the above mentioned fields in GTR's of each member country although the participation to the network is not limited to those in GTR but open to national institutions depending on availability. These institutions are included for the network and conducts researches specified by Agricultural Board or network office. The outcomes from the research efforts by the network are presented in annual conferences to share the information. The examples of network are shown in the following table.

Table 10. Example of networking of institutions for specific research topics

Network Fields	Participating institutions	Research activities/topics (e.g.)
Agricultural Economics and Policy	China : Jilin Academy of Agricultural Sciences Mongolia : The Mongolia State University of Agriculture Korea : Korea Rural Economic Institute Russia : Far East Research Institute of Economics	1. Analysis of current food crop production system in GTR 2. Development of GTI corn and wheat production scheme – 2 million or more tons 3. Investment strategy for GTI agro-industry clusters
Crop Science and Technology	China : Heilongjiang Academy of Agricultural Science, Jilin Academy of Agricultural Sciences Mongolia : Dornod Agriculture Research and Production Center, Plant Science and Agriculture Research Institute Korea : Highland Agricultural Research Institute Russia : Primorsky State University of Agriculture	1. Development of high yield corn, wheat, soybeans cultivars 2. Sustainable management system for large scale crop production 3. Experimental study for energy crops 4. Development of common regulations for controlling plant diseases
Animal Science and Technology	China : Jilin Academy of Agricultural Sciences Mongolia : Research Institute of Animal Husbandry, Institute of Veterinary Medicine Korea : Gangwon National University Russia : Far East Agrarian University	1. Analysis and improvement of existing animal genetic resources in GTR 2. Development of GTI animal disease control scheme 3. Animal feed production and supply system within GTR
Agricultural Engineering	China : Heilongjiang Academy of Agricultural Science Mongolia : The Mongolia State University of Agriculture Korea : National Academy of Agricultural Science, Rural Research Institute (Korea Rural Corporation) Russia : Far East Research Institute of Agriculture	1. Development of farm equipment for large scale crop production system 2. Development of GTI precision farming technology 3. Planning rural infrastructure for GTI agricultural cooperation 4. Environmental management system in large scale crop production regions
Food production and safety	China : Heilongjiang Academy of Agricultural Science Mongolia : The Mongolia State University of Agriculture Korea : Korea Food Research Institute Russia : Primorsky State University of Agriculture	1. Exchange and improvement of food safety guidelines (HACCP) 2. Development of protocols for food processing, storage, and supply within GTR 3. Development of GTI schemes for certifying organic food products

4.1.4 Directions for GTI agricultural cooperation

GTI agricultural cooperation should meet the national policies on agricultural development of each member country. Securing food grains is the top agenda in international agricultural development. Each member country may have a little difference in agendas and views in policies. However, the direction of the international cooperation in agricultural development concentrates on several objectives such as economic achievements through agricultural development, food security, regional development, and so forth. GTR has a great potential of increasing agricultural production through land reclamation and large scale cultivations even

though natural and climate conditions are not favorable. In addition, market within the GTR is large enough to take the production in the region. Various projects for the cooperation can be developed with the following considerations,

- Economic achievement through projects
- Sustainable management in farming and food production
- Relieve the insecurity of grain food supplies
- Socio-economic development in rural area surrounding project sites

Potential fields for the agricultural cooperation need not to conflict the domestic agriculture of the other member countries but to be complementary. Considering recent statistics on food grain trades in GTI member countries as described in previous sections, both China and Korea are importing a large amount of grains. This indicates that increasing the production of food grains may be the most important issue and desirable in considering cooperation. It will also help reduce the risks of world food crisis and price fluctuation of grain markets. However, additional cooperation in other crops or husbandry is not necessarily excluded. Private sectors are allowed to participate in agricultural production, processing, and further food production.

There exist a number of agricultural development projects in the form of international cooperation, particularly in Russia, Mongolia, and China. The companies that are carrying out agricultural production and agro-business express difficulties in institutional and legal processes. A number of barriers and hurdles were described in the previous chapter. The first action in discussing agricultural cooperation should be how to resolve the difficulties and barriers against GTI agricultural cooperation effectively. Therefore, it is highly recommended to provide institutional and legal measures for the existing agricultural enterprises that have carried out their business before discussing GTI agricultural cooperation. Without the resolution of these problems, it is nearly impossible to expect successful agricultural cooperation in GTR.

Demonstration projects are recommended to be developed and implemented after resolving institutional and legal problems. The demonstration projects may be farm developments or small scale agro-industry clusters in major crop production region. Through planning and implementing the demonstration projects, we can refine approaches for large GTI agricultural projects.

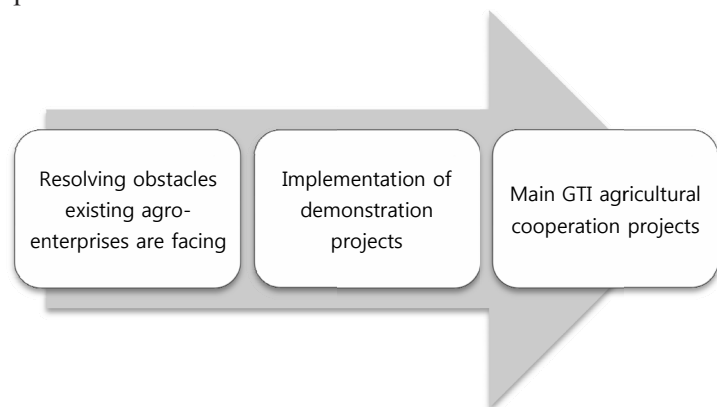


Figure 16. Steps for GTI agricultural Cooperation

4.2 DEVELOPMENT OF PROJECTS FOR AGRICULTURAL COOPERATION

4.2.1 Near-term projects

GTI agricultural cooperation projects should be implemented based on unanimous agreements among the member countries, considering domestic agricultural situations and mutual developments in agriculture and food sectors in GTR. Large and long-term projects require greater efforts in preparation of the projects. Therefore, near-term projects need to be developed and carried out for the foundations and successes of large scale long-term projects and they should be initiated within a couple of years. Based on discussion of national consultants, proposed for the near-term projects are 1) Training programs, 2) Joint research programs, 3) Demonstration projects for crop production and trading

4.2.1.1 Training Programs

The most important step is acknowledging the importance of GTI agricultural cooperation and sharing information on agriculture in GTR among the member countries. The training program provides policy makers and stakeholders with the idea and direction of GTI agricultural cooperation.

Training policy makers for the cooperation

International cooperation for agricultural development requires public consensus and institutional arrangements. Policy makers or government officials should understand important phases and steps to take in GTI agricultural collaborations. Possibly they may have to involve in preparing the master plan of the cooperation themselves. For these, it is recommended to arrange training programs where policy makers share the idea on what the GTI agricultural cooperation are about and they have to prepare for institutional arrangements when they go back to own countries.

The training program may be prepared as either a part of process for planning itself or a simple training to let them understand the cooperation. Since the policy makers or government officials better understand detailed processes and requirements for realizing the cooperation, it seems desirable for the training to be a part of planning process. The policy makers or officials for the program are recommended to participate from Ministry of Finance, Ministry of Agriculture, National institutions on Agriculture. In order to maximize the effects of training, draft master plans with demonstration projects should be prepared before the trainings.

Table 11. Example of training program for policy makers

Components	Descriptions
Training targets	Officials in charge of international cooperation in Ministry of Agriculture and GTR provinces
Number trainees	6 for each country - total 24 - Officials from central government - Officials from GTR provinces
Duration	2~3 weeks
Topic	- Objectives and direction - Project development - Development of agro-industry clusters - Financing for GTI agricultural cooperation - Role and activities of agricultural board - Legal and customs procedures by countries

Training of specialists for developing cooperation projects

There are a number of currently existing international agricultural development projects. They include individual or private companies. They are experiencing many difficulties in carrying out their activities such as crop production, importing and exporting their products and agro-materials. The training programs for them are quite important in that they can access official information and appeal their needs and difficulties. Government officials and researchers can provide the information and also figure out how to support them and what should be prepared for further GTI agricultural cooperation.

4.2.1.2 Joint Research Programs

As mentioned in the previous section, networking is an important component of the framework for the GTI agricultural cooperation. A successful networking can be realized through conducting research activities or programs by specific expert groups. The outcomes from the research programs will provide solid foundations for the cooperation. As the Cerrado project indicated, agricultural research and development is the most important arrangement to the successful agricultural development. New GTI agricultural research centers are recommended to be launched for field specific research projects. Research needs for GTI agricultural cooperation include the followings,

- Improved varieties of genetic resources
- Efficient cultivation of crops and animal productions
- Improvement in farm machinery utilization
- Sustainable farming and environmental conservation
- Pest and disease controls
- Common GTI standards for cross-border distribution of agricultural and food products
- GTI schemes for trading agricultural and food products within GTR

Along with launching new research centers, it is recommended that existing research and academic institutions participate in joint research programs. For specific research topics, selected institutions conduct cooperative research works by exchanging counter parts from the other member countries. More research topics are listed in Table 10. The outcomes from the joint research activities are presented in annual or regular GTI conferences or Agricultural Board meetings.

4.2.1.3 Demonstration Projects

Development of a few hundred ha of demonstration farm or project is important in preparing large scale projects. Through the experience of planning and carrying out experimental or demonstration project, we can identify the direction to GTI cooperation and research needs, and find solutions to resolve various hurdles and barriers in technical and institutional aspects.

One of the candidate demonstration projects is agricultural cluster development in Khalkh-gol region, Mongolia. The region has a great potential in that natural conditions are favorable in growing rice, fruits, and for many other agricultural productions. When a free trade zone is established in the region, we can expect a number of lessons and experiences from the demonstration projects for further development of longer term GTI agricultural cooperation.

4.2.2 Longer-term projects

Compared to near-term projects, longer-term projects take longer time and require much larger investments to realize the projects. Therefore, it takes much longer time to prepare the project. However, the effects of the projects would be much greater than near-term or small scale projects. Therefore, it will be difficult and takes very long time to reach agreements on large scale long-term projects due to the potential impacts on economy in the project regions. Longer-term GTI agricultural projects may include the development of large scale food crop production area and development of agro-industrial clusters based on large scale crop production fields.

4.2.2.1 Increase in Food Crop Productions

The food security is the highest agenda in the world as well as in GTR. Korea is heavily dependent on imports for the demand of major grains. China also started importing a large amount of grains and is expected to continue to import more grains. Meanwhile, Mongolia and Russia have a great potential in developing new

crop lands and increasing food crop production in their territories. The significant increase of major food crop production can be achieved by both increasing productivity and additional development of crop fields. It is recommended to define specific goals for substantial increase in food crop production considering available resources and technologies related with crop production.

Increasing crop productivity in existing crop fields

Although there are large crop production fields where major food crops are grown in GTR, additional increase in crop production are achievable by increasing productivities on farm lands. Increasing productivity on existing farm lands can be made by several ways such as growing higher yield varieties, additional inputs such as fertilizers, improved controls of plant disease and insects, and timely harvesting and appropriate post-harvest processing through utilization of improved equipment.

Additional agricultural infrastructures can contribute to the increase of the productivity. Improving and new construction of irrigation and drainage facilities are important in improving plant growth and ultimately higher productivity. The construction of new dams for developing new irrigation water can be taken into account especially in major food crop fields. Land consolidation also improves the productivity since it helps farm mechanization, particularly in Chinese territories where farmers cultivate relatively small parcel crop fields they own. Development and cultivation of higher yield variety may take long time. It should be one of the major tasks that joint research activities provide by expert networking.

More inputs of fertilizer and agro-chemicals are also highly effective in increasing crop productivity. However, it may affect long-term agricultural sustainability. Application of mineral fertilizes could affect environmental quality. Timely employment of farm equipment is another critical factor in GTR due to the cold weather conditions. More and higher horse power equipment will help reduce unit production costs as well as increase productivity.

Development of new crop fields

There are still great potential to develop new crop fields in GTR. Large land areas are available for new development for crop production. Some are not favorable for crop fields due to many reasons such as poor drainage, limited water resources, or severe weather conditions. The others previously cultivated are left idle due to technical or economic reasons of the region.

The development of new crop fields is more significant in that additional new crop production can be made. Planning in the new development is quite important for success. As a preparation process of the development, the planning should select the appropriate locations based on the availability of natural resources, transportation of products to market or export terminals, and availability of agro-materials and labor. In the planning stage, various expert groups should participate to collect advices, for example which crop is to be produced in the field from the expert groups in agronomy. The experience of Cerrado project conducted by Brazil and Japan may provide a good reference.

Establishment of GTI Agricultural Infrastructure Corporation

Public corporations are important in agricultural cooperation in GTR, particularly when considering new development of large scale crop fields. Korea has a public corporation which has been in charge of construction of rural and agricultural infrastructure long before economic development. The corporation is Korea Rural Corporation(KRC). The corporation constructed a number of dams for irrigation, irrigation canals, land reclamation and consolidation that are prerequisite in improving agricultural productivities. These projects

were funded by government budget and the corporation was in charge of planning, design, and management of construction by private companies.

In developing agricultural project, a certain level of public investment is necessary. The cost of constructing irrigation canals or farm roads is normally larger than the scale private companies can take as an investment. A public corporation like KRC or CAMPO in Cerrado may play an important role in developing and making agricultural cooperation project more successfully. The public corporation can be founded either bilateral or multilateral way, depending on the scale and location of projects.

Table 12. Proposal of GTI Agricultural Infrastructure Corporation

Elements	Description
Share	Member countries
Budget of operation	Fees from its operation such as planning, designing, technical supports
Major tasks	<ul style="list-style-type: none"> - Planning and designing of infrastructure (dams, canals, pump stations, land consolidation and reclamation) - Developing irrigation and drainage systems - Environmental management for sustainable production - Management of infrastructure facilities - Technical support for agricultural engineering in general

4.2.2.2 Agro-Industrial Clusters

Agro-Industrial Clusters

Industrial cluster is defined as geographical concentration of companies and institutions on specific fields or areas. Main objectives of the cluster include corporations of a specific field of industry and related organizations that are required to improve the competitiveness of the corporations. The examples of related organization are suppliers of parts and services. In addition, administrative organizations, universities, and services for training and information are included in the clusters.

The benefits of industrial clusters are expected by the followings;

- 1) Increase in productivities: The companies located in a cluster are able to access of qualified labors and reduce the cost of purchasing materials from the companies within the cluster. Although the competitions are fierce among the companies, the productivities of corporations in the cluster show greater productivities.
- 2) Superior competitiveness by innovation: The corporations in a cluster learn significance of technology, parts of new instruments, and even marketing concepts. Through relations with other organizations in the cluster, they acquire superior competitiveness
- 3) Allowing foundations of new corporation: The clusters provide new opportunities to start new corporations with favorable environment of capital, technology, labor, and other inputs.

Agricultural cluster is the geographical integration of various organizations related to agriculture in a certain area, such as farms for agricultural production, corporations for distribution and processing after harvesting, academic and research institutions, and administrative bodies. The agricultural cluster has a potential to give the each organization stronger competitiveness. It is an extension from traditional agriculture to agriculture related industries and institutions. Sometimes non-agriculture corporations can enter the clusters. When food production companies are included, the cluster becomes an agricultural and food cluster.

Table 13. Component and its functions in agricultural clusters

Groups	Components	Functions
Industry	Farmers and farmers organizations Processing corporations	Expansion of production Production of environment friendly product Marketing with common brand Strengthening competitiveness of local products
	Distribution corporations	Analyze consumers and target markets Analyze profitability and distribution system Find niche market and provide information to producers Advertisement and develop export markets
Academic and Research Institutions	University Research institutions	Research on developing variety improvement Commercialization of technology and transfer Diagnose management, markets
Administrative bodies	Central or local government	Establishing policies and financing Preparation of project execution Public relations and support
	International organizations	Participation in cluster and support Coordination of participating countries Facilitation of networking

The structure of agricultural-food clusters consists of production, industrial support, research and development, and social infrastructure. Agricultural production is related with research and development for agriculture as well as cultivation and husbandry. Industrial support includes agro-materials, equipment, design and packaging. When food production is included, the component of industrial support requires wider range of additional services. Social infrastructure in the cluster implies the importance of function of education, financing, traditional culture, and information.

Agro-industrial cluster in Heilongjiang and Primorsky

Agro-industrial clusters can be proposed to create agro-industrial business and establish spaces for future economic prosperity in Northeast Asian borders. More specifically, the GTI agro-clusters have the following objectives,

- Establishment of infrastructure for large scale agricultural productions
- Creation of agro-businesses for driving continuous economic growth
- Developing agro-industrial cluster as a global hub for distributing agricultural products such as food grains
- Sustainable operation of the cluster for continuous development of agro-business

Table 14. Visions and Objectives of GTI Agro-Industrial Cluster

Vision	Development of agro-industries and regional economy in GTR			
Objectives	Establishment of infrastructure for large scale agricultural production	Creation of new agro-industries	Global hub for distributing agricultural products/ food grains	Provision of driving force for developing agro-industry
Strategies	- Infrastructure for stable and efficient agricultural production - Services for agricultural market access - Integrated support for agricultural production - Cross border cooperation	- Encourage private investment - Support market access in and outside of GTR - Facilitation of transferring technology	- Linkage with existing resources - Distribution complex dedicated for agricultural products - Creation of international distribution networks	- Research and development support - Network between industry and research institutions

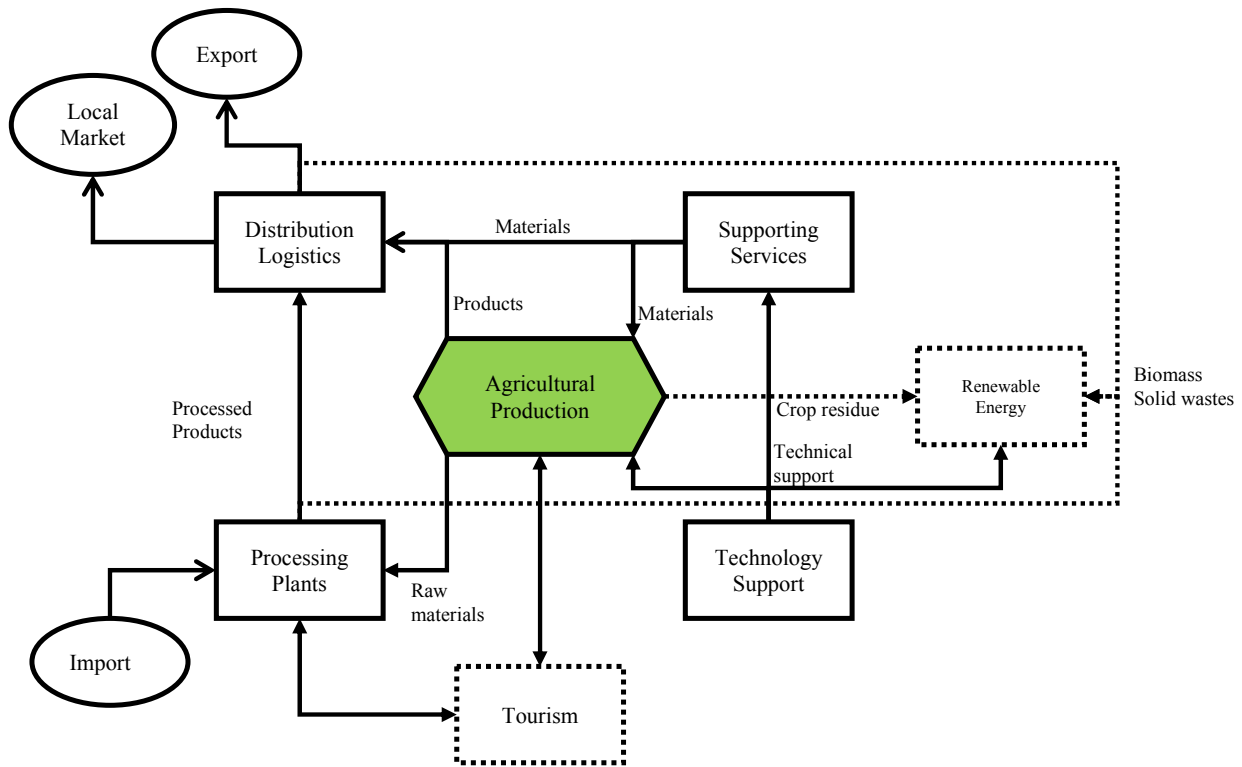


Figure 17. GTI agro-industry cluster components and processes

Agricultural cooperation is highly dependent upon the progresses in other sectors including energy, transportation, and environment. Particularly transportation is highly affecting to trading of agricultural products. Network among farms, corporations for food processing, research institutions, neighboring colleges are the core aspects of the cluster. Agricultural products harvested in near farms are processed and stored before shipping to target markets. Advanced logistic systems provide opportunities for packaging with the cluster brand and efficient distribution of products.

Agro-industries consist of agriculture as primary industry and related secondary and service industries such as processing, food production, transportation, and so forth. Since agro-industries are highly based on agricultural production, natural advantages are the key factors to consider. Soils, climate, topography, and water resources are the major natural advantages in locating the cluster. Facilities and services for processing, storage, and distribution of agricultural products should be arranged to be provided. Due to climate and latitude of this region, appropriate facilities are required for processing and storage of agricultural products. Additional values are accompanied by processing of agricultural products rather than selling raw products. In this aspect, research and development are very important in creating additional values to agricultural products. Close cooperation of research institutions with farms and food processing corporations are getting more important. This type of network or cooperation can help produce new food products from traditional agricultural products.

Northeast Asian region of GTR is well known to have clear natural resources with no environmental pollution. Agricultural products from this region have an image of contamination free. The image can be disclosed for marketing and success in the cluster. Another critical factor is legal and institutional supports to the cluster. Investment and participations are heavily dependent upon the legal and institutional system when importing and exporting their goods. For successful creation of the cluster, favorable legal and institutional support is desirable. Although North Korea is currently not included in GTR, its important role and participation are highly valuable. Not only economic benefits from the participation in the cluster, but the political stability could be expected in the future.

Creation of Soybean and Rice Clusters

According to the trend of soybean production which is characterized by stable growth of production of this crop, no less than 1.5 million tons can be obtained in 2-3 years (the data of 2014 for Primorsky territory, Khabarovsk territory, Amur region, and Jewish Autonomous region).

To solve this problem it is necessary: 1) gradual technical re-equipment of machine-tractor park; 2) work of research groups on introduction of new technologies for the obtaining of productive varieties and the increase of soybeans yields; 3) stabilization of the purchase of mineral fertilizers and adding them into the soil according to their standards (compliance with technologies); 4) prevention of pest and optimal use of products for plant protection; 5) effective use of the insurance system for effective production management; 6) increase of export of goods manufactured for the development of production, etc.

In addition to the production the components of the cluster “Soy” are the enterprises of processing and markets. To improve the quality of the processing enterprises there is need: 1) technical and technological re-equipment; 2) the increase of processing products and the expansion of the range; 3) construction of the processing facility on Primorsky territory for oilseeds; 4) production of compound feed with the use of soy and corn for livestock, etc.

According to statistics, the market of northeast Asia (NEA) is able to import soybeans from the Far East of Russia.

For example, in the Program of development of agriculture of the regions for 2013-2020 period on Primorsky territory more than 14 billion rubles are planned for realization of various aspects of producing of crop production. This assumes the use of extra budgetary funds by 10 times more. The activities of research Institutes and Universities: Far Eastern state agrarian University and the Primorsky state academy of agriculture is of great importance for creation of cluster. In a similar way we can create the **cluster “Rice”** considering its features. The main feature is the fact that the main facilities for the production of rice are concentrated on Primorsky territory. In the next 2-3 years it is possible to stabilize the production of this crop not less than 80 thousand tons. Problems are similar to those described for the cluster “Soy”.

Agro-food corporations in the cluster

Although corporations in the cluster may be either public or private ones, agro-food corporations established in the cluster will be private in that their business is far from public interests. Therefore, the agro-food corporations will join the cluster based on the decision considering return on the investment and potential of profit growth. The benefits of investment in the cluster will increase when the corporation utilizes main agricultural products or related products in the cluster. Soy beans and corns are expected to be produced in GTI agricultural development. These two crops can be used to produce quite a few numbers of products. Most general products from soy beans include soybean oils, soy meals, protein, flour, and various isolates. For example, soy proteins are used in manufacturing breads, cookies, crackers, and other baked goods, ingredients in cereal mixes and pasta. Soy isolates are used in coffee whiteners, liquid toppings. Therefore, when soybean is the major agricultural products consumed in the cluster, various corporations that produce such food products will be interested in joining the cluster. The same story goes to corn. The list of products obtained from corn is also quite long. Similarly to soybeans, the primary products from corns include corn oils, starch, and flour. When ethanol is produced using corns by fermentation, dried distiller’s grains with solubles (DDGS) are available for a feed ingredient. This implies that clusters based on corns or soybeans have greater strengths that can attract various food production corporations.

Biomass and bio-energy are additional fields that can be included in the cluster for utilizing residues or by-products produced both in the crop fields and processing plants. The use of biomass wastes from processing plants can be connected with management of solid wastes and even further production of renewable energy. Since Korea adopts policies to encourage renewable energy, corporations for producing bio-fuels also have good opportunities in succeeding their business inside the cluster in that large amount of biomass are available in the region.

4.2.2.3 Other Potential Projects

There are additional potential projects that national consultants proposed for GTI agricultural cooperation. Through further analysis of the projects, the Agricultural Board may include them as near or longer-term projects based on their effects on the results of the cooperation.

- Cash crop production in the central crop producing areas and eastern provinces in Mongolia
- Technical assistance project: Fishery Development in Buir lake, Khalkh Gol region

4.3 EFFECTIVE IMPLEMENTATION AND FINANCIAL SUPPORT

4.3.1 Measures for effective implementation of the cooperation

GTI agricultural cooperation can take three steps for its implementation. The first step is research and strategic planning. In this step, researches are performed for 1) agricultural development and investment for agro-food industries, 2) Preparation of master plans for regional agricultural developments and agro-industry clusters in GTR, 3) Innovation in agricultural technologies.

The second step is establishment and operation of agro-industry complex. Demonstration projects are formulated and executed for the complex. In this step, investment from private sectors is participated in the projects. The third step is extension of investments. Investments are extended and the cluster is matured in both establishing each element and its functioning. Agricultural productivities are improved and farm extensions are occurred with public financing and government supports in this step.

The success of the GTI cooperation in agricultural development is guaranteed only when there is enough preparation and thorough planning before launching cooperation projects. Based on the planning, each government should do its best to arrange legal and institutional systems to realize the cooperation projects. The recognition that the GTI cooperation is beneficial to each participating country will help persuade every stakeholder to have affirmative attitudes. Then, the budget for the GTI cooperation becomes readily available. Public and private partnership is one of approaches for running projects. Member countries need to support public projects by financing and political supports. Private companies will start further investments as the public supports progress.

The most important prerequisite is mutual trust among the GTI member countries, in which the GTI agricultural cooperation is beneficial to solving food-security problems and economic development in GTR. There will be a number of obstacles raised by disagreements in priority and domestic agricultural policies in realizing the cooperation projects. We should overcome the obstacles with concrete mutual trust for the GTI agricultural cooperation.

4.3.2 Financing for the Projects

Financial sources consist of government funds, private investments, and finances from international organization. Each member country has budgets for international cooperation, particularly in agricultural sector. In addition, Korea has budget for official development assistance to developing countries. Private investments consist of those from private corporations or banks. Public-private-partnership is also an option to effectively drive the GTI agricultural cooperation.

GTI agricultural cooperation help reduce insecurity of world food grains. Therefore, financing from international organization or banks would be available to GTI projects. Recently founded Asia Infra Investment Bank (AIIB) may be a source for financing GTI agricultural cooperation.

For the near-term projects such as joint research project and networking of research and academic institutions, the funding seems available from government budgets of member countries. Demonstration projects may be supported by either government or joint funding from government and private sectors, depending on the characteristics and objectives of the projects.

4.3.3 Requirement of other sectors' progresses

As mentioned in describing clusters, large scale agricultural production requires secure transportation for exports. In planning agricultural cooperation, road and railway paths should be taken into account with respect to transporting food grains. Easiness of access to markets is determined by accessibility to harbor or railways. New road networks should be connected at least from production fields to clusters where storage and processing facilities are located, and further from clusters to highways or harbor in which loading facilities are available.

4.3.4 Potential collaboration of tourism and environmental protection

New development of crop production fields may result in environmental deterioration. Major environmental risks by agricultural production are soil erosion and water pollution due to chemical applications. GTI agricultural cooperation should be sustainable and minimize environmental risks. Efficient uses of crop residues and solid wastes from processing plants reduce potential environmental problems and can be used in producing renewable energy.

Retreat or staying in rural area is one of leisure in Korea. People experience natural environments and agricultural activities while they are staying in rural areas. When the cooperation of agricultural development is started, the similar needs can be satisfied in or near project areas. In addition, large scale agricultural production gives them different experiences from both inside Korea as well as the meaning of journey abroad.

V. SUMMARY AND RECOMMENDATIONS

Considering available resources and market demand of agricultural and food products, GTR has enormous potential in agricultural development and cooperation. Mongolia and Russia still have vast land areas available for agricultural development for crop production. China has been enjoying economic development and started to import major grains and to recognize the importance in agricultural development in this region. The Republic of Korea is heavily dependent on import for food grains and does not have its own solutions with limited land area with world's highest population density. Statistics and current status of agricultural production and trades in GTR indicate that the agricultural cooperation is getting more important in terms of economic development in this region but also food security in the world.

There have been a number of agricultural cooperation projects in GTR, mostly bilateral along the borders. National policies of GTI member countries also reflect the efforts cross-border cooperation in agricultural sector. The Republic of Korea has provided developing countries with the official development assistance programs of which agricultural programs are notable. China also has a number of agricultural cooperation projects in both official and private channels. However, previous cooperation projects suggested that there are quite a few obstacles or barriers in international agricultural cooperation, such as the protection of domestic agriculture and institutional or customs procedure in trading agricultural products. In spite of such challenges, trades and cooperation in agricultural fields that have been conducted in NEA reveal the importance of further agricultural cooperation.

The successful GTI agricultural cooperation requires a well-defined framework. One of the key elements of the framework is the Agricultural Board. The Agricultural Board consists of one senior government official and two other officials from each GTI member countries. The officials are recommended to come from the offices in charge of international cooperation in the Ministry of Agriculture or equivalent Ministries. Although the membership of the Agricultural Board would be limited to the GTI countries, interested governments and international organizations, and international financial institutions can participate in the board as in observer status under the unanimous invitation of the GTI countries. The board will be in charge of planning and implementation of agricultural projects as the administrative body, to achieve the objectives of the GTI agricultural cooperation. The agricultural board's duty is planning and administrating agricultural cooperation.

Creating networks among experts in different fields and institutions is very important in initial stages in GTI agricultural cooperation. It is recommended to include national institutes and universities for major fields of agriculture such as specific crops, livestock, farm machinery, and irrigation and land reclamation. The networks will play a role in creating specific committee or task forces. Later, included are private sectors including farmers, farm enterprises, and food production and processing companies. Major tasks of networking are to prepare the realization of cooperation projects and to provide expertise for each field in GTI agricultural cooperation. Each network by fields conducts collaborative researches for specific topics. There are a number of research or academic institutions for the above mentioned fields in GTR's of each member country although the participation to the network is not limited to those in GTR but open to national institutions depending on availability. These institutions are included for the network and conducts researches specified by Agricultural Board or network office.

There exist a number of agricultural development projects in the form of international cooperation, particularly in Russia, Mongolia, and China. The companies that are carrying out agricultural production and agro-business express difficulties in institutional and legal processes. A number of barriers and hurdles were described in the previous chapter. The first action in discussing agricultural cooperation should be how to resolve the difficulties and barriers against GTI agricultural cooperation effectively. Therefore, it is highly recommended to provide institutional and legal measures for the existing agricultural enterprises that have carried out their business before discussing GTI agricultural cooperation. Without the resolution of these problems, it is nearly impossible to expect successful agricultural cooperation in GTR.

GTI agricultural cooperation projects should be implemented based on unanimous agreements among the member countries, considering domestic agricultural situations and mutual developments in agriculture and food sectors in GTR. Large and long-term projects require greater efforts in preparation of the projects. Therefore, near-term projects need to be developed and carried out for the foundations and successes of large scale long-term projects and they should be initiated within a couple of years. Based on discussion of national consultants, proposed for the near-term projects are 1) Training programs, 2) Joint research programs, 3) Demonstration projects for crop production and trading

Compared to near-term projects, longer-term projects take longer time and require much larger investments to realize the projects. Therefore, it takes much longer time to prepare the project. However, the effects of the projects would be much greater than near-term or small scale projects. Therefore, it will be difficult and takes very long time to reach agreements on large scale long-term projects due to the potential impacts on economy in the project regions. Longer-term GTI agricultural projects may include the development of large scale food crop production area and development of agro-industrial clusters based on large scale crop production fields.

The success of the GTI cooperation in agricultural development is guaranteed only when there is enough preparation and thorough planning before launching cooperation projects. Based on the planning, each government should do its best to arrange legal and institutional systems to realize the cooperation projects. The recognition that the GTI cooperation is beneficial to each participating country will help persuade every stakeholder to have affirmative attitudes. Then, the budget for the GTI cooperation becomes readily available. Public and private partnership is one of approaches for running projects. Member countries need to support public projects by financing and political supports. Private companies will start further investments as the public supports progress.

The most important prerequisite is mutual trust among the GTI member countries, in which the GTI agricultural cooperation is beneficial to solving food-security problems and economic development in GTR. There will be a number of obstacles raised by disagreements in priority and domestic agricultural policies in realizing the cooperation projects. We should overcome the obstacles with concrete mutual trust for the GTI agricultural cooperation.

