ASAN REPORT

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Outside Looking In: A View into the North Korean Economy

EDITED BY J. JAMES KIM AND HAN MINJEONG | SEPTEMBER 2014

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Edited by J. James Kim and Han Minjeong September 2014

The Asan Institute for Policy Studies

Preface

This report provides a collection of works reviewing the latest trends in the North Korean economy. While the survey of the literature suggests that there is no shortage of research on this topic, we pride ourselves in being able to provide what we consider is a set of analysis by contributors who have deep first-hand knowledge through their individual expertise and frequent visits to North Korea.

The contributing chapters were gathered from two separate meetings held in Ulaanbaatar during July 2013 and Hanoi in September 2013 under the guidance of the Asan Institute for Policy Studies and the organization of the Asia Foundation.

In finalizing this report, we would like to acknowledge the contributions from the Asia Foundation and the Asan Institute for Policy Studies as well as mention the contributions of some key individuals including Peter Beck, Meloney Lindberg, Veronique Salze-Lozac'h, William Taylor, Nicholas Eberstadt, and Eunjae Lee. We would especially like to thank Gordon Hein and Hahm Chaibong for their support and encouragement towards the completion of this project. Credit is due to the translation assistance provided by Delia Yoonjeong Kang, Kim Hyeyeun, and Eunhea Grace Kim – this volume would not have been possible without their hard work and support. Finally, we would like to thank Peter Beck, Nicholas Eberstadt, Choi Kang, Soo Kim, and Ross Tokola for their careful reading and feedbacks on earlier draft versions. Any failings and mistakes remain ours alone.

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Executive Summary

This report seeks to provide the most up to date assessment about the economic conditions in North Korea and suggest some possible ways forward. Agriculture has proven to be a lasting stumbling block for the North Korean economy. Can the Chinese and South Korean experiences provide the North with alternative paths? At the same time, China has emerged as North Korea's most important trade partner. Just how deep are those ties? In 2013, the North Korean government placed renewed emphasis on special economic zones. What lessons can North Korea learn from the Chinese experience? Drawing on research presented at seminars held in Mongolia and Vietnam, these are some of the questions that will be answered in this report.

Part I outlines the current state of the North Korean agricultural sector. Ed Reed's contribution begins with a comparative historical overview of agricultural development in the two Koreas. His analysis reveals that the agricultural systems in North and South Korea in the 1950s were based on small landholding farms with decentralized village level cooperatives. Interestingly, however, three decades of authoritarian rule in the two countries produced divergent outcomes. On the one hand, North Korea's rural development relied on the highly centralized and collectivized agricultural sector which was heavily dependent on China and the Soviet Union. South Korean agriculture, on the other hand, was based more on market-based interactions and trade. The result was a North Korea that suffered bouts of food shortage while South Korea flourished under prolonged period of overabundance.

Reed attributes the failure of the North Korean agricultural sector on poor

policy choices (i.e. *juche*), overdependence on trade relations with other socialist states, unfavorable ecological conditions, poor infrastructure, lack of modernization in the agricultural production process, and lack of market incentives. Some recent changes, such as the June 28 measure, attempted to address the last of these problems in different ways, but Reed agrees with the UN reports that these piecemeal efforts are due to fail without corresponding market and land reforms. The key recommendation is that North Korea switch out of the command economy and seek cooperation with South Korea. While Reed's suggestions are worth considering, it is not entirely clear why cooperation cannot be pursued with other countries in the region like China, Russia, or even Japan who all have a stake in North Korea's internal stability and peace.

In contrast, Kwon Cheol-nam's chapter compares how China has implemented a sweeping reforms in tandem with the agricultural and land reforms. What this example illustrates nicely is that reforms like these can be achieved gradually and deliberately with an eye towards tailoring land and agricultural reform in a manner that complements the existing conditions.

Take, for instance, the introduction of market pricing mechanism on agricultural goods. This process was introduced in three stages, where the state first allowed farmed goods to be sold on the market in which the state was one of the largest consumers. In effect, a dual pricing system was established whereby price of non-essential goods were allowed to fluctuate according to market supply and demand but the price of essential goods was determined by the state. Over time, the number of essential goods diminished. In the final stage, the government raised its purchasing price gradually to reflect the market price. Establishment of a strong market incentive seems to have been the driver behind the successful implementation of this policy. Again, the important takeaway point here is that a successful agricultural reform is possible without a wholesale system-wide change.

Of course, Kwon does not downplay the challenges. Like Reed, he holds infrastructure development is a problem. However, he specifically points to three factors behind the North Korean food crisis: poor ecological conditions, weak policy linkage between national development strategy and agricultural reform, and the international context. For Kwon, the way out for North Korea is the adoption of Chinese-style open market reform with a bias towards export orientation. Introduction of market based incentives must be coupled with land reform that promotes property rights and increased flexibility in the rural labor market.

The success of China's open market reform should not come as a surprise to North Korea given the close linkage between these two economies. Part II is devoted to analyzing this relationship. Piao Jianyi provides a historical overview of the economic relations between China and North Korea, which dates back to the founding of each country. According to Piao, the structural connection between these two economies is largely based on trade and investment. The key turning point in this relationship was the end of the Cold War and China's move to embrace open market reforms. While China experienced an unprecedented takeoff, North Korea's economy faced serious challenges due to the tapering of subsidized imports from Russia and imposition of international sanctions against North Korea's nuclear program. Stagnation soon followed and North Korea's vulnerability from its over-dependence on China and Soviet Union became ever more apparent. Their response was the affirmation of a development policy based on the foundation of what the 10th Supreme People's Assembly called "Juche Socialism." Their goal was self-sustenance but a policy of economic myopism and inwardness is difficult to maintain without a growing domestic economy. Instead of achieving more autonomy, North Korea's dependence on China grew and the nature of this relationship was transformed from one based on a special bond forged through the revolutionary pasts to one of "the good neighbor." While the pace has been slow, North Korea started adopting some changes through joint ventures and partnerships with the Chinese government and firms. As of October 2005, bilateral relations between China and North Korea were characterized as "state-led, enterprise based and market oriented."

Lee Jong-kyu and Nam Jin-wook explain that the key vulnerability in the North Korean economy arises from narrow yet deep dependence on its trade with China. Their analysis of North Korea's trade portfolio further reveals that exports are primarily focused on primary and low cost manufactured goods (i.e. textile). In this sense, North Korea's development policy, if it exists, is being implemented in such a way as to perpetuate if not deepen its dependence on China.

Perhaps one key to mitigating the risks in the North Korean economy may come from the development of so-called Special Economic Zones (SEZs) in places like Kaesong and Rajin. Upgrading of the industrial manufacturing base with diversification of exports could lead to the minimization of risks associated with the problem of overdependence. One challenge with the SEZs, however, is the non-market risks arising from the political uncertainty within North Korea. The celebrated 2013 purge of several elite members from the previous regime, capped by the execution of Jang Song-thaek and the temporary unilateral stoppage of operations in the Kaesong industrial complex together reinforce North Korea's image as a less than an attractive market for investors. Nonetheless, the importance of SEZs cannot be ignored as both Li Zhonglin and Im Geum-suk point out in their discussion of China. For Im, the Chinese SEZs were critical in developing the foundation for infrastructure modernization, attracting foreign capital, and consolidating the domestic capital market. She sees the Rajin SEZ as a potential starting point for developmental takeoff in North Korea and as a tool for developing the greater Tumen River region. Better internal and external linkages for firms within and outside of the SEZ will likely result in larger spillover benefits for other sectors in the North Korean economy.

At the center of this transition and development story is *the state* as Li Zhonglin observes. While the Chinese state has been fully committed to its development policy, North Korea is taking a more careful approach to this problem. What this suggests, of course, is that the kind of change necessary to make economic transition in North Korea possible is largely fundamental in nature and it ought to begin at the top (rather than the bottom). Again, this does not necessarily mean that North Korea will require a regime change but it does mean that a change may be in order for the leadership when it comes to thinking about economic policies in North Korea. The report outlines the key features of these recommendations below.

- Introduction of market incentives and resources. Two essential elements with regards to the agricultural sector: 1) land tenure arrangements that provide returns for effort, encourage investments in rehabilitation of the soils and ecologically sound farming patterns; and 2) market structures that provide correct price signals for inputs and outputs.
- 2. Decentralized production, marketing, and distribution. For agriculture,

this means giving farmers more discretion to select the type of crops they wish to cultivate and implementing a mixed production marketing and distribution system whereby farmers can sell to both government and individual consumers. Similar kind of arrangement can be utilized for inputs (i.e. seeds and fertilizers) where the sale of minimum required inputs can occur through state or cooperative outlets but farmers can access open markets to purchase additional inputs as needed. In the manufacturing sector, this means phasing in open market reforms through joint ventures and foreign investments.

- 3. *Focus on export oriented industrialization*. While North Korea may continue to maintain a small agricultural sector, it will inevitably require a larger commitment to developing the domestic industrial capacity. The focus should be on exports. Much of the decline in domestic food production can be managed through trade.
- 4. *Modernization of infrastructure and manufacturing capacity*. Introduction of automation and mechanization in all sectors of the economy. For the most part, basic infrastructure in North Korea is outdated. Lack of modernization in basic transportation, roads, and energy are critical for not only managing the development of the Special Economic Zones (SEZs) but also serve as an important basis for increasing the productive capacity in other sectors of the economy. Instead of taking on this task single-handedly, the government may benefit from introducing competitive bidding system on public construction projects.
- 5. *Diversification of trade partners and goods.* Manage the risks from overdependence on limited trade partner(s) and good(s) through increased diversification.

6. *Reduce geographic and institutional barriers to labor mobility.* One reason for the success of China's economic reform, for instance, was the ability to shift qualified workers to areas of the economy that was short on labor supply. Increased mobility proved crucial in allowing the input side of the economy to make quick adjustments to meet the productive demands.

While above measures are changes that North Korea may consider implementing on its own, there is some room for cross-border cooperation with external actors.

- 7. *Capital investments and joint ventures*. As all of the contributors noted, initial capital for development of industrial capacity in North Korea will inevitably require foreign capital. While private investments can be drawn by preferential terms and conditions, North Korea may want to utilize joint ventures and/or assistance from international financial institutes, such as the World Bank or the Asian Development Bank, to reinforce its own public financing.
- 8. *Investments in research and development (R&D) and technical knowledge.* One way to manage the problem of food shortage arising from the harsh ecological and climate conditions in North Korea is to develop and introduce more hardy and drought resistant crops. Collaboration with other countries, such as China, South Korea, Japan or even the US could prove useful in this regard. As for the manufacturing sector, the key to continual development and staying ahead of the middle income trap is development of human resource capacity. Basic investment in secondary and post-secondary education will prove critical in this regard. Much of the joint business ventures could also

incorporate elements that encourage skill transfer.

One advantage for North Korea is the proximity to neighboring countries that have extensive knowledge and experience in developing an economy. While every country is unique in its own regard, there are important lessons that North Korea can take away from the developmental experiences within the region. We have outlined a few above.

Of course, the above recommendations come with some important caveats. Many of the recommendations hinges on the availability of abundant supply of capital, much of which is likely to come from foreign sources. Foreign investors, however, are not likely to make significant investments in North Korea unless someone (i.e. state) is able to provide assurance that those investments will be protected. Given the recent leadership change within North Korea, along with series of provocations, including the temporary closure of Kaesong Industrial Complex in 2013, nuclear tests and rocket launches (among others), it is unclear whether the North Korean state can do much to buttress this guarantee in any credible manner. The goal of this report, however, was not to advocate for policy change within North Korea but to illustrate some concrete measures that the decision makers can take when the opportune moment arrives for change.

Introduction

There is no shortage of speculative analyses driven by questionable methodology and incomplete data when it comes to any study of the North Korean economy. The problem appears to stem from lack of transparency and dearth of reliable information. At the end of the day, the so-called "experts" and pundits are left to piece together a picture of the North Korean economy based on various eyewitness accounts and "mirror statistics." This report is no different – information is hardly complete. Some information is based on eyewitness accounts by individuals who make periodic visits to North Korea and others are based on less than reliable data. However, information (whether incomplete or biased) can still prove useful.

Take, for instance, an analytic exercise comparing the data on North Korea's real GDP estimates produced by the Bank of Korea and figures on current accounts collected by Stephan Haggard and Marcus Noland. A simple time series analysis revealing the possible relationship between these two variables suggests that the current accounts data explains roughly 41~52% of the variance in the GDP estimate – meaning that there is a significant relationship between these two pieces of information (See Appendix 1).

Revealing as this may be, it is also important to take note of the fact that the information drawn from one source does not reveal everything about the other. In short, incomplete information is still useful. We posit that the chapters in this volume provide useful accounts of the most up to date conditions in the North Korean economy and suggest some possible ways forward. The discussion is divided into three parts. Part I outlines the current state of the North Korean agricultural sector. Ed Reed's contribution in this section begins with a comparative historical overview of agricultural development in the two Koreas. His analysis shows that the agricultural systems in North and South Korea during the 1950s were based on small landholding farms with decentralized village level cooperatives. Interestingly, however, three decades of authoritarian rule in the two countries produced divergent outcomes. On the one hand, North Korea's rural development relied on the highly centralized and collectivized agricultural sector which was heavily dependent on China and the Soviet Union. South Korean agriculture, on the other hand, was based more on market-based interactions and trade. The result was a North Korea that suffered bouts of food shortage while South Korea flourished.

Reed attributes the failure of the North Korean agricultural sector to poor policy choices (i.e. *juche*), overdependence on trade relations with other socialist states, unfavorable ecological conditions, wanting infrastructure, lack of modernization in the agricultural production process, and absence of market incentives. Some recent changes, such as the June 28 measure, attempted to address the last of these problems in limited ways, but Reed agrees with the UN reports that these piecemeal efforts are due to fail without corresponding market and land reforms. The key recommendation is that North Korea switch out of the command economy and seek cooperation with South Korea. While Reed's suggestions are worth considering, it is not entirely clear why cooperation cannot be pursued with other countries in the region like China, Russia, or even Japan who all have a stake in North Korea's internal stability and peace.

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Nonetheless, the importance of SEZs cannot be ignored as both Li Zhonglin and Im Geum-suk point out in their discussion of China. For Im, the Chinese SEZs were critical in developing the foundation for infrastructure modernization, attracting foreign capital, and consolidating the domestic capital market. She sees the Rajin SEZ as a potential starting point for developmental takeoff in North Korea and as a tool for developing the greater Tumen River region. Better internal and external linkages for firms within and outside of the SEZ will likely result in larger spillover benefits for other sectors in the North Korean economy.

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Part I Foundations of Agricultural Reform in North Korea

Chapter 1

Agricultural Development in Two Koreas: Common Challenges, Different Outcomes

Edward P. Reed

Chapter 2

Chinese Agriculture Reform: Implications for North Korea's Food Situation

Kwon Cheol-nam

Chapter 1 Agricultural Development in Two Koreas: Common Challenges, Different Outcomes

Edward P. Reed Kyunghee University

At the time of liberation from Japanese colonialism in 1945 the emerging national regimes in South and North Korea faced the common challenge of solving the age-old problem of food security, made critical by the wartime economy imposed by Japan. Division of the country exacerbated the problem by leaving the main rice-growing areas in the south while the agricultural supply industries and power sources were based in the north. At the same time the miserable conditions of most farmers combined with their exalted expectations brought about by liberation created a powder keg of unrest in the countryside. Solving the agricultural problem became the top priority of both regimes. For the most part, the early steps by the new regimes in South and North Korea¹ were similar: land reform and support for food production. However, in the long run, particularly after the Korean War (1950-53), the rural policies of the two states diverged significantly. This paper will briefly compare the post-liberation transitions in South and North Korea, but the primary focus will be on why North Korea is still faced with a fundamental food security problem, and on the prospects for a second transition in the North.

A Common Legacy

The Korean Peninsula lies in the northern temperate zone where food security has long depended on careful management of crop production within a relatively short and unpredictable growing season. Under the dynastic system that lasted into the early 20th century the vast majority of Koreans labored in agriculture, either as tenants, smallholders or laborers under a system of concentrated ownership and onerous levies and taxes. Local, and sometimes national, food shortages were common and famine was always a threat. Rural communities were tight-knit, often centered on a common family lineage. Farmers cooperated on a seasonal basis for timely completion of rice farming tasks, especially planting and harvesting.²

The Japanese colonial regime (1910-1945) introduced significant technical and economic changes in rural Korea with the aim of dampening colonial resistance and increasing food production for the benefit of its expanding empire. Modern agricultural methods were introduced, including expanded use of improved seeds, chemical fertilizers, irrigation systems, and improved milling, storage and transport systems. A central agricultural research station was established in Suwon, with trial farms around the country, to support these efforts and continue research into improved practices. More directly, Japanese farmers migrated to Korea and acquired land under various quasi-legal methods which some farmed on a large scale with Korean tenants and others as smallholders.³

The Republic of Korea (henceforth South Korea) was proclaimed in Seoul on August 15, 1948; the Democratic People's Republic of Korea (henceforth North Korea) was proclaimed in Pyongyang on September 9, 1948.

^{2.} Edward S. Mason, et al., *The Economic and Social Modernization of the Republic of Korea* (Cambridge, MA: Harvard University Press, 1980), 60-74.

^{3.} For a detailed analysis of agriculture in Korea during the Japanese colonial period, see Albert Keidel, III *Korean Regional Farm Product and Income: 1910-1975,* Seoul: Korea Development Institute, 1981.

These changes brought modern agricultural methods to the countryside and benefited some Korean farmers, especially landlords and owner-farmers. However, as colonial administration more and more served militarist Japanese policies, misery in the countryside increased. Many farmers lost traditional land rights and the increase in rice production was siphoned off to feed famine-struck Japan and the expanding Japanese military. By the end of the Pacific War, in August 1945, the Korean countryside was characterized by hunger and widespread unrest; but expectations were high that liberation would bring relief. This was the situation inherited by the Soviet-backed Korean leaders in the north and by the U.S.-supported politicians in the south.⁴

Rural Transition: South and North

In order to stabilize food production and respond to heightened farmer expectations, both Korean regimes implemented institutional changes in the rural sector. In the North the changes were immediate and radical; in the South, change came in fits and starts. However, by the end of the Korean War, in 1953, the rural sectors in the two new states were not so very different. In both Koreas the landlord class had been eliminated creating a sector of smallholder farms and new institutions created to support them. Soon after, however, the two systems diverged dramatically.

4. Mason et al., 74-82.

Institutional Changes: South Korea

With the surrender of Japan, all Japanese-owned farmland (about 17 percent of the total) was confiscated by the occupying U.S. military government and ownership was lodged in a state entity, the New Korea Company. Reduced rents were paid to the company by tenants who continued to farm the lands, pending final resolution of the land problem. In 1948, just months before inauguration of the new Republic of Korea, the U.S. military government decreed the distribution of land rights to the tenants on these lands in exchange for three times the annual harvest to be paid over 15 years. This was the first land reform in South Korea. Although the coverage was limited, it generated momentum for further redistribution.

After two more years of political wrangling by politicians dominated by landlord interests, the new South Korean parliament passed a land reform law along similar lines affecting the entire agricultural sector. Implementation, however, was not carried out until after the North Korean invasion in June 1950, and was done under wartime conditions. Under the law, land owners sold to a state agency (for government bonds) all land holdings over three hectares; the state then distributed ownership rights to tenants for only 1.5 times annual yield paid over five years. Although the process was disjointed and rushed, the ultimate result was a countryside dominated by smallholder owner-farmers, the elimination of the landlord class, and the precedent for strong state intervention in the sector.⁵

Two other institutional reforms in South Korea were important for strengthening the rural sector. The first was the rapid expansion of primary education, as well as adult literacy programs, throughout the countryside. This resulted in a significant increase in adult literacy and, in the longer term,

^{5.} Both land reforms are summarized in Ban, Sung Hwan, Pal Yong Moon, and Dwight H. Perkins (1980), *Rural Development*, (Studies in the Modernization of the Republic of Korea, 1945-75), Harvard College, 283-291. Many landlords sold their land to their tenants in 1949 and 1950 as the threat of unfavorable land reform legislation loomed.

emergence of an educated smallholder farming population.⁶

The second important innovation was the creation of the National Agricultural Cooperative Federation (NACF, or *Nonghyeop*). Following liberation village-level farmer cooperatives became more active and a bottom-up national cooperative movement emerged. For the sake of efficiency and resource mobilization, the central government sought to expand the scope and control of the movement by combining the national Agricultural Bank with the national agricultural cooperative movement to form the government-supervised NACF. The NACF replaced the farmer-initiated cooperatives and became the primary conduit for supply of credit and farm inputs as well as for marketing rice and other crops. Virtually all Korean farmers were enrolled as members, and thus an important channel for government intervention in the rural sector was established.⁷

Institutional Changes: North Korea

The nascent communist regime in North Korea moved quickly to implement policy changes in the rural sector, both to stabilize food production and create a strong political support base. A straightforward land-to-the-tiller reform was implemented in early 1946, based on confiscation of private land without compensation and free distribution to tenants. (Under the law, landlords could be given small farms to cultivate outside of their home villages; in fact, some were persecuted and most chose to flee to the South, either immediately or later during the Korean War.) The redistribution of land was swiftly implemented with political cadre guiding village-level processes. The new government collected taxes in kind directly from the new owners. Village-level cooperative workteams were formed building on traditional forms of cooperation. This new smallholder institutional structure characterized the rural sector in North Korea until after the Korean War.⁸

A new policy of gradual collectivization was introduced following the devastation of the war. Between 1953 and 1958, small cooperatives were amalgamated into larger village-based units. In 1958, all cooperatives in each *ri* (lowest administrative unit) were integrated into single collective farms, thus aligning administrative and agricultural management. By the end of the process there were approximately 3,800 collective farms (called "cooperative farms"--*hyeopdong nongjang-*-in North Korea), each cultivating an average of 500 hectares and containing an average population of 1,300 persons in 300 households.⁹ With periodic adjustments, this has remained the general structure of the North Korean countryside until today.

The ri-based collectives became the unit for agricultural planning, labor allocation, and distribution of farm income, fully integrated with the centralized national planning system through the *gun* (county) Agricultural Cooperative Management Committee. The collectives also served as the basis for providing social services to the rural population (i.e. child care, schools, and health clinics).¹⁰

^{6.} Ban et al., 310-312.

^{7.} Ban et al., 212-227.

^{8.} Chong-sik Lee (1963), "Land Reform and Collectivization in North Korea," *The China Quarterly*, 14: 65-81.

^{9.} Joseph Sang-hoon Chung (1974), *The North Korean Economy: Structure and Development*, Hoover Institution Press, 4-16.

Technical Innovation: South Korea

The governments in both South and North followed up institutional reform with investments in the agricultural sector. Early on the South Korean government, with assistance from the United States and other donors, invested in an expansion of agricultural research and extension, building on the institutions established under Japanese rule. The Office of Rural Development (later the Rural Development Administration) was established in Suwon in 1947, and many Korean researchers were sent abroad for training. The Seoul National University College of Agriculture was established near the Suwon research center. One of the most important fruits of this effort was the development—in close collaboration with the International Rice Research Institute (IRRI) based in the Philippines—of new high-yielding rice varieties. In an accelerated program, the IR-667 hybrid variety (called *Tongil* in Korea) was assertively disseminated to farmers in the early 1970s. When the new varieties were hit by blast disease in 1978, the researchers worked to develop new hybrids that were more adapted to local conditions.¹¹

Since chemical industries had been based in the north, South Korea faced a critical shortage of chemical fertilizers. American foreign aid largely supplied this critical input until domestic fertilizer production came on line in the mid-1960s. Since then Korea has produced the full range of agricultural chemicals and is a net exporter.

By the early 1970s, with resources generated by Korea's successful exportled industrialization drive, the government began to make significant investments in the rural sector. Massive investments were made in large-scale irrigation systems, farm roads, electrification, and communication. In the 1980s, a program to realign and standardize paddy fields allowed the introduction of small-scale machinery for cultivation, rice transplanting and harvesting. More arable land was developed by massive seabed reclamation projects. Also, beginning in 1968, the government intervened heavily in the grain and input markets to ensure favorable terms of trade for farmers, contributing to substantial increases in farm household income.¹²

These investments and policies coincided with a government-led, rural massmobilization campaign, *Saemaul Undong* (New Village Movement), initiated by President Park Chung Hee to foster village-level cooperation, improve living environments, and facilitate adoption of new farming methods.¹³ As a result of this range of economic and social investments South Korea achieved national food security and higher living standards for the rural population. Nevertheless, following the usual pattern of rapidly industrializing economies, the rural population steadily declined, from 60 percent of the total population in 1960, to 43 percent in 1980, and to only 17 percent in 2010. Today only about 6 percent of the South Korean workforce is employed in agriculture.¹⁴

^{10.} State farms were also introduced in the 1950s and exist until today. These are usually focused on large-scale specialty agricultural enterprises and are managed along factory lines with workers as employees of the state. About 200 state farms cultivate approximately 10-15 percent of total farmland. Until the 1990s official policy was to gradually convert "cooperative farms" into state farms, but this policy has never been seriously pursued.

^{11.} Larry L. Burmeister (1987), "The South Korean Green Revolution: Induced or Directed Innovation?" *Economic Development and Cultural Change* 35, no. 4, 767-790.

^{12.} A dual pricing system was implemented whereby rice was purchased from farmers at an elevated price and sold at below-market price in urban areas. At the same time the price of fertilizer and other farm inputs was heavily subsidized. See Ban et al., 234-243.

^{13.} Ban et al., 275-280.

^{14.} World Bank Indicators.

Technical Innovation: North Korea

North Korea also invested heavily in agricultural research and extension. The National Academy of Agricultural Sciences was established in 1952, with headquarters near Pyongyang and experimental farms in each of the ecological zones around the country. Research focused heavily on both rice and maize, the two primary cereal crops. Among other things, more hardy rice varieties were developed suitable to the North's climate, and a method of increasing maize yields by transplanting potted seedlings into dry fields was developed. Likewise, investments were made in agricultural education with a national agricultural university in Pyongyang and regional universities and colleges around the country.

Kim Il Sung's 1964 "Theses on the Socialist Agrarian Question in our Country" set the themes for agricultural development, emphasizing the need for both ideological and technological advances, and the achievement of self-reliance in basic food supply. State policy called for a technical revolution in agriculture: irrigation, mechanization, electrification, and chemicalization, as well as a "seed revolution." Beginning in the 1950s, North Korea invested heavily in irrigation systems and began mechanization of farming centered on machine and tractor stations at the county level. Nation-wide locally specific targets were set for heavy application of chemical fertilizers. Additional land was brought under cultivation by expanding into terraced hillsides and seaside reclamation areas. The result was a surge in production from about 3.5 million tons of grain in 1960 to over 5 million tons in the mid-1970s.¹⁵ Under the North Korea's collective farming system, farmers were organized into workteams and individual income depended on the team's total production and the individual's labor contribution. North Korea also used mass-mobilization campaigns to encourage greater effort and higher production levels. As with everything, Kim Il Sung took a personal interest in agriculture. He made regular visits to *Chongsan-ri* collective farm to meet with leaders and give personal guidance. The "*Chongsan-ri* method" was held up as the model for the whole country and mandated leaders at every level to go down to lower levels to encourage farmers, and consult and learn the actual situation as a basis for setting goals and policies.

The Great Agricultural Divergence

In the mid-1950s, the agricultural scene in North and South Korea was quite similar: smallholder farmers, village-level cooperation, and the challenge of increasing production in a difficult environment severely damaged by war. By the mid-1980s, both Koreas could claim to have essentially achieved their shared goals of food security and the tapping of rural resources (economic and human) for the industrialization of the country. However, they arrived at this point by very different roads. The market forces at play in South Korea rapidly moved labor from family farming to the industrial and service sectors, from rural areas to urban centers. Successful export-oriented industrialization, and centrally planned allocation of foreign financial flows, provided ample resources for investment in transforming agriculture into a highly productive, labor-saving economic sector. Self-sufficiency in rice production, a political goal, was more or less achieved, but overall food security was assured by importing cheap food to support light industry exports. However, these gains did not come without serious problems. Globalization

^{15.} Nam Sang-wook (2002), "Feeding the People: Possible Agricultural Normalization in North Korea," *East Asian Review* 14, no. 3, 90-91.

created severe stress in South Korea's rural sector resulting in high levels of farm household debt in the 1980s and 1990s and a widening rural-urban income gap, and accelerating the pace of outmigration from the sector.¹⁶

By contrast, in North Korea a sufficient food supply had been achieved by introducing collectivized, industrial-style agriculture dependent on fuel-based machines and pumps and on ever-increasing applications of chemical fertilizers. Central planning allocated inputs and collected and distributed outputs, and also fixed labor allocations in every economic sector. Although ultimately dependent on critical raw materials provided by friendly neighbors (i.e., the Soviet Union and China), the agricultural economy was isolated, without exposure to either national price signals or international markets. When the world within which this system had been developed suddenly broke apart, the fragility of North Korea's agricultural gains were tragically exposed.¹⁷

South and North Compared

By the late 1980s, South Korea's sprint toward economic expansion had greatly outpaced North Korea in terms of size and complexity of the economy, as well as per capita income. Nevertheless, when compared with countries in Southeast Asia, for example, the North's economic development was respectable. In agriculture and rural living standards, in particular, North Korea could point to substantial gains. However, North Korea's food security was built on a very fragile ecological and economic base. The primary goal of self-sufficiency in grains had resulted in soil-damaging mono-cropping, excessive application of chemical fertilizers, expansion of cultivation into fragile uplands, and critical dependence on fuels to operate irrigation pumps and farm machinery. Production reached an historic high in the late 1980s, but then began to falter. The knockout blow came with the breakup of the Soviet Union and an end to favorable and barter trade arrangements for acquiring oil, spare parts, and other critical inputs on which the economy, including industrialized agriculture, depended. The immediate impact on agriculture came with the plunge in the supply of chemical fertilizers and the lack of fuel to power machinery and irrigation pumps. As shown in Table 1.1, rice production (as an indicator for overall food production) had already begun to decline when the heavy rains that arrived in the summer of 1995 destroyed a large portion of that year's crops and further eroded the vulnerable topsoil.

Table 1.1: North Korea, Paddy (unhulled) Rice Production, Annual Averages, 1985-2012 (thousand metric tons)

1985-89	1990-94	1995-99	2000-04	2005-09	2010-12		
3,194	2,116	2,066	2,515	2,714	2,534		

Source: USDA, in International Rice Research Institute, World Rice Statistics Database. http://rice stat.irri.org:8080/wrs2/entrypoint.htm

The story of North Korea's slip into famine and its appeal for international humanitarian aid is well documented.¹⁸ From 1995 to 2000, the focus of the

^{16.} William W. Boyer and Byong Man Ahn (1991), *Rural Development in South Korea: A Sociopolitical Analysis* (Cranbury NJ, London and Mississauga, Ontario: Associated University Presses).

^{17.} See Chong-ae Yu (2005), "The Rise and Demise of Industrial Agriculture in North Korea," Working Paper 08-05, The Mario Einaudi Center for International Studies, Cornell University.

^{18.} For example, see Stephan Haggard and Marcus Noland (2007), Famine in North Korea: Markets, Aid and Reform, New York: Columbia University Press; Andrew S. Natsios (2001), The Great North Korean Famine: Famine, Politics, and Foreign Policy (Washington: The U.S. Institute of Peace).

government and aid agencies was to deliver emergency food and medical supplies and to supplement the meager supply of agricultural inputs in order to reestablish local food production. The government also returned to some farm practices that had been abandoned earlier, such as double cropping with barley and wheat (before rice) and planting potatoes. There were also campaigns to rebuild the soils with applications of lime and green manure. Gradually as some local fertilizer production resumed and commercial imports revived, grain production was stabilized at about 80 percent of the level of the late 1980s. This left a gap in the minimum food supply of about one million tons to be closed each year. This has been more or less accomplished through a combination of commercial imports and international food aid that fluctuates according to need and the political will of donors.¹⁹

Recent data on rice production in North and South Korea is a reflection of the difference between the two farming sectors (See Table 1.2). South Korea harvests about one-third more rice per hectare than North Korea (a difference of 2.6 tons). Closing that gap would more than meet the needs of the North. But another factor is also telling: When South Korea mills its harvested (paddy) rice, it converts to 75 percent milled rice. The ratio of milled to paddy rice in North Korea is estimated (by FAO) to be only 65 percent. This reflects a number of problems, beginning with post-harvest handling of paddy rice in the North and inefficiency of the milling process. These suggest other areas where gains could be made rather quickly.
 Table 1.2: Average Rice Production Data, South and North Korea, 2008-2012

	South Korea	North Korea
Rice Planted Area	891,000 hectares	577,000 hectares
Paddy Rice Harvest	5,960,000 m. tons	2,560,000 m. tons
Avg. Yield Paddy Rice	6.68 tons/Ha	4.44 tons/Ha
Avg. Yield Milled Rice	5.00 tons/Ha	2.88 tons/Ha
Ratio: Milled/Paddy Rice	75%	65%

Source: USDA, IRRI World Rice Statistics Database

Over the past 15 years, while North Korea went through the greatest economic crisis of its history—accompanied by two leadership transitions and economic sanctions imposed for violation of Security Council resolutions— South Korea continued its economic advance. Today, a comparison shows the yawning gap between the two economies, and the very different economic structures (See Table 1.3). While approximately one-third of North Korea's population is engaged in farming, the figure for South Korea is about 6 percent. And, while close to one-quarter of North Korea's GDP is contributed by agriculture, the figure for South Korea is less than 3 percent. It is worth emphasizing again that differences in ideologies and policies have led to these very different Korean economies. While in South Korea economic investments, consumption and labor allocation have responded to market forces, in the planned and centrally managed North Korean economy allocations have more or less been directed by the state.

United Nations, "Overview of Needs and Assistance, DPRK, 2012," http://www.wfp.org/sites/ default/files/DPRK%20Overview%20Of%20Needs%20And%20Assistance%202012.pdf (accessed June 4, 2014).

	NORTH KOREA	percent	SOUTH KOREA	percent
Total Populaion(a)	24.7 million	100.0	48.9 million	100.0
Urban	14.2 m	60.3	40.7	83.2
Rural	9.3 m	39.7	8.2	16.8
Total Work Force		100.0		100.0
Non-agri		65.0		93.8
Agriculture		35.0		6.2
Total GDP	\$40 billion(b)		\$1,640 billion(c)	
GDP per cap.	\$1,800		\$32,800	
GDP Composition(d)		100.0		100.0
Agriculture		23.3		2.7
Industrial		49.9		39.8
Service		33.8		57.5

Table 1.3: Basic Economic Data, North and South Korea, 2011-2013

Source: CIA World Factbook: https://www.cia.gov/library/publications/the-world-factbook/wfbExt/ region_eas.html (Accessed Dec. 15, 2013) For North Korea, except for population (based on 2008 census), all figures are best estimates. (a) 2013 estimate; (b) PPP, 2011 est.; (c) PPP, 2012 est.; (d) 2012 est.

North Korea's Response: Tinkering without Reform

North Korea's Food Security Problem

Why has North Korea, a country that once more or less achieved food selfsufficiency for its population, become a chronic food-deficit country for the past 20 years? The answer is tied up with the ideological quest for economic *juche*: maximum economic independence and self-reliance. In agriculture, this meant striving for self-sufficiency not only at the national level but also at the local, and even collective farm, levels. Relentlessly driven by an all-powerful central authority, this policy had many implications over the long term for the agricultural sector. The critical vulnerability at the macro level was the fact that the industrial-style agriculture that was pursued (initially with increased production) was reliant on fuel, chemicals and machinery that directly or indirectly depended on the favorable trade relations with other socialist states, primarily the Soviet Union and China. When these trade partners joined the global marketplace and switched to trade based on convertible currency, North Korea's industrial base, including industries supporting agriculture, was devastated.

At this time North Korea did not take the decision to follow its former socialist friends along the path of marketization, but rather to stick it out with an economy "of our own kind," and this set the stage for the problems that have undermined the agricultural sector. The primary problems that now confront North Korean agriculture can be summarized as follows:²⁰

1. At the policy level, most experts agree that, given its climatic environment and its ecological base, self-sufficiency in cereal production is not an appropriate goal for North Korea. Pursuing it has led to inappropriate crop mix, serious depletion of soil nutrients, and stripping vulnerable hillsides of cover. The result has been an ecological disaster, vulnerability to even average weather incidents, and a lack of dietary balance with serious health implications.

20. FAO and WFP, "Crop and Food Security Assessment Mission to the Democratic People's Republic of Korea," Rome, November 28, 2013. Also see Woon-Keun Kim (1999), "The Agricultural Situation of North Korea," Food and Fertilizer Technology Center, Extension Bulletin, vol. 475.

- 2. Over-centralized management of agricultural organization and production, among other things, has reduced adaptation to local conditions, prevented adjustments to changing circumstances, and distorted incentives. Combined with the lack of farm access to input and product markets this system has prevented the agricultural sector from achieving maximum efficiency.
- 3. Since the near collapse of the domestic chemical industry (in the early 1990s), farms have been starved of the fertilizer, crop protection chemicals, and vinyl sheeting that they had become dependent on. What is available (from partial re-starting of local production, commercial imports, and aid) is rationed among collective farms with limited opportunity to procure more even when it may be locally available.
- 4. Unreliable electricity supply has required rationing among regions and farms, especially affecting post-harvest processing. Interruption in the supply of gasoline and diesel fuel has disabled the pump-dependent irrigation systems and farm machinery. Additionally diesel fuel (when available) is sometimes of poor quality leading to machine damage.
- 5. The short supply and poor condition of operational tractors, transplanting machines, and on-farm transport have disrupted the timeliness of farm operations. Almost half of field cultivation is now done with oxen, limiting the area that can make the rapid turn-around required for double cropping. Also, mobilization of urban labor (including students and office workers) in the busy seasons disrupts other economic activities.
- 6. In spite of serious efforts to develop and supply improved seeds, fur-

ther technical advances are needed to develop hardiness and adaptation to both drought and flood conditions. There are also problems with timely arrival of seeds at the farm level because of limited transportation, and lack of appropriate on-farm storage of seed.

7. The system of collective management and group labor organization of the farms is often identified as a critical constraint on production. Certainly the link between careful labor input and personal reward, as well as long-term investment in sustaining a productive environment, are issues in North Korea as in other collective farm systems. However, this issue must be considered in the context of the other constraints outlined above.

Adjustments Introduced by North Korea

Food production has certainly been a major concern for the North Korean leadership. Various campaigns have launched since the mid-1990s to address or compensate for the problems outlined above—with the exception of any sign of a serious review of the commitment to the quest for cereal self-sufficiency. The remainder of this paper will focus primarily on the policies introduced to address agricultural organization and management issues that create the context for addressing the other problems.²¹

Since the onset of the food crisis in the mid-1990s, North Korea has introduced a number of adjustments in the agricultural management system with

^{21.} A detailed discussion of North Korea's collective farm system and the changes introduced over the past decades can be found in Nam Sung-wook (2007), "Chronic Food Shortages and the Collective Farm System in North Korea," *Journal of East Asian Studies*, 7: 93-123.

uneven results. These are summarized in the table below.

Table 1.4: Various North Korean Agricultural Policy Adjustments, 1995-2012

DATE	POLICY CHANGE	OUTCOME			
1995	Sub-workteams (<i>bunjo</i>) in- troduced (15-20 members)	Modest; limited by lack of increase in input supply			
July 2002	Price & wage adjustments to close the gap between state & informal market prices	To channel farmer grain sales to the state allowing re-opening of public food distribution	Initial production increase, then decline; price differ- ential re-emerged		
2004	Smaller sub-workteams & open grain marketing float- ed	To strengthen work incen- tives & capture grain mar- keting	Aborted after announce- ment		
2009	Sudden currency devalu- ation (100:1) implemented	To discourage hoarding of cash and grain	Confusion, opposition; gov- ernment retreat. Increased use of foreign currency		
June 2012	Similar to 2004 changes, plus more favorable pro- duction-sharing	To increase production and rationalize supply to con- sumers	Yet to be seen (see below)		

June 28 (2012) Policy

Called the Yuk-I-Pal (6.2.8) "new economic management system" in North Korea (because it was described in instructions issued on that date), these changes were never formally promulgated. There were reports from informal sources that the system was being tested in several remote parts of the country. Some outside observers viewed this as the first steps toward a Chinese-style agrarian reform. However, as of early 2014 it was not clear which, if any, of the changes were being implemented and on what scale.

The major June 28 changes regarding agriculture were as follows:

1. The size of the sub-workteam (*bunjo*) to be further reduced to four to

six persons, the size of two or three households.

- After the usual deductions (payment for inputs, collective farm social fund) 70 percent of the *bunjo*'s assigned production quota would be sold to the state at administered prices (below market); the remaining 30 percent could be retained by the bunjo.
- 3. Additionally, the *bunjo* team could keep and distribute any production above the established quota for that season.
- 4. Produce retained by the team could be kept for consumption or sold at farm (or urban) markets at prevailing prices (presumably significantly higher than administered prices).
- 5. Purchase of additional farm inputs (fertilizer, chemicals, etc.) by the teams would be allowed. However, it is unclear if this would allow purchase on the open market or through the state county-level farm supply office—and at what prices.
- 6. Non-collective farm members (presumably factories or urban cooperatives or other emerging entities) could be allocated idle land within the collective farm for cultivation based on a contract covering the growing season (six months) and for payment of 30 percent of the production. This commercial sharecropping arrangement is an intriguing aspect of this package and raises many associated questions about implementation and ultimate impact.

The apparent rationale underlying these proposed changes is to promote increased agricultural production in several ways:

- (a) encouraging more efficient labor by linking individual effort more directly to individual return;
- (b) offering the material incentive of higher incomes obtained by selling some produce on open markets at higher prices;
- (c) providing farmers the option to apply more fertilizer and other inputs purchased on the markets; and
- (d) bringing uncultivated, marginal lands under cultivation.

Uncertainty on the Ground

To date the North Korean authorities have not formally announced this new policy. In early February 2014, Kim Jong-un issued a statement on agricultural policy to a national gathering of cooperative farm workteam leaders. If there are signals of reform in the statement that some observers seem to have found,²² they are very well disguised. The bulk of the statement stresses the wisdom of the *Juche* agricultural system introduced by his grandfather, Kim Il Sung, 50 years earlier. A statement that farmers should be carefully compensated according to their labor contribution (following the labor points system) in itself is nothing new. Practical instructions about using organic methods to compensate for lack of chemical fertilizer make sense, but only endorse what farmers have already been doing. Supporting cropping mix based on local conditions is offset by the priority maintained on increasing grain

production. It's not clear that this statement gives cover to local party leaders and farm managers who may want to implement the July 28 changes.

Researchers are left with limited and frequently conflicting reports about implementation of the changes from merchants or defectors who have recently left North Korea, or from others who send out fragmented reports from local areas. Thus it is not surprising that the picture is not consistent.²³

One solid source of information is the annual report of the DPRK FAO/WFP Crop and Food Security Assessment Mission (CFSAM) that has been published every year since 1975.²⁴ Although the teams operate under some limitations, they conduct the most systematic and country-wide assessment of the DPRK agricultural sector. The authors do not hesitate to point out problems, and they make concrete recommendations which, in recent years, have explicitly

- 23. Since late 2012, there have been conflicting reports coming from sources inside North Korea about implementation of changes on the collective farms. For example, see: Kim Kwang Jin (2013), "Farmers Baffled by Order Reversal," *DailyNK*, February 20. http://renewal.dailynk.com/english/read.php?cataId=nk01500&num=10332 (accessed June 4, 2014). Lee Sang Yong, "Agricultural Madness Angers Farmers," DailyNK, July 5, 2013. http://renewal.dailynk.com/english/read.php?cataId=nk01500&num=10713 (accessed June 4, 2014) "N Korean Farmers Planting Rice with Profits in Mind," The Guardian, June 1, 2013. http://www.theguardian.com/world/feedarticle/10818349 (accessed June 4, 2014). Masanori Yamakuchi (2014), "North Korean Leader Kim could be Serious about Reforms," Nikkei Asian Review, May 16. http://asia.nikkei.com/Politics-Economy/Policy-Politics/North-Korean-leader-Kim-could-be-serious-about-reforms (accessed June 4, 2014).
- 24. FAO and WFP, "Crop and Food Security Assessment Mission to the Democratic People's Republic of Korea," 1995-2013 (annual reports, 1995-2013). The CFSAM teams refer to official DPRK Ministry of Agriculture data, but also spend up to two weeks (in multiple teams covering different parts of the country) in the field visiting collective farms, urban and farmer markets, making limited household visits, and meeting with local officials.

^{22.} Andrei Lankov (2014), "How Economic Reforms are Changing N. Korea's Farming Industry," NK News, January 2. Randall Ireson, "Game-Changing Agricultural Policies in North Korea?" 38 North, February 26, 2014. http://38north.org/2014/02/rireson022414/ (accessed June 4, 2014).

called for reforms along the lines of the June 28 policies.

A comparison of the 2012 and 2013 CFSAM reports is particularly interesting in relation to two aspects of the purported reforms:

	2012 CFSAM	2013 CFSAM
Bonuses for cereal production	"One of the major changes during 2012 has been the increase in the effective price of the major cere- als by the introduction of a bonus, KPW10/kg for paddy, maize, wheat and barley."	"In 2012, the CFSAM Mission learned that farmers would receive a bonus If this was meant as a 'price reform', this year's Mission learned of no change in the pricing system and the receipts of such bonuses was not confirmed."
Marketing changes	"Some changes with respect to the marketing of staple crops pro- duced on cooperative farms in a few selected counties on a pilot basis are expectedIf this system were to be changed so that the State ac- quires a certain quota and lets the farmers keep the remainder for their own consumption and sell any surplus on famers' markets this would provide an incentive for farm- ers to produce more."	"Despite some hints of the grain marketing reform on a "pilot exper- imental basis" during the previous year's CFSAM, no reform related to agricultural markets/marketing was observed or is expected."

The reports also note that collective farmers still do not have direct access to the new local markets for selling any surplus, and that marketing of cereals is still officially prohibited.

There are at least three ways that these observations might be interpreted. First, it could be that the so-called June 28 changes that had been hinted at in 2012 have not been implemented in any extensive way. A second interpretation could be that changes are taking place but the authorities do not want to reveal this to outsiders—in the same way that they continue to deny the obvious role of urban markets in supplying food and other necessities to the public.

A third possibility—that could overlap with the first two—is that there is confusion among local Party cadre and collective farm managers about which arrangements are allowed and which are not. This may have opened the way for risk-taking experimentation in some areas along the lines of the June 28 changes, but clearly a national policy shift that could be termed a transition in the agricultural sector has not yet occurred.

Needed: A Genuine Agricultural Transition in North Korea

It is clear that the solution to North Korea's food security problem does not lie in a return to the strategy that was followed into the 1990s. That strategy not only led to production stagnation, but it also undermined the ecological base on which food production is based. Ever more intensive and extensive measures depleted the soils and denuded hillsides leading to loss of topsoil, silting of streams and recurring floods. What is needed is a strategy that provides incentives and resources not only for maximizing production but also for restoring the environment through sustainable agricultural practices. Two essential elements of such a strategy would be land tenure arrangements that provide returns for effort, encourage investments in rehabilitation of the soils and ecologically appropriate cropping patterns, as well as market structures that would give farmers appropriate price signals for produce and inputs.

And so we are inevitably talking of tenure and market reforms. As the expe-

rience of China and Vietnam illustrate, even modest changes in these areas can yield rich and rapid dividends and need not lead to political destabilization. Following the production-focused FAO/WFP reports, and the analysis by agricultural specialists who have extensive experience in North Korea,²⁵ the following offers an outline of the *essential* changes in the North Korean agricultural sector required for stabilizing and increasing production on a sustainable basis.

- Implement a contract-based household farming system with allocation of farm plots based on long-term leases. Reducing the size of the subworkteam (according to the 6.28 policy) to six to eight persons could be an interim step, but it is essential that specific land plots be allocated based on extended lease arrangements (minimum of 20 years).²⁶
- 2. Give contract farmers essential discretion on crop selection based on soil type and estimated profitability.
- 3. Implement a mixed production marketing system: guaranteed direct state purchase of some percent of farmer's production at near market price and farmer access to farmer and urban markets where additional
- 25. See especially Randall Ireson (2006), "Food Security in North Korea: Designing Realistic Possibilities," Shorenstein APARC, Stanford University; and Nam Sung-wook, 87-115.
- 26. Similar arrangements in Vietnam and China are described as follows: "Villagers may not own land; they may only hold 'use rights' to it—twenty years for annually cropped land and fifty years for perennially cropped land in Vietnam and, since 1992, thirty years or more in China depending on the type of land. During the period of tenure, however, households may cultivate the land or transfer, lend, or rent it out, and can transfer the use rights to their heirs." Anita Chan, Benedict J. Tria Kerkvliet and Jonathan Unger (1999), *Transforming Asian Socialism: China and Vietnam Compared* (Lanham, MD: Rowman & Littlefield Publishers) 112.

production can be sold.

- 4. Implement a mixed farm inputs (seeds, fertilizer, plastic sheeting, crop protection) marketing system: sale of minimum required inputs through state or cooperative outlets and farmer access to open markets to purchase additional inputs as needed.
- 5. Make legal provision for marketing all farm products (including rice and maize) as well as agricultural inputs on open markets.
- 6. By means of official and public legal action as well as highly visible campaigns communicate to all levels of the bureaucracy down to the farms that these new polices are endorsed by the leadership and will not be reversed.

Ideally part of a larger program of reform, these are the essential steps that would encourage farmers to maximize production while also investing in long-term soil preservation and improvement. There are other issues that would have to be addressed, chief among them the role of the existing collective farm management and institutions. At least for an interim period, there will be the need to centrally allocate access to limited capital resources (cultivation and harvest processing machinery, transport, etc.), as well as channels for state purchases and sales. Agricultural credit and insurance schemes would also eventually be required. These are the services provided in many countries (including South Korea) by state-supported agricultural cooperatives. It would be natural for the existing collective farm management office to be the local unit for providing these services and to be absorbed into higher-level cooperative or state structures. Meanwhile, social institutions (education, health services) would also continue to be centrally

provided based on levies on farm production.

For these relatively modest changes to result in higher production levels, adequate supplies of essential farm inputs, particularly appropriate mix of fertilizers, and seeds, would have to be available on a timely basis. It is also assumed that farm households would continue to have access to homelot gardens for supplementing their diets and bringing vegetables to the market.

Although it is beyond the scope of this paper, it is natural to ask why the North Korean authorities have hesitated to take these steps. Just as the examples of other socialist transformations have indicated the production gains that such changes can bring, they have also demonstrated that even these incremental changes require and lead to more fundamental changes in the larger economy. Market-based pricing in the agricultural sector cannot be inserted into a command economy. State rationing of food distribution cannot survive markets for buying and selling of cereals and other essentials. While the pace of change may be, to some extent, controlled, the direction toward a full market economy would be set by such changes. Until the leadership is prepared to officially embrace this policy direction, agricultural transition in North Korea will continue to be halting, giving mixed signals to farmers and farm managers who are in no position to take the political risk that implementing these changes would entail.

Opportunities for South-North Cooperation

Although there are important climatic and soil differences as one moves from the southern tip of the Korean Peninsula to the Chinese border, the challenges to creating an ecologically sound and productive agricultural system are similar throughout the country. No doubt, farmers work just as hard in both north and south. The sharp difference in land and labor productivity between the two sections today is due to different policies, not only in the agricultural sector but in the two economies. A modification in the policies of North Korea along the lines outlined above would initiate a transition in the agricultural sector and also, no doubt, in the larger economy. It would also open the way for expanded cooperation between North and South in a joint pursuit of food security for the peninsula.

Even in the pre-unification era, there are important avenues for effective South-North cooperation that could support an agricultural transition in North Korea. In fact, during past periods of political thaw between the two sides a number of agricultural initiatives were undertaken, and some continue. These were generally in the field of seed improvement, cultivation systems, and reforestation.²⁷ Such initiatives could be revived and expanded, along with other areas of cooperation. Here are just a few examples:

1. Plant breeding and research: The rice research institutes in both North and South have cooperative agreements with the International Rice Re-

^{27.} For cooperation in developing hybrid corn varieties see: Kim Soon-kwon, et. al., "Combating hunger in North Korea through super-corn development and science-based sustainable farming system," 4th International Crop Science Congress 2004: http://www.cropscience.org.au/icsc2004/post-er/2/3/375_kimsk.htm (accessed June 4, 2014); World Vision South Korea has introduced hydroponic seed potato farms: Cha, Heisoon, "North Korea: World Vision Farms Set to Dramatically Reduce Food Deficit," November 2007, http://www.worldvision.org/news.nsf/news/20071101_dprk_potato_seeds?Open&wvsrc=enews (accessed June 4, 2014); On cooperation in reforestation see: "South Korea Launches Reforestation Campaign in North," *North Korea Economy Watch* (blog), March 6, 2008, http://www.nkeconwatch.com/2008/03/06/south-korea-launches-reforestation-campaign-in-north/ (accessed June 4, 2014).

and South have cooperative agreements with the International Rice Research Institute, although North Korea has not fully developed a joint program. A triangular program focusing on supporting the North's ongoing efforts to produce drought and flood-resistant rice strains is one place to start. A similar approach could be used to support research in other important crops, such as winter wheat, barley, potatoes, and soya.

- 2. IT and remote sensing technology: Both North and South have policies for promoting use of advanced technology in all fields. Agriculture is an area where existing and new applications could be jointly explored for creating solutions targeted for specific circumstances.
- 3. Soil restoration and preservation: Both South and North have relied heavily on chemicals to seek food security. Joint research and experimentation to restore soil fertility and develop more sustainable farming systems would yield positive results for both sides.
- 4. Reforestation and restoration of uplands: South Korea implemented one of the most successful reforestation programs in the world following the Korean War, turning barren hills into thickly wooded forests. Build-ing on some trial projects, this area of cooperation could be quickly expanded.
- 5. Appropriate mechanization: Farm mechanization took very different routes in South and North. The rugged *Chollima* tractors manufactured decades ago in the North were adapted to cultivating large collective fields, while South Korea followed Japan's lead in developing cultivators, planters and harvesters suitable for operating in smaller fields and by a single farmer. South Korea could assist the North to develop man-

ufacturing capacity for farm machinery that is more appropriate to its emerging household-based farming system.

Conclusion

This paper has emphasized the common challenges faced by South and North Korea in securing and maintaining food security in a shared and challenging environment. The economic systems and rural institutions of the two Koreas have diverged drastically since the mid-1950s. Nevertheless, by the mid-1980s both Koreas could claim that they had more or less solved the food problem. North and South emphasized scientific research to develop improved seed materials and pursued intensive farming practices—with the North pushing beyond the carrying capacity of the environment. Looking toward the future, with relatively modest adjustments in its rural institutions, North Korea could probably stabilize and begin to rebuild its agricultural base. This would create an opportunity for cooperation between South and North both to strengthen North Korean agriculture and to seek joint solutions to the challenges that must be met to maintain food security on the peninsula into the future.

There are many deep ideological and systemic differences between South and North Korea. However, the shared environment, common challenges, and relatively narrow range of options probably make cooperation in the agricultural sector less difficult than in others. And, finally, based on the author's own experience, it can be said that farmers in North and South, with their shared experience of working the land, probably have more in common than many other Koreans on the two sides of the political divide.

Chapter 2 Chinese Agriculture Reform: Implications for the North Korea's Food Situation

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For much of the postwar period, the command economies of North Korea and China were largely isolated and self-sufficient. Things quickly began to change in China when market reforms led to the overall improvement in the farmers' standard of living. In contrast, North Korea experienced a severe food shortage and loss of agricultural productivity since the 1990s. Based on past analyses of Chinese agricultural reform and North Korea's economic condition, it is now widely understood that natural disaster was not the cause of the severe food crisis in North Korea. Rather, it was due to poor planning and policy. In this section, we discuss the process of Chinese agricultural reform, followed by an analysis of North Korea's food shortage problem since 1990, and consider the lessons of Chinese agricultural reform for North Korea's food crisis.

Chinese Agriculture Reform Process and Its Experience

The Politburo of the Chinese Communist Party moved to establish a collective agricultural system by adopting "The Resolution on the Establishment of a People's Commune in Rural Area" in August 1958. Under this resolution, the Chinese government established 26,000 people's communes by merging 740,000 farming cooperatives. In 1962, "the three-tier production system" was created to further consolidate the farming commune. The arrangement led to three noticeable impacts in the agricultural sector. One is that it allowed for a more equitable distribution of resources and income in the rural sector. Secondly, diversification of agricultural production became more difficult. Lastly, there lacked an incentive mechanism for achieving greater productive efficiency at the individual level.

In 1978, China embarked on an open market policy during the 3rd Plenary Session of the 11th Central Committee of the Communist Party of China. Corresponding reforms also followed in agriculture. The critical dimension of this shift was the reform of the collective production system based on "the household contract responsibility system" and farm-product distribution system (i.e. price liberalization).

Process of Agriculture Reform

Chinese agriculture reform can be characterized as the reform of the collective production and farm-product distribution system. In the 21st century, the Chinese agriculture reform focused on reorganization of land-use right's distribution system, scaling, mechanization, industrialization and taxation (i.e. agriculture tax exemption).

First, there was collective production system reform, centrally based on the household contract responsibility system. Chinese agriculture reform started from the collective production system reform. That is, in 1978 and 1979, Chinese government attempted a pilot project on the collective production system. Based on this experience, a broader reform initiative was launched to change the household contract responsibility system in 1980. By 1983, the number of farming households for contract responsibility reached 94.5 percent of the national farming households.²⁸

The household contract responsibility system operates by having the individual households sign contracts with collective economic groups. Under this arrangement, agricultural households are responsible for collective economic group's land and its production. Basically, it is a system that combines collective possession with individual farm households. The goal is to separate land ownership from land-use thereby allowing the co-existence of collective possession and individual property rights. The land and other production resources are allocated to individual households based on the number of workers that can be allocated to agricultural production. The individual farms take control over production management as stated in the contract and maintain sole rights to production.

Thanks to this change, farming households have become the main agent of production and management, which led to the increase in individual production and income in the rural areas. The incentive mechanism was now in place to encourage farmers to do their best to improve productivity and efficiency. Farmers also began to acquire new farming skills and apply them. Improved productivity allowed for positive spillovers in other areas of the economy. It also encouraged the development of secondary and tertiary sector.

The second part of the reform involved the farm-products' distribution system. This dimension dealt with price marketization and distribution channels. The change was gradual and implemented in 3 steps: 1) permit price increase and market exchanges of farm products, 2) coexistence of price adjustment and price opening, and 3) formation of price determining mechanism²⁹.

The market for farmed goods was established during 1978-1984. The goal was about improving agricultural productivity and reducing the gap between the price of agricultural and industrial goods. Specifically, in 1979, the average price of farmed goods (e. g. grains, cooking oil, and raw cotton) increased by 24.8 percent. To dampen inflationary pressures, a special mechanism for adjusting the price was introduced. Farm products were excluded from mandatory planning thereby allowing both the state and the market to determine price of different goods. The Chinese government also opened its market so that the government also became a major consumer in the free market. As a result of this shift, farmers were able to sell their surplus crops beyond the government set quota and this contributed to raising farmers' productivity.

This form of dual pricing mechanism continued during 1985-1991 allowing essential goods, such as foodstuff, raw cotton, and cooking oil to be under state control whereas price of other non-essential items to be driven by the market. Prices of non-essential goods (i. e. fruits and fishery products) were allowed to fluctuate according to the market with the list of this non-essential items gradually expanded over time. For instance, the number of crops being sold under government set price was 113 in early 1980; this figure decreased to 17 in 1986 and nine by 1991. The overall result was a rise in

^{28.} Zhengdacai "cong chao qian dao zhi hou: zhong guo nong ye gai ge kai fang de gui ji fen xi," Jing Ji Yu Guan Li Yan Jiu, February 1998, 60.

^{29.} Li bing kun, "nong chan pin jia ge gai ge de ping jia yu si kao", *nong ye jing ji wen ti*, 1997 nian, di 6 qi, 13-14ye he "nong chan pin liu tong ti zhi gai ge yu shi chang zhi du," *Zhong Guo Nong Cun Jing Ji*, June 1996, 11-12.

production but these changes also contributed to the rise of inflation.

During the early 1990s, the government moved to raise the national purchasing price to reduce the price gap among essential and non-essential items. As a result, the government's purchasing price for farm products rose 4.5 times more in 1996 compared to 1978. Also, increase in the price of industrial goods exceeded more than 1.9 times. Income also grew.³⁰

The agriculture reform based on the household contract responsibility system mostly solved the problem of rural living. However, after the newly formed production system for peasants was implemented, productivity and farming households' income reached a ceiling and the income gap between farmers and urban residents appeared to rise once again.

The household contract responsibility system granted farming households land-use rights by separating land ownership and usage rights, but the rights for land-use was not bought and sold freely. This was one of the main factors holding back the modernization of agriculture. Productivity in small scale farms remained low due to the lack of proper reform in the peasant's agricultural production system. Farming household income growth slowed and rural unemployment began to emerge as a major source of concern. The gap between rural and urban areas began to also grow thereby threatening China's economic development and social fabric.

To address these problems, the Chinese government allowed land-use rights deals in the form of primary cooperatives, land lease and transfer, and stocks, encouraging the land under contract with farming households to be provided at cost to cooperative farms and agricultural development institute. At the same time, the Chinese government actively supported the implementation of collaborative management style in combination with "corporation, agriculture base, and farming household." Also, some retraining programs were launched to assist greater cross-sectoral labor mobility.

Chinese Agriculture Reform Experience

It is important to recognize that the agriculture reform was pushed forward while China was embarking on export oriented industrialization. It is difficult to imagine whether the kinds of reforms discussed above would have been possible under any other contexts given the complementarity of the measures adopted in both the agricultural and industrial sectors.

Infrastructure and technological developments, for instance, served not only to buttress China's industrial reforms as others in this report suggest, but also to support agricultural reforms. Under the people's commune system, for instance, agricultural infrastructure, such as irrigation facilities, farmland organization, power transmission and distribution were built by collective labor forces. These facilities were critical to the agriculture reform process and contributed to agriculture production development. To top it off, several measures, such as domestic development and distribution of agriculture cultivation techniques, introduction of advanced agriculture technology, training talented personnel in agriculture, mitigating farmers' burdens were also significant. The Chinese experience in agriculture reform provides numerous lessons for North Korea, which has been facing food shortages for some time.

30. Li bing kun, 13.

Present Condition of North Korea's Food Shortage

The term food shortage indicates a condition in which the quantity of domestic food production and food imports lag behind demand. Consumption is determined by factors such as grain consumption but the public's consumption structure on food varies according to the level of economic development and standard of living. North Korea's food shortage surfaced during the mid of 1990s and its basic characteristic is absolute shortage of supply. The condition in North Korea was unfavorable for agriculture production and prolonged underdevelopment has prevented the modernization of agricultural infrastructure facilities. To make matters more difficult, North Korea has to also deal with water shortage as well as frequent natural disasters. Severe scarcity of foreign exchange due to sanctions related to the nuclear issues also restrict the quantity of commercial food imports and international aid.

Food Production and Production Structure

First we begin with the assessment of North Korea's food crisis. Due to the lack of reliable data, we rely on multiple sources and various measures to estimate the extent of the problem. The first source we will be relying on is the South Korea's Ministry of Unification (MoU), which estimated North Korea's food production to have decreased from 4.43 million tons to 3.88 million tons between 1991 and 1994 (See Figure 2.1). Until 2001/2002, the figure rounds out at 4 million tons (excluding 4.13 million tons in 1994/1995). However, production continued to decrease throughout 1999 and 2001, which threw North Korea into a food crisis. In 2001/2002, food production started to increase slightly with 4.54 million ton yield in 2005/2006, and 4.48 million tons in 2006/2007. Unfortunately, the yield started to go down again 2006/2007,

reaching 4.11 million tons in 2009/2010.

South Korean government's transfer of chemical fertilizers and other factors, such as favorable weather condition, increase of irrigated land, and improvement of agricultural machines' operating rate made North Korea's food production increase possible. However, in 2007, North Korea had to endure the great flood and typhoon, which led to a drop in production.³¹ To make matters worse, South Korea suspended the shipment of fertilizers in 2008.

Figure 2.1: Food Production in North Korea 1991~2013 (in 10,000 tons)³²



The FAO data generally confirms the statistics from the MoU. But in general, the FAO estimate is more conservative even though it accounts for production yields from vegetable gardens and slope farming, which the MoU neglects. Taken together, what this means is that the North Korea's food problem is more severe than what the MoU claims.

^{31.} Considering South Korea's chemical fertilizer aid to North Korea, the figure was 160,000 tons in 1999, 300,000 tons per year from 2000 to 2004(except 200,000 tons in 2001), 350,000 tons per year from 2005 to 2006, and 300,000 tons in 2007, which constitute total amount of 256,000 tons. However, from 2008, the aid provision was halted since Lee Myung Bak administration.
32. Sources: KREI, Ministry of Unification (South Korea), FAO/WFP.

The MoU stopped publishing its estimate of North Korea's food production since 2010/2011 while the FAO has not. Based on the latest FAO's estimate, North Korea increased its food production over the last three years (See Figure 1). However, Korean agriculture experts are predicting that North Korea's food production is about 4 million tons in 2010/2011. This is 280,000 tons less than the FAO total.³³ Also, considering the great flood and typhoon in 2012, there is a strong possibility that the FAO estimates for 2011/2012 and 2012/2013 is higher than the actual amount.³⁴

Agricultural infrastructure and production resources are useful for dealing with natural disasters or changes in weather. However, the North Korean agricultural infrastructure is very weak and vulnerable to changes in the environment due to its high dependency on foreign aids and imports of agriculture production materials, such as chemical fertilizer and energy.

Table 2.1 shows that North Korean food production focused on staple crops. The cultivation area of rice and corn takes up almost 70 percent of all agricultural production. More specifically, the rice's cultivation area is 570,000-587,000 hectare, which takes 37 percent of the total growing area. The growing area of corn dropped in each successive years after 1999. Potato is taking up a larger share of the overall production to replace corn. The cultivation areas for wheat and corn have also increased.³⁵

34. Kwon, Taejin estimated that double-cropping produce, such as wheat, barley, potatoes, etc., has decreased to 200,000 tons due to the drought. He also predicted that this figure would reach up to 500,000 tons if the individual's farming land case is included. Kwon, Taejin, "North Korea's drought, is it over?," *North Korea Agriculture Trend* 14, no. 2, 10-11.

	Rice Corn Wheats		Legumes		Potatos		Other Grains		Total						
		Quantity	Share	Quantity	Share	Quantity	Share	Quantity	Share	Quantity	Share	Quantity	Share	Quantity	Share
	Area	58	37	56	36	12	8	12	8	16	10	2	1	156	100
1999	Productivity	2.63	-	1.87	-	2.58	-	1.14	-	1.56	-	2.36	-	-	-
	Production	153	46	105	32	31	9	14	4	25	8	5	1	332	100
	Area	58.6	36	52.6	33	13.7	9	13.5	8	20.1	13	2.5	2	161	100
2006	Productivity	3.23	-	3.33	-	1.53	-	1.14	-	3.14	-	0.74	-	-	-
	Production	189	42	176	39	21	5	16	4	45	10	2	-	448	100
	Area	58.7	36	52.6	33	13.7	9	13.9	9	20.1	12	2.5	2	161.5	100
2007	Productivity	2.6		3.02	-	1.77		1.11	-	3.19	-	0.7	-	-	-
	Production	153	38	159	40	25	6	15	4	47	12	2	1	401	100
	Area	58.7	37	52.6	33	-	-	13.9	9	20.1	13	13.7	9	159	100
2008	Productivity	3.17	-	2.89	-	-	-	1.15		2.54		1.76	-	-	-
	Production	186	43	154	36	-	-	16	4	51	12	24	6	431	100
2008	Area	57	37	50.3	33	7.8	5	-	-	30.9	20	8.2	5	154.2	100
2009	Productivity	56.9	38	50.3	34	7.4	5	-	-	18.1	12	16	11	148.7	100
2011	Production	57.1	39	50.3	34	9	6	13.1	9	13.9	10	2.9	2	146.3	100

Table 2.1: Farm Production Structure (Area in Ten Thousand Hectares, Productivity in Ton/Hectare, and Production in Ten Thousand Tons Polished)

Note: Translation required some changes to the content. The area data of 1999-2008 is from the Rural Development Administration (RDA) in South Korea and that of 2008-2011 from Food and Agricultural Organization. Area of kitchen gardens and slope agricultural land are not calculated. The data of productivity and production of 1999-2008 are from RDA. The production data of 1999 is from Korea Rural Economic Institute (KREI). Wheat is categorized as "Other Grains" in 2008.

- *Source*: bukhan nongup donghyang (North Korean Agricultural Trend) by KREI of 2000, 2007, 2008, 2009, 2010, 2012 and Volume 4.
- 35. In general, rice and corn production account for 80 percent of the total. Rice figures prominently in this mix, taking up 38-46 percent while corn is about 32-39 percent of the total. Potato production has continually increased up to 250,000 tons in 1999 and reached 510,000 tons in 2008. Grain production decreased from 310,000 tons in 1999 to 250,000 tons in 2007 whereas the bean production increased from 140,000 to 160,000 tons.

^{33.} Total amount is 420,000 tons if vegetable gardens and the slope production amount is included like the FAO's data. See Kwon, Tae Jin and Nam, Min Ji, "2011 North Korea's food supply and demand trend," *North Korea Agriculture Trend* 11, no. 4, 3.

In North Korea, farming land expansion has already reached its limit which makes it impossible to satisfy demand through domestic production alone. In addition, deterioration of irrigation facilities and serious energy deficiency have had a huge impact on agricultural productivity. Only 56 percent of its arable land is suitable for enough irrigation. The cultivation area for corn has diminished since the North Korean government implemented the species diversification policy. The good news is that productivity improved slightly as outside aid in the form of fertilizers and new seed technology contributed to the improvement in yield.

Gains in production, however, did not necessarily translate into corresponding improvement in overall nutrition or health. Rice in North Korea is the staple crop. Consumption of other sources of nutrients, such as dairy or beans (high in albumin), has been extremely low leading to severe malnutrition.

Food Demand

We attempt to estimate food demand using various sources beginning with nutritional intake (See Appendix I). Putting these estimates together, we determine that the minimum food consumption level in North Korea is about 5.1-5.2 million tons using WFP's annual food consumption per capita of 167 kilograms. The basic consumption level that can satisfy the basic food demand of the people is estimated by using MoU's annual food consumption per capita rate 222 kilograms which roughly translate into 6.5 million tons. Finally, when North Korea's food consumption level reaches that of South Korea, we estimate its food demand to be 11 million tons.

Shortage in Food Supply

As argued earlier, when we compare the MoU data with that of the FAO, MoU figure is an overestimate. When estimating food demand, the MoU's data is also larger than that of the WFP. The difference between the MoU's food production data and the WFP's food demand data could be considered as the shortage in food supply. When we calculate the consumption quantity by subtracting the amount of food import for commercial purpose and the amount of international aid, the result could also be the final shortage in food supply. Table 3 reflects the result from these estimates.

Looking at Table 3, it is clear that North Korea's food shortage problem is not only lingering, but it is also exacerbating. More closely, food production shortage is over 1 million tons during 1995-2002, and in 2000/2001, the amount reached 2.04 million tons. Food demand for 1995/1996-1996/1997 is much larger than other years because quantity of feed grain demand is overestimated. The shortage in food production decreased to around 0.8 million tons during 2002-2007, but it increased again during 2007-2012. The shortage in production in 2012/2013 is 0.73 million tons, but the amount of actual shortage is likely to be larger.

This problem of supply shortage in North Korea has been tempered due to large-scale food assistance from the international community, but this started to change as of 2002/2003. Upon closer review, there was a drastic decline in food production due to large-scale food aid from the international community during 1999-2001. However, during 2002/2003-2004/2005, the shortage in food supply increased to 0.3-0.4 million tons again due to sharp decrease in food aid. However, this shortage increase is related to the amount of food import for commercial purpose as well. North Korea's

food import for commercial purpose reached 0.5-0.7 million tons for three years until 1997/1998, but it decreased to 0.3 million tons in 1998/1999, to 0.21 million tons in 1999/2000, and to 0.1 million tons during 2001/2002-2004/2005. If North Korean government maintained 0.5-0.7 million tons of food import for commercial purpose, the problem of food supply shortage in North Korea would have been eased greatly.³⁶

During 2007/2008-2010/2011, the quantity of food supply shortage had increased to 0.7 million tons due to South Korean government's cessation in food and chemical fertilizer assistance, and North Korea's decrease in food production³⁷. And then in 2011/2012, the shortage decreased to 0.25 million tons thanks to the increase in food aid toward North Korea by the Chinese government. However, since it is highly possible that the quantity of production in 2011/2012 and in 2012/2013 suggested is larger than actual quantity of production, it is hard to rule out the chances where actual food supply shortage is larger than the amount described.

Meanwhile, there are additional comments to the above result. First, the production amount yielded from vegetable gardens and the slope is not included in the estimation of the Ministry of Unification, but is included in FAO's estimation. The production amount yielded from vegetable gardens and the slope is estimated to be 0.17-0.25 million tons annually.³⁸ Also, when we look at 2007's North Korean population data, WFP uses a larger estimate than that of CIA (adopted by United States Department of Agriculture), the Korea National Statistical Office's (adopted by MoU), and the United Nations Department of Economic and Social Affairs' (See Figure 2.1).

When we add 0.2 million tons of food production yielded from vegetable gardens and slope to the quantity of food production, and subtract 0.167 tons of food demand from the one million people, each year's food supply shortage decreases by about 0.37 million tons. In this case, the food supply shortage during 1999-2001 and 2007-2011 still reaches 0.3-0.4 million tons, suggesting that North Korea is facing a new food crisis since 2007/2008 when the food situation worsened again³⁹. Meanwhile, the production shortage in 2012/2013 is 0.73 million tons, assumed to be met with the food demand when the amount of food assistance from international community and the amount of food import for commercial purpose is bigger than 0.5 million tons.

^{36.} The amount of food import of North Korea is 1.29 million tons in 1991, 0.83 million tons in 1992, 1.09 million tons in 1993, and 0.49 million tons in 1994. It is considered that the food crisis of North Korea came to the surface due to the decrease in food import in 1994, as well as the occurrence of the great flood in 1995. Food import is from KOTRA, 2008 bukhan daewoe muyeok donghyang, 2009.

^{37.} The amount of rice aid from South Korean government was 0.15 million tons in 1995, 0.5 million tons in 2000(0.2 million tons were corn), 0.4 million tons in 2002-2004 and in 2007, 0.5 million tons in 2005, 0.1 million tons in 2006, total amount reaching 2.85 million tons.

^{38.} Kwon, Taejin, "2009 nyeon bukhanui sikryang suguep jeonmanggwa nambukhan hyeopryeok gwaje," *KREI Quarterly Agricultural Trends in North Korea* 10, no. 4, 8 Kwon, Taejin and Nam Minji, "2010 nyeon bukhanui sikryang suguep jeonmang," *KREI Quarterly Agricultural Trends in North Korea* 11, no. 4, 15-17.

^{39.} On July 4th, 2011, Commission of the European Communities announced that they are giving support of 10 million euros to the food aid project to North Korea. Before the announcement of food assistance, the Commission sent out food assessment team that consists of 5 employees from ECHO to North Korea, and the team investigated local food situation during 2011.6.6 -17. As a result, it was reported that the food situation had worsened compared to the previous year, the amount of food distribution by the state being dropped from 400g per capita daily in April to 150g per capita daily in June. *Joongang Ilbo* Japanese version, sent on July 5th, http://headlines. yahoo.co.jp

Also, as it is stated above, the food demand estimated by the WFP is the minimum food consumption level that is needed for the livelihood of the North Korean people, and it is 1.3 million tons smaller than the basic food consumption level estimated by the MoU. All of this suggests that the food shortage problem in North Korea has been very serious for a long time.

Causes for North Korean Food Crisis

The causes that gave rise to the North Korean food crisis are natural ecological constraints, failure of economic policy, and change in the international settings. Of these, the failure of economic policy is considered to be the most fundamental problem.

Natural Ecology and Climate

Generally, the ecological condition impacts North Korea's agricultural production. North Korea's surface area is 123,000 square kilometers with average altitude of 440 meters with mountains and highlands accounting for 80 percent of the nation's total land area. The mountain soils have high acidity (60 percent) and the average depth of the soil layer is around 15-20 centimeters. Climate is prone to temperate monsoon seasons. There is short spring and fall with stifling summer and cold/dry winter. They also have a large variation in day and night temperature. The average temperature for the year is around 8-12 degrees Celsius with annual precipitation 1000-1200 millimeters (below inland plateau area 500 millimeters). 60 percent of the rainfall is concentrated in July and August.

Arable land area is around 1.6 million Ha, consisting of 36.5 percent of pad-

dies and 63.5 percent of fields. 18 percent of this land has a slope below 5 degrees, 42 percent has a slope between 6 and 15 degrees, and 40 percent have a slope of 16 degrees.⁴⁰ As revealed above, North Korea has challenging conditions for agriculture. The soil condition is poor and natural disasters such as cold weather damage, flood, and drought are common.

Since the beginning of 1990's, North Korea has been frequently struck by natural disasters, except for 2001-2006 when the climate condition was relatively good. The central west coast region was struck by cold weather and drought in 1992-93. In 1994, Hwanghaenam-do and Hwanghaebuk-do, which are North Korea's breadbasket, were damaged by heavy rain and hail. Heavy flood was a problem in 1995, 1996, 2007, and 2010. Drought was the issue in 1997, 1999, and 2009. North Korea has very little capacity to cope with natural disaster because of the weak agricultural infrastructure resulting from the persistent economic downturn as well as shortage in resources for agricultural production. As a result, the agricultural production decreased every time there were natural disasters, and this situation has intensified the food crisis.

Economic Development Strategy and Agriculture Policy

While the ecological condition is challenging, North Korea has abundant natural resources and high quality workforces that are advantageous for export-led growth. Internally, the focus should be on the growth of the service sector (i. e. distribution, tourism, and trade). Food demands can be better met through imports. Thus far, North Korea's focus has primarily been on heavy industry, especially national defense, which is not integrated into the national

^{40.} Statistics Korea, Comparing South and North Korea's Economic Society, 1997.

economy. Defense sector is completely regulated by the state and it is relatively small. In short, its industrial foundation is weak and production efficiency is low. Needless to say, this sector lacks competitiveness in exports.

From a structural point of view, the bureaucratization and absence of incentives have created a system characterized by disproportionate concentration of management authority to the government officials. Mass mobilization for production proceeded in the manner of mass movement. Investment was focused on buildings and massive monuments, which did not lead to any sustained positive spillover benefits. The result of all this was a strain on budget and depletion of foreign exchange reserves.

It is not surprising that North Korea's economy has been in decline since the 1980s, with chronic shortages in energy, capital goods, resources, raw material, food, and daily consumed goods. Over dependence on economic aid and preferential trade with socialist countries has created vulnerabilities to external conditions. Under the collective production system, which has its foundation in collective farms, there was a lack of autonomy in agricultural production. Productivity among the peasants was low due to lack of incentives and dependence on rations. Lack of fertilizer and pesticide, along with the deterioration of agriculture infrastructure facilities and machineries as well as energy scarcity have all contributed to the agricultural production crisis. The sudden end of imports from Russia in 1991 triggered the economic crisis in North Korea.

The North Korean government took on a series of measures, such as enforcing land readjustment project, building irrigation canal, diversifying crops, expanding double-cropping area, and expanding potato growing area, which all achieved some results. But they could not avert the food shortage problem. North Korea needs to adopt export-led development strategy and attract foreign capital by adopting appropriate economic policy that seeks to impose an open market. However, North Korea has preferred to maintain the existing system. As a result, there is no complementarity in the domestic and foreign policy.

The defects in agriculture production distribution system also worked to exacerbate the food shortage problem. Confusion within the leadership of the communist party and the collective production system, excessive concentration of management authority, lack of production autonomy, and lack of incentives all deterred production, self-consciousness, and creativity, which led to decrease in agricultural productivity.

There were policy measures which also failed or even contradicted each other. For instance, the North Korean government implemented an instant contract system in 1996. This measure departmentalized the collective farm into smaller production teams and aimed to "plan reasonably and allow self-reserve for the surplus production beyond the planned quota." In 2001, the government also took tentative measures to reduce the number of production teams from 10-15 to five to eight. "The Economic Improvement and Management Measures" of July 1, 2002 increased food purchasing price significantly and extended the authority of collective farm to control production. Without an arrangement where the peasants were allowed to freely sell surplus crops above assigned production level on the market, these measures did not succeed in achieving their intended consequences. The surplus crops from the cooperative farm were only sold in an existing state-operated distribution centers and could not be traded freely on the market. After the nuclear crisis in 2006, the government started to tighten its control of the economy and prohibit the sales of agricultural product in the marketplace
as well. In short, there was little incentive built into the system to raise productivity.

Since the mid-1970's, North Korean government had promoted its agriculture policy through "closed space farming and farmland organization." The executive order intended to expand arable land area and boost food production. Loss of soil's fertility and damage from the insect lowered productivity. The farmland organization led to reckless logging and destruction of forest as well as water and soil loss. Also, as a result of "5 Policies for Nature Space Remodeling" which promoted extensive reclamation of riverbed and sands, the riverbed got higher and the farm tracts got narrower. Floods were common during times of heavy rain. In 1990's, the North Korean government had forcefully promoted soil improvement that renewed 20-25cm surface layer of arable land area. As a result of the loss of soil layer around the farmland, there were frequent landslides.

Shock from the Change in International Settings

The external geopolitical environment was also unfavorable for North Korea. First, there was the worsening of relations with the Soviet Union. The relationship between North Korea and the Soviet Union started to decline as the Soviet economy faced serious problems during the late 1980s. Enhanced diplomatic relations between Soviet Union and South Korea did not help. Trade between North Korea and the Soviet Union had declined since the 1990s because the Soviet Union requested exchangeable currency as a payment for trade. When the Cold War ended, North Korea had lost its largest aid source and this event triggered the food crisis.

North Korea's only source of support was the international community when

the great flood had hit its land in 1995. China, South Korea, U.S, Japan, European Union as well as United Nations provided a large-scale humanitarian food aid. According to the 2011 CRS report the international community contributed around 12 million tons of food aid to North Korea during 1995-2009.⁴¹

When the North Korean government announced the withdrawal from the Non-Proliferation Treaty in January 2003, the food aid from the international community dropped. Since North Korea does not accept the demands by western countries to ensure transparency in distribution and establishing ex post facto confirmation, the size of food assistance to North Korea remains very small. The food shortage problem has gotten a lot worse as the South Korean government, North Korea's biggest food aid source at that time, completely stopped their food assistance to North Korea as of 2008.

Lessons from China: A Way Out for North Korea?

In this section, we draw on the Chinese experience to recommend concrete policy measures for North Korea.

First, the North Korean leadership must clearly express and implement the Chinese style "open market reform." Looking at the case of China, agricultural reform was initiated by the Central Committee. Implementation became more bold and creative at the local and individual level only after this initial step was taken by the leaders at the top.

^{41.} Of this, 26.9 percent came from China, 26.5 percent from South Korea, 18.5 percent from the United States, and 10.7 percent from Japan, which comprised of 80 percent of total aid (See Washington Yonhap News, June 27, 2011, http://www.wowkorea.jp/news/Korea/2011/0627).

Although the North Korean government attempted to promote an open market policy during the mid-1990s, there was a lack of clear policy articulation at the leadership level, which meant the desired results could not be achieved. Needless to say, this lack of clarity and consistency created problems during the implementation.

Second, it is necessary for North Korea to switch from the existing development strategy to one that favors exports and conditions in the international environment. It is difficult for North Korea to self-support their food demand due to the fact that conditions for agricultural development is challenging from a geographical standpoint. Moreover, under the current scenario, economic downturn will continue. Problems, such as the shortage of fertilizer and pesticide, deterioration of agriculture infrastructure, energy deficiency requires outside help. Meanwhile, North Korea must play to its strength in abundant natural resources as well as high-quality labor force. The food shortage problem can be solved if North Korea fosters recovery by promoting the growth of its export and service industry.

Third, North Korea should seek ways to adjust the agriculture production and distribution system so as to promote incentives among peasants to raise productivity. The Chinese government not only accomplished price increase of farm produce, agriculture production system reform, and farm-products' national purchasing based on the household contract responsibility system, but they also promoted farm-products' distribution system reform, which allowed farmers to freely sell surplus crops in a marketplace.

While the North Korean government attempted to change the agriculture production system (i.e. "instant contract system" and "household farming") and to raise food purchasing price (i.e. "Economic Improvement and Management Measures"), meaningful changes to the agricultural system cannot be possible without a distribution system that allows farmers to sell the extra crops above assigned production level freely in the market.

Fourth, North Korea must solve the issues of land ownership or transaction of land use rights before promoting economies of scale, mechanization, and industrialization at the front end of this change. The Chinese case illustrates how the government implemented the household contract responsibility system at the early stage of the reform process. When this system reached a limit, the government was flexible enough to readjust its policies to deal with the growing income gap among urban and rural areas. Since North Korea has a smaller population and arable land compared to China, it would be less difficult for North Korea to make significant changes in its agriculture production and farm-products distribution system.

Fifth, the flexibility in mobility of the agricultural labor force should be encouraged by allowing the farmers to migrate freely. Looking at the experience of China, job security based on the mobility of farmers contributed to the rise in income.

Sixth, agriculture infrastructure facilities need to be revamped. At the early stage of agricultural reform in China, agricultural infrastructure built under the people's commune system played an important role in China. Foreign capital and state investment needs to be channeled more effectively to modernize the agricultural sector.

More effort is needed to improve international environment. In particular, if the food assistance from the international community can be increased by the improving international settings, it would not only ease the food shortage problem, but also set the stage for later reform. More investment can be made on technology and skill upgrade as well.

Since 2013, North Korean government has devised various measures to institute change. It is desirable for the international community to induce North Korea to "reform and open-up" by seeking cooperation, since the stability and development of North Korea will be beneficial to stability, development, and peace of the whole Northeast Asian region as well.

Part II The China Connection

Chapter 3

China-North Korea Economic Relations

Piao Jianyi

Chapter 4

North Korea's External Trade Relations

Lee Jong-kyu & Nam Jin-wook

Chapter 3 China-North Korea Economic Relations

Piao Jianyi Chinese Academy of Social Science

Bilateral economic relations between China and North Korea have a long and complex history. The discussion in this section will trace this history from its inception after World War II up to the present time and consider the driving factors that explain the critical turning points. In doing so, we show how the structural complementarity of the two economies along with geographical proximity as well as geopolitical necessity drove the two countries closer together on the economic front.

The Historical Roots of Economic Cooperation between China and North Korea

Any understanding of the economic relationship between China and North Korea must begin at the point of Japan's unconditional surrender on August 15, 1945 when the North Korean Communist Party established the "North Korean Provisional People's Committee." It was at this time that the Chinese Communist Party set in place a strategy to build and solidify a base in the Northeastern Provinces and dispatch forces to the region. North Korea was strategically significant in that it links the southern and eastern fronts. Towards the end of 1947, the Chinese Northeast Administrative Commission and the North Korean Provisional Committee signed a tentative agreement to maintain exchanges via letters and telegraphs.

As soon as the People's Republic of China was established, Pyongyang acknowledged the government's legitimate right to engage in official diplomatic relations. In December 1949, the first official intergovernmental agreement was reached through an exchange of letters, telegrams, and phone conversations. In August 1950, after the Korean War, the two countries signed a compensation-trade deal. A month later, the US-led UN forces succeeded (i.e. Operation Chromite) in advancing above the 38th parallel up towards the Yalu River.

Another month later, China deployed its troops and witnessed a domestic movement to "Resist US Aggression and Aid Korea." The Chinese voluntarily enlisted and organized logistical and medical corps. In addition, they donated weapons and established a fund equal in value to 3,710 aircraft. Such assistance continued until 1952, in following volumes: 7,500 tons of food items; 100,000 blankets; 35,000 pieces of fabric; 384,000 articles of cotton clothing; 200 tons of raw cotton; 150,000 pairs of shoes; 818,000 towels; 140,000 care packages; 1,279,000 boxes of other supplies; and cash amounting to RMB 182.9 billion.

The Northeast Province offered aid of its own: fund donations equivalent in value to 5,700 tons of food; 150,000 towels; 20,000 articles of clothing; 300,000 packs of cigarettes; and 25,000 "care packages." The regional governments took responsibility for helping 21,000 orphans who had lost their parents during the war. The Chinese aid corps also sent medical supply and services to North Korea. The Chinese Army cut its expenditures to help North Korea rebuild.⁴²

^{42. &}quot;jungguk inmini nopeun gukjejueui ujeongeul balhuigayeo 3nyeonrae daeryangeui muljaro josuninmineul jiwoenhada", *Inmin Ilbo*, August 4,1953.

Consolidation of the Bilateral Economic Cooperation

After the Korean Armistice, North Korea consulted with the Soviet Union, the Eastern European socialist bloc, and China on the issue of post-war recovery. In November 1953, Pyongyang and Beijing announced an agreement that all financial and physical debt from the Korean War be forgiven. Between 1954 and 1957, China donated RMB 8 trillion to help North Korea purchase essential goods necessary for economic recovery.⁴³ China reconstructed railways that had been destroyed during the war; it also provided machinery, buses, and trucks. North Korea's suggestion was accepted to allow for the creation of joint venture airlines of North Korea and Soviet Union fly China's northeast airspace. Chinese technicians were sent to North Korea to aid in technology training, and North Korean technicians were sent to China for training. The Chinese government accepted North Korean students for academic purposes.⁴⁴

With the Agreement on Economic and Cultural Cooperation between China and North Korea signed, bilateral economic relations became more formal. The salient points of the Agreement were:

 the development of an economic and cultural relationship based on principles of mutual cooperation supported by equal, mutual benefits;

- (2) economic and cultural aid or cooperation to facilitate cultural exchange;
- (3) a series of agreements on the economy, trade, transportation, culture, and education;
- (4) ratification as soon as possible, with a validity of 10 years after ratification; and
- (5) an automatic ten-year extension of the agreement unless one party were to make a claim to repeal.⁴⁵

Bilateral economic relations developed in tandem with multilateral cooperation among socialist bloc countries. The former differs from the latter in that the relationship was not based on interests but on companionship throughout the long-lasting revolutionary struggle. While the Soviet Union, at North Korea's behest, extended the due date for paying back wartime assistance, China changed its aid into donations. Another difference was that the relationship had a legal base that depended upon a long-term agreement. Chinese assistance focused on transportation, shipment, light industries, and agriculture, which directly contribute to people's improved living standards. These traits constituted the basis of the bilateral economic cooperation that ensued.

^{43.} This list included coal, fabric, raw cotton, food, building materials, transportation infrastructure, metal goods, agricultural and other types of machinery, fishing boats, paper, stationery, and daily necessities.

^{44. &}quot;junghwa-inmin-gonghwa-guk jeongbu-wa Josun-minju-juui-inmin-gonghwa-guk jeongbu daepyodan dampan-gongbo", *Inmin Ilbo*, November 24, 1953.

^{45. &}quot;junghwa-inmin-gonghwa-guk-gwa josun-minju-juui-inmin-gonghwa-guk gyeongje mit munhwa-hyupryeok hyupjeong," *Inmin Ilbo*, November 24, 1953.

Critical Junctures in Economic Cooperation

Bilateral economic relationship between China and North Korea developed in association with the multilateral relationship among communist countries and can be analyzed according to the following development phases.

Post-war Recovery and Founding of the Socialist State (1954-1960)

The years from 1954 to 1957 marked North Korea's post-war recovery period. The Socialist Bloc supported North Korea through aid. During this time, and thanks to China's RMB 5 trillion aid, the North Korea-China Economic Cooperation supported railroads, stamps, and currency; the two countries also officially started compensation trade.

In 1954, China, the Soviet Union, and North Korea were part of nine socialist countries that promoted international railroad transit links. China and North Korea signed agreements on border railways, mail and parcel exchanges, border-area currency exchanges, and protocols for foreign trade and exchange. Since then, China has sent workers and technicians from various fields, such as construction, shipbuilding, welding, cement, enamel, glass, ceramics, textiles, and commodities, to North Korea to help the latter country develop. Also, Chinese companies have received thousands of North Korean technicians and laborers in smelting, steelmaking, shipbuilding, construction, railroading and repairing, fertilizer manufacturing, dyeing, sericulture, printing, tanning, wood processing, can-making, tobacco-making, and other fields, and taught them professional skills. China also sent massive quantities of construction materials, transportation equipment, metal goods, trucks, chemicals, textile machines, coal, fabric, paper, and other goods to North Korea. By the end of 1957, China had sent RMB 8 trillion in aid as well.

During this period, North Korea and China signed a compensation trade protocol (Agreement on Economic and Cultural Cooperation), which rapidly increased trade volume between the two countries. In 1954, China provided approximately RMB 3 trillion of coal, fishing boats, construction materials, machines and industrial raw materials, while North Korea provided electricity, minerals, seafood, and medicine as a mutual offer. In 1957, China provided food, raw and refined cotton, coal, salt, steel, chemical industrial materials, paper, and construction materials; meanwhile, North Korea exported iron powder, silicon, tool steel, angle steel, colored metals, cement, fruits, seafood and regional special products as part of the mutual trade.

In 1958, North Korea entered the Socialist Foundation Construction period. The North Korea-China Economic Cooperation started to transition from an aid-oriented relationship to a more equitable one. During that time, China provided coal, coke, cotton, various machines, railroads, beans, and industrial chemicals, while North Korea provided iron, iron powder, steel ingots, seafood, and medicine as part of its mutual trade. Trade volume between the two countries increased more than 50 percent compared to the same period in the previous year, and increased ten times compared to 1954.

The two countries also signed a 1959-1962 long-term mutual supply agreement. The agreement entailed China's supplying of coal, cotton, tires, curbing, rolled-steel materials, ferromanganese, sulfur, paraffin, and plaster, while North Korea would supply iron ore, copper, zinc, high-speed steel, carbon steel, calcium carbide, ginseng, and seafood. North Korea would also, through joint investment, construct the Yalu River Unbong hydroelectric power plant. In the agreement, China agreed to loan North Korea half of the construction fee on a long-term basis, and North Korea would pay the loan back with barter within 10 years, starting from 1961. Another long-term loan that North Korea would pay back with barter over 10 years would be textile, cement, and paper-bag factory machines supplied by China, with China also supplying North Korea the means of production for steel ball bearings, silk weaving, flour, and sugar. Through these arrangements, the two countries' economic cooperation developed from one-sided aid and compensation to large-scale construction and financial cooperation.

To fulfill the agreement, China and North Korea have signed a compensation-trade protocol each year since 1959. The two countries also have a non-trade payment currency-clearing agreement, a border-currency exchange protocol, a convention on civil aviation, an air-transportation mutual service protocol, a civil-aviation technology cooperation protocol, and the Yellow Sea fishery protocol. In 1960, China signed agreements to provide loans, plants, and technology support. As a result, between 1961 and 1964, China supplied RUB 420 million in loans, and contributed to the establishment of a rubber-tire factory, a radio communication-equipment factory, and a commodity-production factory. China also agreed to supply cotton textiles and radio-station equipment. Finally, China signed a border river- and air-transportation cooperation agreement, provided that territory in Liaoning province and Pyeonganbuk-do would be available for joint use.

Comprehensive Socialist Consolidation

From 1961 to 1974, North Korea officially started to establish its own form of socialism. This period was also marked by several major events, such as the Cuban Missile Crisis, growing animosity between China and the USSR, the establishment of diplomatic ties between South Korea and Japan, the Great Proletarian Cultural Revolution, the Vietnam War, the Pueblo Incident, the Sino-Soviet border conflict at Zhenbao Island, the improvement in China-US relations, among others. It was also during this time that North Korea accelerated its economic development to the point that its economy leap-frogged that of South Korea.

In July 1961, the Chinese and North Korean governments signed the Treaty of Friendship and Cooperation, which took the two countries' relationship to unprecedented heights. Based on the agreement's stipulation that China would supply plants and technical support, the two countries signed another protocol establishing China's support of commodity production companies in North Korea. China confirmed that it would support the establishment of fountain pen, knitting, and natural-rubber product factories, and that it would also support planting techniques and equipment for light-industry development.

In 1962, the two governments decided to extend their agreement period from four to five years; they signed the 1963-1967 long-term agreement to mutually supply high-priority products. China would provide fuel, mineral products, agricultural goods, chemical industrial products, black metals, and plants, while North Korea would provide minerals, metals, equipment and machines, industrial chemical products, seafood, textile products, among others. The two countries also signed the Normalized Air and Sea Cargo Treaty. As a result of these developments, North Korea-China trade entered a new stage capped by the opening of formal trade link between Shanghai and Nampo in 1964.

Although the Great Proletarian Cultural Revolution did not engender the climate for long term agreements between the two governments during 1968-1976, they did engage in short term cooperation. In 1971 and 1973, the two governments signed an economic and technical cooperation agreement, but this did not bring about significant changes. In 1972, the two countries' trade volume increased 50 percent compared to 1963. During that period, the two countries signed a mutual-cooperation agreement regarding the fishing industry and geological economic technical cooperation, thus completing the "North Korea-China Friendship Pipeline."

Renewal of Long Term Cooperation (1974-1989)

After 10 years of the Great Proletarian Cultural Revolution, the Chinese and North Korean governments signed a 1977-1981, 1982-1986 long-term trade agreement. 1978 was the year that North Korea started to focus on foreign trade and exchange. North Korean and Chinese economic cooperation paved the way for new opportunities. Afterwards, the two countries signed agreements on trade, nontrade payment, and a fixed basic exchange rate on currency (1982), as well as an agreement regarding the consignment of partial exports from Jilin and Heilongjiang, China, to Japan passing through the port of Chungjin. In September 1984, North Korea implemented the "partnership-management law," "partnership company income-tax law," "foreigner income-tax law." These measures bolstered the two countries' economic cooperation. North Korea signed a consular agreement with China; Ryanggang Province and Jilin Province agreed to build a road and bridge connecting Hyesan and Changbai. In 1985, China signed an agreement supporting North Korea economically.

Post Cold War Transition in China-North Korea Economic Cooperation

The international context changed significantly as a result of the end of Cold War. In China, Deng Xiaoping, the architect of Chinese reform, proposed the Three-Step Strategy to open and reshape the Chinese economy. North Korea agreed to the UNDP's plan, which announced the establishment of a free economic-trade zone (FETZ) in the Rajin-Sonbong region. In 1992-1993, North

Korea and China did away with the bartered trade to one based more on market based trade. Efforts were being made to develop border-trade cooperation and border-region development. The two countries also signed various agreements on such matters as mail communication, railroad transportation, water transportation, aviation service, irrigation facilities, hydroelectric power generation, currency and finance, and so on. As a result, the two countries' trade volume increased 29.5 percent and reached USD 890 million during 1992-1993. The Chinese border-trade companies also made significant investments in Pyeongyang and Rajin-Sonbong, while North Korean government decided to open restaurants in Beijing, Dandong, Yanji and other regions.

While China began its journey towards prosperity during this period, North Korea's international and domestic situation did not turn for the better. The collapse of Eastern Europe and Soviet Union meant the tapering of important imports such as oil, coke, cotton rubber and other raw materials. North Korea's decision to develop its own nuclear program also sparked international sanctions. With Kim Il Sung's passing in July 1994, many observers were bracing for a possible collapse of the North Korean regime. North Korea was also dealing with the problem of severe food shortage as a result of the drought and weather related disasters (i.e. tsunami and floods) during 1995-1998. Average food production dropped by more than 50 percent. Due to other resource shortage, electricity generation also dropped significantly leading to lower productivity; for instance, factory operations were reduced by 70 percent.

Trade between China and North Korea also suffered with trade volume decreasing to USD 370 million by 1999. Hence began yet another turning point in relations between these two countries with China coming to North Korea's aid through emergency contributions amounting to RMB 50 million during 1995-99.⁴⁶ In September 1998, the 10th National People's Congress the 1st plenary session, North Korea announced "Juche Socialism Strong and Prosperous Nation" policy (also referred to as Juche Sahweju-eui Kangsung-dae-guk) development plan. The idea as it was announced placed emphasis on "heavy industry as priority while simutaneously develop[ing] light and agricultural industries." North Korea's economy showed signs of recovery by 1999.

Towards the end of May 2000, North Korea and China jointly expressed the intention to "look to the future and strengthen good neighbor relations" during Kim Jung-il's visit to Beijing. In January 2001, Kim once again expressed the desire to renew North Korea's economic relations with China during his visit to Shanghai.

By 2002, North Korea's economy had stabilized and entered the development track. North Korea-China trade volume recovered to USD 740 million with border trade accounting for 25 percent of this. In November of that year, Chinese Panda Electrics engages in a joint venture to establish a production facility in North Korea.

In October 2003, the Chairman of the Standing Committee of the National People's Congress Wu Bangguo visited North Korea and delivered Hu Jintao government's message of reaffirming "the good neighbor" policy. After Kim Jong-il's visit in April 2004, the two countries signed an agreement to develop the border region. In 2003-04, two countries' trade volume peaked to over USD 2.3 billion. China had become North Korea's largest trade partner.

46. The aid included 620 thousand tons of food, 20 thousand tons of chemical fertilizer, 80 thousand tons of oil and 400 thousand tons of coke. Rapid expansion of trade was also coupled with increased investments. During 2003-04 the amount of Chinese investments in North Korea rose from USD 1.3 million to 50 million. North Korea also opened more restaurants in China followed by its first computer software developing company. The two governments signed an agreement to protect investments in March 2005. In October, the Vice Premier of the State Council of China Wu Yi brought with him 300 tons of float glass to Daean Wuho Glass Company during his visit to North Korea. Based on "state-led and company engaged market" principle, the two countries signed the governments technology cooperation agreement and an agreement to establish a joint venture involving the Wuguang Group and the North Korean government. The two countries also agreed to jointly develop North Korea's biggest mine⁴⁷ and establish a bicycle factory jointly owned by the Tianjin Digital Trade Company and the North Korean government.

In October 2005, President Hu Jintao visited North Korea and reaffirmed China's commitment to economic and technological cooperation. In January 2006, Kim Jong-il visited Hubei, Guangdong and Beijing. At the time, China's economic policy was built on the foundation of "state-led, company engage market operation." The two countries sought to explore new areas of economic cooperation through the use of economic, trade, science and technology committees.

In November 2005, China's biggest state operated iron ore trading company Sino Steel and Shougang Tonggang Group decided to invest RMB 7 billion in North Korea and agree to develop the Musan Iron Mine which is projected to have an annual yield amounting to about 1 million tons. There was also a closer coordination between China and North Korea to simplify customs entry protocol during March and October 2006 through "the green channel"

^{47.} The Yongdeung mine was estimated to have an annual yield of about 1 million tons.

border ports in Quanhe-Wonjung, Sanhe-Hoeryong. Meanwhile, Vice Premier Hui Liangyu visited Pyeongyang and completed the economic and technology cooperation agreement. China National Tourism Administration opened tour routes between Hunchun-Rason, Tumen-Onsong, Heilong-Taehongdan, and Samjiyon. North Korea had established the Taepoon International Investment Group to channel and direct more investment from China. The result is a rise in Chinese investments in North Korea to USD 1.35 billion.

Increased Chinese investment in North Korea was followed by a rise in two countries' trade. In 2005, the total trade between China and North Korea peaked at USD 1.58 billion. China's major export goods were mineral raw materials, crude oil, machines, electronic goods and grain, while North Korea's major export goods were coal, mineral, steel, clothes and seafood. Border trade increased 47 percent accounting for a third of all trade volume between the two countries.

There were some signs of change when North Korea completed its first nuclear test in October 2006. The Chinese government responded by halting all permits to Chinese companies for investments in North Korea. None-theless, trade between North Korea and China continued and managed to reach a new peak at 1.8 billion dollars. China's major export goods were oil, minerals, TV, electronics and plastic products, while North Korea's major export goods were minerals, coals, fiber, seafood and steel. Things became more favorable when the Six Party Talks resulted in the signing of "the 2.13 Agreement" in February 2007. The port connecting Qingshi, Jilin and Unbong, Zagang was opened shortly thereafter. North Korea's Pyeonghaw Motors decided to switch its partnership from Fiat to a Chinese automobile company. Models based on this new collaborative effort resulted in the sale of "Sam-Chun-Ri" and "Hwi-Pa-Rham I" in North Korea. The North Korea

government also hosted "the 1st Pyeongyang China Light Industry Product Trade Fair" in July. China followed up with the presentation on "Planning for Promotion of Traditional Industrial Foundation in Northeast," and announced the construction of a mining supply channel between Nampyeong and Musan. In September, North Korea-China economic trade science technology committee held its 3rd meeting and discussed the construction of Fuchun-Nasun and Rajin Industrial Park.

This was followed by more joint ventures. Tangshan Steel Group and Daetang Group signed an LOI with the Taepoong International Investment Group to build a 150 ton smelting facility as well as the 600 thousand KW thermal power plant in Kim-chaek Industrial Park. The largest scale joint management company called the Hae-joong Joint Mining Company was established through the partnership of Zhonguang International Investment and North Korea's Hyesan Youth Mine. East Sea Joint Venture Company was established through a joint investment by China's major magnesite manufacturing company and the North Korean government. The result of this effort was the development of the Oongjin Mining facility as well as the construction of the 150 thousand KW thermal power plant and a smelting facility.

Taepoong International Investment Group announced that it will support the USD 10 billion loan if Chinese companies were willing to invest in North Korea's road, railroad, port, and other infrastructure with China's National Development Bank. Between October 2006 and January 2008, the Chinese investment in North Korea amounted to USD 260 million. In 2007, the total trade volume was USD 1.974 billion. China's major exports were petroleum and other oil while North Korea's major export items were coal, fossil fuel and other minerals. China's coal import was increased almost two fold, and North Korea became the 3rd largest coal exporting nations to China after ASE-

AN and Australia.

Economic cooperation between China and North Korea continued into 2008 as the People's Bank of China announced the establishment of the border trade balancing accounts which enabled North Korean companies to open RMB trade account in Dandong. This became an important source of financial capital (in RMBs) to the North Korean market. Continual deepening of joint ventures resulted in the establishment of the new firms in tobacco, lighting, processing, travel, and beverage.

Xi Jinping visited North Korea in June 2008 and renewed China's commitment to economic and technology cooperation as well as expansion of air and ground transport. 2008 marked the 10th consecutive year of increasing trade between China and North Korea (USD 27.8 billion). Another interesting fact to take note of is that about half of all trade occurring between China and North Korea can be attributed to trade via Jilin. In the past, 70 percent of the China's export to North Korea was from Dandong. This implies that the nature of trade between these two countries have shifted from one largely centered around simple consumption goods to one that is based more on sophisticated manufactured goods.

Current Status of the Economic Relationship

As of October 2005, the two countries agreed on the principle that the bilateral economic relationship should "be state-led, enterprise-based, and market-operated." Starting in 2008, this notion had become more apparent in the areas of trade, investment, border development, and local government cooperation.

Current Status of the Bilateral Economic Cooperation

<u>Trade</u>

Bilateral trade took a sharp downturn for the first time in over a decade to USD 2.68 billion in 2009. In 2010, the bilateral trade was USD 3.47 billion, an increase of 29.6 percent; China export increased by 20.8 percent while that of North Korea grew by 50.6 percent. China's top exports to North Korea were rice, corn, mineral, fuel, heater, machinery, electronic goods, audio and visual equipment, automobiles and its parts, iron, steel and related goods, plastic, rayon, and chemical fertilizer. North Korea's top exports were coal, seafood, iron ore, textile, iron, and steel.

This period can be characterized as an unprecedentedly stable phase of the relationship. Notably, North Korea ran an increasing trade deficit against China since 2003 when the bilateral trade increased by a large margin. The deficit grew from USD 23 million in 2003 to USD 110 million in 2009 and USD 1.09 billion in 2010. This is largely due to the fluctuating prices of North Korea's imported goods in the international market. It is noteworthy though that such deficits imply North Korea's improved purchasing power.

North Korea's deficit is actually structural as China invests in sectors boosting its exports like mining development, construction of ports and heavy machineries. Unless North Korea utilizes such investment to develop its export sector, its exports will not surpass imports. In this context, it can be said that the structure contributed to a dramatic surge of the bilateral trade in the first half of 2011.

Investment

Investors changed from small commercial companies to large state-owned companies in 2002. Such change is considered strategically critical to the relationship. Larger companies mean longer term contracts and increase in the overall volume of investment. By the end of 2009, large public companies including China Minmetals Corporation, Sinosteel Corporation, and Shougang Tonggang Group were making sizable investments in North Korea.⁴⁸

Border Regional Development

The two countries built a total of 16 ports together along the border areas to encourage trade. Various construction projects followed to expand shipping, roads, hydroelectric power plants, and railways. Cross border travel was also eased. Comprehensive cooperation reaching over 1,330 kilometers along the Yalu and Tumen River resulted in the development of three major trade routes; Dandong - Sinuiju, Tonghua - Hyesan, Hunchun – Rason.

When the former Prime Minister Wen Jiabao visited North Korea in October 2010, he concluded the negotiation for the joint construction of the new Yalu River Bridge, which is expected to be 20.4 kilometers long and 33 meters wide. China announced its investment of RMB 1.7 billion in the project.

Aside from encouraging trade between Dandong and Sinuiju, this project is expected to bring a significant change to the relationship between North Korea and China. A development project is already under way on the two biggest islands in the Yalu River (i. e. Wihwado and Hwanggumpyong) as well as the effort to build two hydroelectric power plants in Wangjianglou and Wenbing. Development of Rajin as an international logistics hub that can function as a complex for trade, export processing, and inventory is part of this broader effort. While other sections in this report provide a more detailed account, we can look to examples such as the highway construction project linking Wonjong and Rajin where Chinese investment has played a major role in infrastructure development. The give and take was not one way, however. China's long term loan of USD 10 million to DPRK to repair 179 kilometer railway linking Domun and Chungjin was possible because North Korea agreed to extend the leasing rights to Ports 3 and 4 in Rajin for additional 15 years.

Movement of people is also increasing. According to the 2009 statistics, 103.9 thousand North Koreans officially visited or immigrated to China. 52,100 were employed in foods, clothing and IT industries along the border.

Cooperation at Local Government Level

Given the extensive history and depth of cooperation at the national level, it is only sensible that cooperation also permeates the local regional and municipal level as well. In fact, the central government of China continues to link local level planning and policies with the national objectives through promotion of Northeast China Revitalization policy, Liaoning Coastal Economic Belt Development Plan, Changjitu (Jangchun-Jilin-Tumen) Development Project, and the establishment of the Daxingangling Environmental Protection Zone.

^{48.} China Nonferrous Metal Mining (Group) Co., Ltd., (Luanhe), Tangshan Iron and Steel Group Company made investment in about 20 mines like Gangan, Oryong, Gogeonweon, Yongbukcheong-neyon in Northern Hamgyeong province, Musan, Deokseong, Sangnong in Southern Hamgyeong province, Yongdeung, Seongchoen in Nothern Pyeongan province, Yongmun, Cheonseongcheong-nyeontangwang, 2.8 Jikupdongmaengcheongnyeontangwang, Yongheung in Southern Pyeongan province, Suan, Eunpa in Northern Hwanghae province, and Oongjin in Southern Hwanghae province.

The value of cooperation has also been recognized by the leadership in North Korea. Kim Jong-il, for instance, stated that "the DPRK and Chinese Northeast provinces share a border with similar environment and industrial structure. Pyongyang will encourage exchange and cooperation with the Northeast provinces to learn from its experience and policies." As an illustration of how much emphasis is now being placed on the local level, when Zhou Yongkang (a former member of China's Politburo Standing Committee now under investigation in China) visited North Korea to renew the bilateral economic and technical cooperation agreement, a North Korean envoy was dispatched a few days later to assess the developments in Jilin and Heilongjiang before the agreement was concluded. There is realization on both sides that deepening relations at local level would be the key to unlocking the growth potential in North Korea.

Discussion

The historical overview illustrates the importance of structural ties in the bilateral economic relationship between North Korea and China. First, former leaders of the two countries shared a special bond forged through a collective memory founded on the revolutionary past. The bond has grown under each successive leadership. They support and respect the idea of coming up with a development plan that suits the other's situation or circumstances. The two countries see the economic cooperation as one of many means to carry on this tradition and to achieve common prosperity. Such bond is a critical political base for future cooperation.

Second, the history of cooperation between these two countries has continued after the end of the Cold War. The principle of "state-led, enterprise-based,

and market-operated" economic policy epitomizes the evolution of this relationship as of 2005. Chinese firms have made significant investment based on the principle to long run benefits.

Thirdly, the two countries have a complementary economic structure. While China is in need of resources and more international markets to continue its economic development, North Korea is in need of modern technology and entrepreneurialism for improvement in the people's standard of living and its economy. North Korea's abundance of natural resources and China's economic takeoff complements each other quite well. Given that China's Northeast provinces have experience and competence in modernizing heavy industries and infrastructure, which is a part of North Korea's development plan, bilateral relationship is poised to only grow into the future.

Lastly, geographical proximity creates a favorable environment for cooperation to flourish. Beijing and Pyongyang are very close geographically. Abundance of entry points by air and sea across the Northeast province, Bohai Bay, and Yangtze River Delta makes access among economic zones relatively easy. In other words, infrastructures are already in place free movement of people, goods and services. With the Northeast China Revitalization Policy being implemented in earnest, the bilateral cooperation would facilitate further development of infrastructure, exploitation and processing of natural resources, cross-border trade, and more cross border flow of capital.

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Chapter 4 North Korea's External Trade Relations⁴⁹

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In 2013, the authorities of Democratic People's Republic of Korea (hereinafter referred to as North Korea) claimed a few notable policies in foreign trade in midst of internal and external chaos. They proposed 'diversification of trading channels', fearing that political relationship with China might be worsened. They also announced that they would 'diversify exporting goods', promoting light industry in order to manage the overdependence on natural resource exports. Lastly, the 'institutional and policy support' was improved in order to attract foreign investment.⁵⁰ However, the political and military tension in the Korean Peninsula created by the third nuclear test and the execution of Jang Song-thaek makes it difficult to evaluate whether any of North Korea's attempted policies will prove to result in positive outcomes.

Inter-Korea trade also took a step backward with the closing down of the Kaesong Industrial Complex. Considering the fact that the transaction volume within the complex has been increasing even after the '24th May Measures' (i. e. ROK economic sanctions against North Korea), the economic impact on North Korean authorities must have been huge. In the case of trade with China, it was once expected to shrink after North Korea had forced the

third nuclear test. However, the expansion of underground resource exports has led to an increase in total trade, resulting in an even more extreme dependence on China. In this section, the trend and prospects of the recent changes are examined with a focus on the bilateral trade between North Korea and China as well as the inter-Korea trade.⁵¹

Characteristics of Recent North Korea's Foreign Trade

The main reason why the North Korean authorities recently have adopted a platform of 'diversification of trading channels and goods' is that the trade structure of North Korea has been extremely imbalanced. The recent North Korean foreign trade could be described as an unbalanced structure displaying extreme dependence on either a specific country or an item. Firstly, North Korea's main trade partner is China. In the early 2000s, South Korea, China and Japan used to be the main trading partners of North Korea; however, as the relationship with South Korea and Japan has worsened over time, China has become the most important trading partner of North Korea. China's share of North Korean total foreign trade was 89 percent in 2011 and 88 percent in 2012, showing that the excessive dependence on China has changed little. Even if the inter-Korean trade is included in the figure, China still took over almost 70 percent of North Korea's total foreign trade.

Secondly, North Korea's export structure is heavily concentrated on natural resources and low cost manufactured goods. On the export side, the top five

^{49.} This study is a rearranged version of Lee (2014).50. Lee (2013), pp.27~28.

^{51.} In 2012, bilateral trade between North Korea and China covered 68.4 percent of North Korea's total trade (including inter-Korean trade) and the inter-Korean trade covered 22.5 percent. In sum, North Korea's total trade dependence on these two countries was over 90 percent.

goods were anthracite (HS 2701), iron ore (HS 2601), various apparels (HS 62) in 2012. These took over 39.5 percent of North Korean export in 2010, 53.7 percent in 2011, and 61.0 percent in 2012, showing a continuous increasing trend. Even with HS 4-digit level—a relatively sophisticated standard—the share of top five goods is very high, which shows that the tendency of excessive dependence on few products in export structure still has not been fixed. On the contrary, North Korea's top import goods were crude oils (HS 2709), petroleum oils (HS 2710), motor vehicles for the transport of goods (HS 8704), maize (HS 1005), and woven fabrics (HS 5407). The share of these top five goods. Therefore, the North Korea's import structure is rather evenly distributed, compared to its export structure.

Figure 4.1: Trend of the North Korea's Volume of Foreign Trade



Source: Korea International Trade Association, Ministry of Unification

Table 4.1: North Korea's Top Five Export Goods

(Unit: %)

Denk	2011			2012		
капк	HS Code	Commodity	Share	HS Code	Commodity	Share
1	2701	Anthracite	34.3	2701	Anthracite	42.3
2	2601	Iron Ore	9.6	2601	Iron Ore	8.7
3	6203	Men's Apparels (suits, etc.)	3.3	6202	Women's Apparels (coats, etc.)	3.4
4	8703	Passenger Cars	3.3	6203	Men's Apparels (suits, etc.)	3.3
5	7201	Pig Iron	3.2	6201	Men's Apparels (coats, etc.)	3.3
Total	Share of the top five ex- port goods		53.7	Share of the top five ex- port goods		61.0

Note: Excludes the inter-Korean trade; the share refers to the export share in that certain year. *Source*: UN Comtrade.

Response by the North Korean Authorities

With growing tension in the Korean Peninsula, the external trade of North Korea took a slight turn for the worse in 2013. Nonetheless, North Korea expressed a strong determination for economic development by selecting a strategy to keep abreast of both nuclear power and building economy.⁵² The economic policy announced in 2013 is that if the peace can be secured by the nuclear deterrence, North Korea will be able to concentrate its resources into building economy. This is comparable to an announcement made in 1962, but the recent one is evaluated to be more economy focused. In particular,

52. The plenary session of the Workers' Party's Central Committee on the 31st March in 2013.

North Korea implemented measures that expressed a will to develop the economy through the open-door policy,⁵³ despite the high tension between the two Koreas, which demonstrates that North Korean authorities recognize that it would be difficult to rejuvenate economy on their own. A few notable policy directions on external economic relations in the first half of 2013 are as follows:

Firstly, the North Korean authorities proposed to diversify external trade during the plenary session of the Workers' Party's Central Committee in March 2013. Signs of unstable relations coupled with overdependence on the Chinese trade may have led to this proposal. In North Korea's "Journal of Economic Research,"⁵⁴ one North Korean economist argued that "if trading companies are bound up with countries, they might be politically and economically pressured by those countries." Also, North Korea has, on several occasions, revealed intention to diversify trading channels with emerging nations such as Russia, India, Iran and Southeast Asian countries.

In addition to trade diversification, North Korean authorities also showed keen interests in diversifying exports. Kim Jong-un attended the National Meeting of Light Industries in March and stated that "Integrating production and export should be realized with responsibility in mind."⁵⁵ The 16th International Spring Trade Fair in Pyongyang,⁵⁶ the largest trade fair in North Korea, was held in May to promote North Korean goods to potential buyers. A number of foreign firms from Germany, Malaysia, Singapore and Switzerland participated

in the trade fair and products such as nano-footwear, brain function enhancing goods, hybrid vehicles, and tablet PC were exhibited.⁵⁷ Meanwhile, Kim Jong-un ordered to utilize the funds, earned from exporting metals such as magnesite and zinc extracted in Dancheon area of South Hamgyong Province, to the development of light industries, introducing a specific financing scheme.

Finally, institutional and policy support was improved with an eye towards attracting foreign investment. Key step was the passage of "the Act on Economic Development Zone"⁵⁸ was especially enacted. According to this act, not only the foreigners, but the ethnic Koreans overseas can also invest in the Economic Development Zone. It states that they can freely take part in economic activities within the zone. Also, with special emphasis, it promotes the investment in sectors such as construction, advanced science and technology, which produce goods that are competitive in international markets. Some argue the establishment of 'Central Bureau for Economic Development' is imminent to support the implementation of this act. In the meantime, various attempts were made by the North Korean authorities to attract the foreign investors to the large-scale infrastructure building projects. For instance, North Korean authorities announced a construction plan for a new road connecting Pyongyang and Pyongsung. And they plan to purchase equipment and materials through international bidding procedure.⁵⁹

58. 'Economic Development Zone' is defined as a specific economic zone that guarantees preference in economic activities according to special regulation enacted by the state. 'Act on Economic Development Zone' consists of regulations on establishment, development, administration, dispute settlement (seven Chapters, 62 Articles, and two Annexes).

^{53.} Cheong (2013).

^{54.} Seunghak Jeon (2013).

^{55.} Chosun Shinbo, *"Speech by General Kim Jong-un at the National Meeting of Light Industries"* (in Korean), March 19, 2013.

^{56.} The 16th International Spring Trade Fair in Pyongyang, May 13-16, 2013.

^{57.} Yonhap News, "Promoting the International Spring Trade Fair in North Korea, from a Brand New *Car to Nano-footwear*" (in Korean), May 26, 2013.

^{59.} Yonhap News, "North Korea to Procure Equipment and Materials for Road Construction through International Bid" (in Korean), June 11, 2013.

Trend of North Korea-China Trade in 2013

Bilateral trade between North Korea and China rose during 2012-13. But after North Korea conducted its third nuclear test in February 2013, the trade volume dropped by 17.7 percent and 7.9 percent in February and March, respectively (compared to the same time of last year). In the first half of 2013, the trade volume between North Korea and China reached only USD 2.96 billion, which is 3.1 percent lower than that of 2012. However, with a precipitous rise in export to China, bilateral trade increased by 10.4 percent which translates into USD 6.54 billion in 2013. Also, the volume of trade deficit with China decreased from USD 0.96 billion to 0.72 billion. It seems that effort by the North Korean authorities to invest more inputs to the strategic mineral resources paid off in promoting export of these goods.

Figure 4.2: Monthly Trade between North Korea and China, January 2012 ~ December 2013

Source: Korea International Trade Association

Table 4.2: North Korea's Trade with China

(Unit: million USD)

	Import	Export	Total	Trade Deficit
2012	3,446 (8.9%)	2,485 (0.8%)	5,931 (5.4%)	961
2013	3,633 (5.4%)	2,912 (17.2%)	6,545 (10.4%)	228

Source: Korea International Trade Association

However, this does not imply that North Korea's trade with China has improved, because the export structure has remained extremely simple, based on natural resources. In fact, North Korea has exported the most amounts of coal (HS2701) and iron ore (HS2601) in 2013 compared to any other year. The exports of coal and iron ore reached USD 1.38 billion and 0.3 billion, respectively. These figures cover 47.4 percent and 10.3 percent of total exports in 2013, increasing even more from 42.3 percent and 8.7 percent in 2012. Oth-

Table 4.3: North Korea's Major Export Commodities to China

(Unit: million USD, %)

	Rank	HS Code	Commodity	2012		2013	
				Volume	Rate of Increase	Volume	Rate of Increase
	1	27	Mineral Fuels (an- thracite, etc.)	1,206	4.9	1,390	15.3
	2	62	Apparels (excluding knits)	373	4.5	499	33.9
	3	26	Minerals (iron ore, etc.)	358	-11.9	415	16.2
	4	03	Fish, crustaceans, mollusks, other aquatic invertebrates	101	21.5	114	13.2
	5	72	Iron and Steel	125	-19.5	95	-23.9
Total		2,485	0.8	2,912	17.2		

Source: Korea International Trade Association

er than underground resources, the exports of apparels (HS61, HS62) and fishery goods (HS03) showed significant growth.

On the other hand, the largest imported goods (i. e. mineral, fuels, and energy) in North Korea decreased by 6.2 percent compared to the previous year. Some news has revealed that the Chinese authorities ordered to strengthen the monitoring on customs clearance, especially on large industrial products, in border cities such as Dandong.⁶⁰ As Table 4.4 shows, there was a drop in imports of boiler and machinery (HS84) and electronics, TV, VTR (HS85).

Table 4.4: North Korea's Major Import Commodities from China

	HS Code	Commodity	2012		2013	
Rank			Volume	Rate of Increase	Volume	Rate of Increase
1	27	Mineral Fuels, Ener- gy (crude oil, etc.)	790	2.5	741	-6.2
2	84	Boiler and Machinery	293	5.5	263	-10.1
3	85	Electronics, TV, VTR	267	6.2	254	-4.9
4	87	Vehicles and Parts Thereof	233	5.5	240	3.0
5	54	Man-made filaments	129	17.6	146	12.9
Total			3,446	8.9	3,633	5.4

(Unit: million USD, %)

Source: Korea International Trade Association

This implies that a stricter monitoring of illicit trade, after the nuclear test in February, had a negative impact on trade between the two countries. That is to say, strengthened inspection on customs clearance, cash flow, smuggling, and immigration control had measurable impact.⁶¹ The effect of such inspection was very prominent along the border provinces, such as Liaoning and Jilin, indicating that a stricter inspection on customs clearance had a more devastating impact in these regions.⁶² Transactions between North Korea and Chinese firms also diminished, as substantial difficulties arose in trading procedures (i. e. liquidating payment), which also appears to be a major factor in the stagnation of imports from China.

Bilateral trade between North Korea and China in 2013 can be summarized as follows. China has strengthened the monitoring on illegal trade activities, which negatively affected imports from China more than exports to China in the first half of 2013. In particular, imports of industrial goods such as vehicles, machinery and electronics were negatively affected. This could be interpreted as a warning to North Korea from the Chinese authorities, because a decline in imports from China means the commodity supply within the North Korean economy could be in jeopardy and lead to a significant decline of daily necessities. However, such trend was only observed temporarily and disappeared during the second half of 2013, as it was the case after the second nuclear test by North Korea. Overall, North Korea's dependence on China has become more extreme than ever.

^{60.} Yonhap News, "China, Strengthening the Inspection on North Korean Customs Clearance" (in Korean), 15 February, 2013; Dong-A Ilbo, "North Korean Dealer Out of Contact ... North Korean Supervisor Visiting China Hurriedly Returned to North Korea" (in Korean), February 5, 2013.

^{61.} We are only referring to the cases in which China strengthens monitoring on illegal trade, not the cases in which China intentionally reduces or suspends all trade with North Korea.

^{62.} In case of vehicles and parts thereof, the import decreased by 19.9 percent from Liaoning Province and 44.3 percent from Jilin Province. The import of machinery dropped sharply by 25.0 percent from Liaoning Province and 62.3 percent from Jilin Province.

Trend of Inter-Korea Trade in 2013

North Korea is highly dependent on the Kaesong Industrial Complex. In 2012, the total inter-Korean trade reached USD 1.97 billion, USD 0.90 billion from North Korea to South Korea and USD 1.07 billion from the latter to the former. In 2013, the figures were USD 0.52 billion and 0.62 billion, respectively, summing up to USD 1.14 billion. And the trade through the Kaesong Industrial Complex amounted to USD 1.96 billion in 2012 and USD 11.3 billion in 2013, which means that "Inter-Korea Trade = Kaesong Industrial Complex." The share of Kaesong Industrial Complex was 56.0 percent in 2009, 75.5 percent in 2010, 99.1 percent in 2011, and 99.5 percent in 2012 displaying a continuous rapid rise. Even in 2013, when the Kaesong Industrial Complex was in jeopardy of a complete shutdown, the share was 99.7 percent. This trend implies that after imposing the '24th May Measures', the inter-Korean trade has been practically equal to the Kaesong Industrial Complex. As confirmed by Figure 4.3, the share, as well as the amount of transaction through the Kaesong Industrial Complex has been rising every year. Even after the imposition of the '24th May Measures', the transaction volume reached USD 1.44 billion in 2010, USD 1.70 billion in 2011, and USD 1.96 billion in 2012, showing a steadily increasing trend. On average, between 2008 and 2012, the trade excluding the Kaesong Industrial Complex has decreased by 44.9 percent each year, whereas the transaction through the Kaesong Industrial Complex has increased by 37.3 percent each year. Such trend stopped in 2013, when the Kaesong Industrial Complex was closed down for 166 days, cutting the trade almost in half. As a matter of fact, with general trade and processing-on-commission trade broken off, the imbalanced structure of inter-Korean trade has worsened with increasing dependency on the Kaesong Industrial Complex. The main commodities traded from South Korea to North Korea were fabrics and electronic products which amounted to 60.8 percent; they were also the main commodities traded from North Korea to South Korea, reaching 72.0 percent of the total trade.⁶³



Figure 4.3: Annual Amount of Inter-Korea Trade

Source: Ministry of Unification

As Figure 4.3 clearly shows, the inter-Korea trade was halved in 2013 compared to 2012. It is more shocking that the trade through Kaesong Industrial Complex was hit, when it had been increasing very year until 2012 unlike general trade and processing-on-commission trade that were practically nil after the '24th May Measures' was imposed in 2010. However, after the complex has started to resume in September, the monthly trade volume gradually has regressed to the monthly average volume in 2012 (approximately USD 164 million).

63. Institute for International Trade (2014).

Table 4.5: Monthly Inter-Korea Trade within the Kaesong Industrial Complex in 2013

Year /	Month	Inbound	Outbound	Total
2012	Monthly Average	89,496	74,763	164,259
	January	95,197	85,432	180,629
	February	91,639	71,731	163,370
	March	112,620	79,396	192,016
	April	14,349	5,940	20,289
	Мау	62	461	523
	June	10	13	23
2013	July	41,236	405	41,641
	August	543	4,937	5,480
	September	16,523	35,210	51,733
	October	69,505	82,511	152,016
	November	79,184	76,298	155,029
	December	94,374	78,269	172,642
	Total	615,243	520,603	1,135,846

Source: Ministry of Unification

Raw materials (39.7% of total outbound) and capital goods (25.3% of total outbound) were exported to North Korea. On the other hand, consumption goods (44.0% of total inbound) were imported from North Korea. Fibers (MTI44) were the most inbounded items (43.5%), followed by electronic parts and components (15.7%). Of the outbound items, textile fabrics (29.5%) and electronic parts and components (8.5%) had the highest shares.

(Unit: thousand USD, %)

Evaluation and Prospects

In early 2013, the North Korean authorities attempted to 'diversify trading channels', but ended up depending even more on China. They proposed 'diversification of the export goods', left only to observe the highest share of natural resources as their main exports. They pledged to promote more foreign investment by improving 'institutional and policy support', but it was themselves that introduced obstacles to investment in the form of political uncertainties. The inter-Korea trade through the Kaesong Industrial Complex also took a step backward, as it was temporarily closed down. In short, this year can be evaluated as the year in which the structural weakness of the North Korea's external trade was worsened.

The bigger concern for North Korea is that the environment surrounding North Korea is becoming worse, regardless of North Korea's policy capability and will. North Korea expressed clearly that Jang Song-thaek was found guilty of "selling coal and other precious underground resources at random" and "treason of selling Rajin-Sonbong Special Economic Zone at 'dirt-cheap price'". This is opposed to the basic economic theme of the North Korea's external trade, which are the acquisition of foreign currencies through natural resource exports and the promotion of foreign investment through 'Special Economic Zone' and 'Economic Development Zone'. Thus, there could be a problem with the acquisition of foreign reserve currencies. In order to take a view of North Korea's external economy in 2014, the main channels for acquisition of currencies such as natural resource export, promotion of foreign investment and export of labor force should be closely examined.

Exports of anthracite and iron ore are likely to stagnate or decrease in the future. During the time span between 2010 and 2013, anthracite and iron

ore were sold, respectively, USD 10.50 and USD 39.60 lower than the international prices.^{64,65} It is uncertain whether demand from the Chinese side would remain the same if the natural resources are not sold at 'dirt-cheap price'. Also, the excessive exploitation has led to a decline in the quality of natural resources, which would decrease demand for North Korean exports.⁶⁶ Secondly, promoting foreign investment through 'Special Economic Zone' would also be difficult. The most important element in promoting foreign investment is eliminating uncertainty. Aside from the political uncertainty attributed to the nuclear test and execution of Jang Song-thaek, there is uncertainty regarding the basic investment environment, as the Egyptian telecommunications company failed to remit USD 400 million to Egypt due to the restrictions imposed by the North Korean authorities.⁶⁷ In such circumstances, the promotion of foreign investment would be difficult. Thirdly, North Korea recently has acquired large amounts of remittance through export of workers. As it is expected to be difficult to acquire foreign currencies from other channels, the North Korean authorities are likely to export more workers to foreign countries. In fact, the North Korean labor force in foreign countries are estimated to be approximately 65,000 in 40 different countries and their annual remittances are estimated to be USD 150 to 230 million.⁶⁸ The figure is likely to increase in 2014.

- 64. Average monthly price of anthracite (2010~2013): export price to China (90.14 USD/ton), international price (100.68 USD/ton).
- 65. Average monthly price of iron ore (2010~2013): export price to China (104.96 USD/ton), international price (144.56 USD/ton).
- 66. Yonhap News, "Decline in quality of North Korean Anthracite ... Warning within the Chinese Firms" (in Korean), July 12, 2013.
- 67. Chosun Ilbo, *"The Egyptian telecommunications company failed to remit 400 million USD in North Korea"* (in Korean), January 23 2014.
- 68. North Korea Strategy Center and Korea Policy Research Center(2012), 18.

Kim Jong-un emphasized solving internal problems such as remedying the shortage of food through agriculture and fishery in his new year address. He said, "All the energy should be focused on farming in order to build economy and improve people's lives".⁶⁹ It is a more passive address than the year before, when he emphasized that "agriculture and light industry are the main force of building economy". Overall in 2014, the external trade of North Korea would show only an insignificant change such as expansion of fishery and underground resources other than anthracite and iron ore exports and it is not expected to progress drastically.

69. Cheong(2014).

Chapter 5 Lessons for Rajin Special Economic Zone: The Shenzhen Experience

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The end of 1978 marked a turning point in China as the 11th Central Committee of the Communist Party's Third Plenary Session called for a broad sweeping reform. The goal was to promote development through innovation and investment. The first step towards achieving this goal was the establishment of the "Special Economic Zone (SEZ) in the Guangdong Province" as mandated by the Fifth Chinese People's Congress Standing Committee.⁷⁰ The central government specified four pillars for invigorating the newly established SEZ: 1) foreign funds; 2) foreign-domestic joint ventures and foreign owned enterprises; 3) export oriented manufacturing; 4) continuation of socialist market principles.

Thirty three years since the initial implementation of above reforms, Shenzhen has grown into one of the most vibrant southeast coastal cities populated by over 10 million. In 2012, Shenzhen's GDP per capita was about RMB

Part III A Path Forward: Special Economic Zones

Chapter 5

Lessons for Rajin Special Economic Zone: The Shenzhen Experience

Im Geum-Suk

Chapter 6

Modes of Cooperation for China and North Korea

Li Zhonglin

^{70.} The SEZ covers approximately 327.5 square kilometers, spanning 49 kilometers east-west and 7 kilometers north-south.

^{71.} As late as 1979, Shenzhen was only a small fishing village in Guangdong. The total area spanning 2,020 square kilometers was populated by only about 70,000 people, 80 percent of who were occupied in farming and fishing industries. Manufacturing was meager with most of it concentrated around the 27 agricultural and seafood processing plants owned by local state-owned enterprises. There was a handful of two to three-story buildings in the downtown area.

Construction

During the early stage of infrastructure development, Shenzhen SEZ suffered from severe power shortage. Companies found normal day-to-day operation difficult given the alternating supply schedule consisting of "3-day supply and 1 day outage." To address this problem, the Chinese government began to construct a 1.8 million kilowatt (kw) nuclear power plants in the Dapeung Peninsula during the mid-80's. Most of this project was seen through its completion by 1992. Power outage was no longer an issue.

In order to expand port traffic, ports in Shekou (蛇口) and the Chiwan (赤 湾) were constructed during the 1980s to handle 10,000 and 5,000 tons of freight (respectively). Construction of Yantian (塩田) was completed in 1989 to manage10 million tons of cargo. 1 billion won was also invested in the construction of an international airport during the early 1980s in the west Boanhyeon area.⁷² Highway that connects Shenzhen to Guangzhou was completed in 1992 followed by another set of highway during the mid-1990s that connects Shenzhen to Shantou (汕头), Huizhou, and Dongguan (东莞).

The City of Shenzhen used various means from bank loans to private foreign and domestic capital totaling approximately 6 billion won to finance infrastructure projects. This effort led to the development of a modern system of roads, plumbing, power supply, communication, sanitation, heating and land survey spanning an area of about 40 square kilometers. Five industrial areas, including Luohu (罗湖), Sangpbu (上埗), Shekou (蛇口), were also established. The massive overhaul led to the construction of 115 roads (total length 100

13,000 and its total trade was USD 466.7 billion.⁷¹

Following in its neighbor's footsteps, North Korea has moved to establish a SEZ of its own in the city of Rajin in the North Ham-Gyong Province in conjunction with the UNDP's Tumen River Development Project also known as the Greater Tumen Initiative (TRADP/GTI) during the early 1990s. The goal of the TRADP/GTI was to convert the border region into a regional hub for freight relay, trade, export processing, tourism, and finance. This plan, however, stalled as a result of weak infrastructure, underdevelopment, rigid regulatory structure, and deteriorating conditions in the global political environment. China has announced that it will forge ahead in its commitment to develop the Tumen region and North Korea has begun implementing a new set of policies. Currently, China and North Korea maintain that the project is built on the principles of "joint development" and "joint management." Indeed, there are many parallels between the two SEZs in Rajin and Shenzhen. In this section, we look to the experiences of the Shenzhen SEZ to draw lessons for the Rajin project.

Infrastructure Development

China during the 1980s was in the midst of recovery from the aftermath of the Cultural Revolution. The government saw large scale investment as a key to jump start the economy in Shenzhen. Infrastructure was the top policy agenda. When we examine the investment portfolio for infrastructure projects during the early 1980s, central bank loans accounted for 36 percent, public financing by the local government made up 27.5 percent, and foreign investment was responsible for 24.3 percent.

^{72.} The 110 square kilometer airport coasts a runway length of 3400 meters with an annual passenger capacity of 20 million and supported direct flights to over 29 international destinations.

km), renovation of the Luohu Railway Station and completion of the electrical railway system linking Shenzhen to Guangzhou. Foreign capital was instrumental in establishing a direct-dial phone line between Hong Kong and Shenzhen.

Financing

Domestic Sources

Local banks played a critical role in raising funds for infrastructure projects in Shenzhen SEZ. One byproduct of this development has been a sharp uptick in the number of local bank branches from 20 in 1979 to 175 by 1985. Trust and insurance companies increased from zero to 28 while the number of workers increased from 400 to 3,000 during the same period. In 1985 alone, local banks in Shenzhen city were able to attract over RMB 502 million worth of investment from the surrounding Heilongjiang and Xinjiang Autonomous Region.

Foreign Banks

In April 1985, the government enacted "the SEZ Foreign Banks and Sino-Foreign Joint Venture Bank Management Regulations." Fourteen foreign banks, including the HSBC, BNP Paribas of France, GMS Bank, and the Bank of Switzerland, were invited to contribute investment capital for Shenzhen SEZ.

Public Finance

There are three elements in the government's public financing strategy for the Shenzhen SEZ. First is the reliance on local regional banks. Shenzhen Finance Bureau in conjunction with the Shenzhen branch of the Bank of China jointly established the Shenzhen Special Zone Development Bank. Making use of rural credit companies, the government also modeled the Shenzhen City Joint Bank under the existing collective ownership system. Finally, the Shenzhen International Trust and Investment Corporation and the Shenzhen Insurance Corporation were established.

Second set of measures include the use of land leases. The Shenzhen municipal government made renewable leases based on use: 30 years for industry, 50 years for commercial residential properties, 50 years for education, science, and health, 30 years for travel, and 20 years for agriculture and livestock. The lease was paid in lump sum or split into two years of equal payment with an interest rate of 8 percent. Adjustment in the lease was possible after three years with the increase capped at 30 percent.

Third area is in public financing for the tertiary sector. The municipal government sought to take advantage of the SEZ location to develop the tourism industry. In 1980, Shenzhen SEZ had more than 70,000 tourists. Tourism receipts amounted to RMB 300 thousand and tourism revenue was nearly 1 million won. In 1984, the number of tourists to Shenzhen rose to 3.3 million with the ratio of domestic to foreign visitors being 50:50. Commercial revenue was 280 million won with a profit of about 30 million won. In short, the tourism industry was growing very rapidly and it was one of the major sources of foreign capital for investment in infrastructure.

In order to expand tourism, the government promoted various joint venture schemes which involved two or more foreign and domestic partners. These partnerships often consisted of the Chinese companies supplying the land and foreign companies contributing the cash capital. Profit sharing ratio was set at 3:7 or 2:8 in favor of foreign companies for 10-20 years, after which the asset is turned over to the Chinese partner. Up until 1984, much of the investment for development of the tourism industry in Shenzhen was fueled by funds from Hong Kong.

The growth of tourism also had positive spillover effect on other sectors of the economy, including the retail restaurant and hospitality industry. According to the official data, the number of stores in Shenzhen increased by a factor of 30 between 1979 and 1984 with more than 200 restaurants serving over 20,000 customers daily. Growth of the retail sector also led to a rise in tax revenue for the local government.

Finally, the Shenzhen municipal government was also able to rely on increased agricultural exports to Hong Kong and the surrounding areas. In short, Shenzhen SEZ made use of various measures to raise capital.

Lessons for Infrastructure Development in Rajin SEZ

Given above experiences in Shenzhen, is there any lesson for Rajin? The current system of roads, railways, ports, electricity, water, sewage, and communications infrastructure in the Rajin SEZ are very outdated. In particular, Rajin needs significant investment in roads and railways to enable long distance travel. This includes rebuilding the railways connecting Hunchun to Rajin (122km), Tumen to Rajin (158.8km), and Tumen to Chongjin (171.1km). Expansion of the port in Rajin along with the construction of an international airport as well as improvements to other areas will require significant capital investment.

From what we can tell, the promotion of infrastructure development in Ra-

jin is likely to progress with much of the capital investment coming from the Chinese government and private corporate stakeholders. China's interest in Rajin lies in the access to the port of Rajin and the sea lanes in the Pacific. The Chinese government is likely to utilize joint partnerships to attract capital investment to the area. Jilin Provincial government was pivotal in securing the funds to complete the road construction between Hunchun and Rajin. Security for Rajin Pier 1 was also made possible with investment from Chuangli Group in China. China is planning a large scale investment project for rail and road construction in 2016-2020. Investment for the railway and port construction is likely to be led by the Janghang Sino Group/Sino Trans & CSC Holdings (Zhong Guo Wai Yun Changhang Jituan You Xian Gong Si) (中 国外运长航集团有限公司) and the Hong Kong Merchant Group (香港招商局集团).

Second, the newly revised Rajin Economic Trade Property Act states in Article 13 that: "property development in the Economic and Trade Zone will be managed by a corporation; the method of management including construction of infrastructure and public facilities will depend on licensing requirements and negotiations between those responsible for handling this development process." In other words, the government is willing to trade off property right for development of public infrastructure. Not only is this a preferred mode of operation for companies but this method is likely to have the greatest impact in the short run.

Similar to Shenzhen, the government is also seeking to raise capital through tourism promotion. Tourism marketing in China was launched as early as 2010. Leased Singaporean cruise ships have been used to promote Mt. Keumkang tour along with other tour packages that includes rail travel to Mt. Chilbo, three city (Hunchun-Rajin-Vladivostok) tour, car rental deals in Rajin, among others. There are other areas in need of improvement such as hotels, restaurants, and other facilities if tourism is to be an integral part of the Rajin SEZ development.

One last possible source of capital is international development funds. The role of international organization cannot be downplayed for the successful take-off of the SEZ. The Vietnam case illustrates how normalized relations with the international community during the early 1990s can lead to influx of international aid. The total amount of aid that Vietnam was able to attract is comparable to about 3 to 5 percent of its Gross National Income (GNI).

If North Korea is to join the international financial institutions such as the IMF, World Bank or Asia Development Bank (ADB), it would have access to funds for Poverty Reduction and Growth Facilities (PRGF) as well as the International Development Association (IDA), and the Asian Development Fund (ADF). Eligibility to these funds are conditional on North Korea's standing with the international community or membership to one or more of these organizations.

Of the three organizations, the most promising option may be the ADB. Most recently, several Southeast Asian countries have successfully secured funds from the ADB to embark on a large scale infrastructure development project. During 2012-2014, ADB planned on investing a total of USD 3.9 billion into 18 development projects related to the Greater Mekong Subregion (GMS). However, North Korea will need support from major players in the region, like China, Russia, and South Korea, to not only secure its membership and access to these funds but also to see through the execution of the loan program. Obviously, all of this is contingent upon the resolution of the North Korean nuclear issue.

Case of Economic Reform in Shenzhen SEZ

Shenzhen SEZ was a field case experiment for national reform in China. As the discussion in this section will show, Shenzhen SEZ is the product of careful planning and systematic reforms on property rights, labor market, infrastructure, financial system, and fiscal policy. Together with broader policy of open market reform, these policies played an integral role in propelling the economic miracle in Shenzhen.

Property Rights

One way that the Chinese government sought to introduce the concept of private property right without compromising the notion of "socialist public ownership" or "collective ownership" is by making use of (domestic-foreign) joint ventures and foreign direct investments within the SEZ. Nonetheless, the SEZ was mainly focused on export industries driven by joint ventures and foreign enterprises that depended on market mechanisms. In other words, manufacturing and distribution within the SEZ followed market principles rather than central planning. This led to the expansion of the manufacturing and retail sectors which in turn contributed to the establishment of a vibrant market.

Human Resource

The key area of labor market reform was in the cadre personnel system. A large number of high quality public sector employees flocked to the SEZ during the initial stage of its development. The government did not shy away from making use of the national labor pool to address labor needs. From 1980 to 1984 more than 12,000 professionals (accounting for about 28.7

percent of Shenzhen SEZ) from across the country had been invited for a position in Shenzhen SEZ. Private companies also moved away from the national labor appointment system to one based more on private/merit based selection process. Permanent employment system was replaced with fixed contract based hiring.

Prior to the open market reforms, fixed wage system was the dominant form of compensation in China. Naturally, labor productivity was low. Workers gained greater appetite for raising their productivity when flexible wage system was introduced. This type of merit-based wage scheme was first introduced by 40 foreign funded firms in Shenzhen SEZ during 1980 before it began to take root in state owned enterprises across the rest of the country.

Other types of human resource practices including fluctuating wage scheme as well as productivity or skill-based employment were also introduced. In order to deal with the possible rise in costs associated with labor displacement, the government also enacted the "Social Labor Insurance Ordinance" in November 1983, which mandated that foreign owned enterprises and domestic firms should each contribute 25 percent and 20 percent (respectively) to the workers insurance fund. All work on the unemployment insurance is to be managed by the labor service center.

Competitive Bids on Public Construction Projects

The government decisively made a shift away from the top down control over the urban construction projects to one that depended more heavily on a competitive bid by private contractors as of 1982. What this meant was that public spending on construction was bound to be more efficient. One illustrative example is the decision to not have the government sponsored company execute the construction of the 20 story Shenzhen International Commercial Building for RMB 580 per square meter over a 2 year period but to find a better offer through a more competitive bidding process. The First Metallurgical Construction Company submitted a bid for RMB 398 per square meter subject to a completion date of 1.5 years. This move resulted in a total savings of about 9.4 million Yuan.

Market Price

Except for the key strategic commodities, the market was left to set the price for generic products in Shenzhen SEZ. Market price was first introduced for 90 percent of all agricultural goods and building materials. This move proved useful during the initial stage of SEZ development since the market price effectively lowered the cost of large scale construction projects. To manage the possible impact that the sudden shift could have on inflation, the price of essential industrial goods were allowed to fluctuate within a predetermined price band.

Lessons for Rajin SEZ

Institutions are critical to the success of the SEZ and market reforms. That is, successful development of the SEZ would not have been possible without the right institutions to make sure that the introduction of foreign capital and technology would have a lasting impact. Shenzhen SEZ was a critical test bed for making sure that the transition from planned economy to a market oriented one is successful in China. Reform of existing governmental institution was also critical for mitigating the unintended consequences of wholesale systemic reform. There are signs of noticeable change in the Rajin SEZ as of 2010. First and foremost, North Korea moved away from a pricing system that relied on ration to the market. Market price is being implemented on consumer goods as well as productive input within the Rajin SEZ. This is a marked departure from past practice and the rest of the North Korean economy.

With regards to the employment standards for corporations in the SEZ, the revised Rajin Economic Trade Act of 2012 states in Article 40 that "companies in SEZs will have the sole right to determine management, business practice and standards, production planning, sales planning, financial planning, employment standards, wage and compensation, price of products, and allocation of profits." What this means, of course, is that companies with foreign investment should have the sole right to determine salaries. However, hiring decision still remains under the control of national government and compensation still cannot be made directly to the workers.

The North Korean government is moving to concentrate the skilled labor pool in the Rajin SEZ while dispatching officials to China so that they can gain a better understanding about how market policies are being handled in the mainland. However, because North Korea has many restrictions on the movement of people within the country, there are structural limitations to efficient allocation of talented labor.

Reform of property ownership is in desperate need. Aside from foreign corporations, North Korea needs homegrown entrepreneurial capacity. In other words, there needs to be a movement away from the notion of state and collective ownership towards the establishment of an entrepreneurial milieu. To do this, the government should permit and encourage the incorporation of private businesses.

Lessons from the Chinese Model of "wai yin nei lian (外引内联)" - Outer Reliance and Internal Strengthening

The Shenzhen SEZ project was part of a broader development plan to attract foreign capital as well as introduce advanced management techniques and technology. The principle of outer reliance and internal strengthening was central to this development strategy. The discussion in this section is devoted to the discussion of this ideal and its relations to the reforms discussed above.

Strategy of Outer Reliance, wai yin (外引)

Outer reliance refers to the introduction of foreign capital and technology. During the early stage of SEZ development, there was skepticism and speculation about the value and risk of outer reliance. This view was tempered by the reality of san lai yi bu (三来一补) which referred to the three types of exports that can be produced in SEZ: processed raw materials and components, customized manufacturing, and export assembly. There are other means by which foreign investors can transfer production technology and skills to a Chinese corporation.

Strategy of Inner Strengthening, nei lian (内联)

Inner strengthening refers to linkages established among domestic companies. This is an important dimension to the development of SEZs. Without horizontal and vertical linkages to the domestic economy, the influx of foreign direct investments cannot have lasting impact. Managers and technicians working in companies operating in SEZs should acquire the skills to handle new technology and management know-hows. The skill and knowledge transfer will prove instrumental in the establishment of domestic enterprises that in turn will ultimately lead to more jobs and higher income. In this regard, SEZ can be seen as a bridge between domestic and international economy.

Cooperation among domestic firms is critical to economic development and continued influx of foreign investment. While vibrant, SEZ has limited resources and manpower; the same was not true of the mainland. Accordingly, cooperation among firms in the SEZ and non-SEZ mainland allowed for sustained growth and development. An illustration of this kind of symbiosis can be found in the partnerships that emerged among the Shenzhen textile companies and firms in Shanghai and Hong Kong during the 1980s.

Early in the reform process, China's domestic companies also made use of the SEZ to acquire foreign technology and management methods. Domestic firms were also allowed to take advantage of the location and preferential treatment that comes with operating in the SEZ to increase exports and profits and thereby promote national development. In other words, cooperation between foreign and domestic firms can be a source of development not only for the SEZ but also the broader economy.

The structural linkage between Shenzhen SEZ and domestic economy was established over time through carefully planned moves. In the first stage, which began in the first half of 1979 and lasted till 1981, the joint ventures typically focused on small commercial, catering, construction companies. During the second stage which began in earnest from the second half of 1981 until 1982, the linkage between domestic and foreign firms was greatly expanded to cover a full range of companies in other sectors. The third stage began as of May 1983 with the creation of "the conference of national coalition," which allowed joint venture firms to receive preferential treatment on land royalties as well as taxes and export licensing. Domestic firms were able to take advantage of additional benefits. For instance, the corporate tax for domestic firms in SEZ was set at 15 percent which was comparably lower than the 33 percent that companies in other regions had to pay. Foreign reserve was also capped at a much higher rate of 90 percent. As a result of these measures, the number of firms in the SEZ increased to 39,000 by 1989, accounting for 36 percent of the total industrial output value as well as 35 percent of all exports in the SEZ. In short, these companies played an important role in Shenzhen.

Business operations in the SEZs can take root in one of three ways: one way is by having the special district and other local governments establish a joint venture company; another is by having the firms in the SEZ, non-SEZ mainland, and foreign companies form one; finally, the last method involves individuals or domestic companies establishing a corporate entity within the SEZ. In general, the SEZ provides the land and the firms provide the funds and the technology as well as resources. Profits are shared.

Unfinished Work in the Rajin SEZ

In 2012, newly revised "Rajin Economic Trade Zone Law" permitted economic cooperation between companies within and outside of the SEZ. Article 43 ("Economic Cooperation among Companies Outside of the Zone") states that "the companies may sign a contract in order to acquire resources and materials from other countries for the purpose of managing the company. Government organizations, companies, and [non-governmental] organizations can produce, process or package raw materials." Article 48 ("Economic and Trade Zone Product Purchase") states that "firms and organizations can sign contracts with domestic institutions, enterprises and organizations to produce, sell, and manufacture products in the SEZ." This means that companies in the SEZ can purchase and acquire raw materials from outside the zone as well as subcontract part of the production to firms outside of the zone but there is no provision that permits companies or firms from outside the zone to invest and engage in economic activities within the zone.

Taking some lessons from China's SEZ, North Korea might consider establishing linkages between firms in and out of the SEZ. There needs to be a realization within the hierarchy that the introduction of foreign capital is critical to the SEZ but the participation of domestic capital is also important.

Conclusion

North Korea seeks to achieve greatness through the development and vitalization of the Rajin SEZ. China also seeks to use the Rajin SEZ as a tool for promoting the Tumen River Development project. China hopes to have completed the infrastructure development in Rajin by 2015/16.

At the moment, the Rajin SEZ shares many similarities with China's Shenzhen SEZ of the 1980s. Expansion of infrastructure and manufacturing as well as the development of service and manufacturing are urgently needed. The experience and lessons from the Shenzhen SEZ will be useful for the development and construction of the Rajin SEZ.

Chapter 6 Modes of Cooperation for China and North Korea

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China's economic takeoff is having a major impact on North Korea and this trend is not likely to change any time soon for at least the following three reasons: first, North Korea has much to gain from its economic relations with China. Provided that the nuclear issue is not resolved any time soon, international sanctions will remain in place and North Korea will continue its reliance on China. In short, if there is economic recovery in North Korea, it will be because of its cooperation with China.

Secondly, the linkage between China and North Korea has a deep structural dimension. More than 80 percent of the goods circulating in North Korea are from China. This implies that China is a major source of basic consumer goods sold in the North Korean market. Expanding trade relations between China and North Korea can instill a broader desire for reform in Pyongyang. The spillover effect from increasing cooperation between firms in North Korea and China can also serve to increase efficiency and competitiveness of the North Korean economy.

Thirdly, the spillover effect is not restricted to markets and firms. Human resource development is another important part of this story. China is the only country with which North Korea has maintained amiable relations in the post-Cold War era. North Korea often dispatches workers to China or invites Chinese experts to educate or train North Korean workers. Chinese universities in Peking, Jilin, Nankai, Liaoning, and Yanbian have often been asked to train and educate North Korean students and government employees.

Given China's influence over North Korea, the discussion in this section will consider how this dependence will persist into the future. In short, we attempt to make a broad macro comparison of the Tumen River Development Program or Greater Tumen Initiative (TRADP/GTI) and the Changjitu Development Project.

UNDP's TRADP/GTI

The UN Development Program's (UNDP) TRADP/GTI is an ambitious multilateral undertaking to develop the Tumen river region. The project failed to meet initial targets due to the complex geopolitical context in Northeast Asia as well as the wide socio-economic gap among cooperating nations. There are some silver linings to point out, however. Economic relations between North Korea and China were much improved while basic infrastructure (i.e. rail, road, airport, customs, and port) in the Tumen River region experienced radical change and development.

Achievements of TRADP/GTI

The geographical starting point of the TRADP was Hunchun, Yanbian. The main objective of TRADP was to establish a port, inject new capital, and invest in human capital. In promoting these objectives, China along with Russia moved to sign a formal lease agreement with North Korea to develop and

utilize the port in Rajin. China's State Council also chose Hunchun city as one of the first open border cities vis-à-vis North Korea. Surprisingly, North Korea actively supported the TRADP, abolishing the long-lasting closed door policy and declared the Rajin-Sonbong area as a free economic and trade zone (FETZ) in December 1992. In 1990, Russia also implemented the "Vladivostok Plan" and "Primorsky Krai Plan," establishing its own FETZ and opened ports in far eastern area, including Siberia, Sakhalin, Nakhodka, and Vladivostok.

Border Economic Development Zone in Hunchun was already equipped with some basic social infrastructure, such as bonded warehouses, frontier trade markets, modernized plant facilities, recreational facilities, schools, and studio apartments. But as other components such as energy, transportation, communication, and internet were added to these facilities, the investment climate in the downstream region of Tumen River experienced considerable change. North Korea also expanded its investment in the Rajin-Sonbong SEZ, trying to update basic infrastructure including the railway, road, port and communication facilities.

In July 1994, the Russian government ratified the construction of railroads connecting Hunchun to Makhalino by October 1997. As part of the Vladivostok Plan, the Russian government also sought to build a new highway between Vladivostok and Hunchun. The Tumen River area was to be the connecting base for the Asia-Pacific and continental Europe.

Tourism was also an important component for attracting the much-needed capital for the TRADP/GTI. Currently, there are different tour packages in China and North Korea that includes stopovers in Hunchun–Rason, Heilong–Sanchi Lake–Mt. Baektu, Heilong–Sanchi Lake–Pyongyang–Mt. Baektu, and Longjing–Chongjin–Mt. Chilbo. For tours in China and Russia, Hunchun–Vladivostok

is quite popular as are Hunchun–Slavyanka, Hunchun–Vladivostok–Moscow, Hunchun—Zarubino/Posyet.

The shipping industry in Yanbian also quickly began to take shape. The long run plan is to develop the ports in Rajin and Zarubino as well as Posyet to link the economy around the Tumen River region to South Korea, Japan, and the US. As the first step in this process, the ferry route through Hunchun-Zarubino–Sokcho was opened for operation in April 2000 by the Dongchun Transportation Service.

Limitations of TRADP/GTI

The guiding principle and goals of the UNDP's TRADP/GTI are impressive; however, the project has been a failure for several reasons. One has to do with the unstable political condition in Northeast Asia. North Korea's nuclear weapons program has been a major source of tension in the region ever since the 1990s. This issue not only prevented cooperation among interested parties but also discouraged foreign investment.

Institutional differences among TRADP/GTI participating nations also hindered cooperation in that they were the source of distraction from coordinated policy formation and implementation.

One of the major weaknesses (and also strength) of the TRADP/GTI was that it was focused on the border area. While the program was designed to take advantage of the cooperating countries' relative strengths, border security got in the way of program implementation. Due to the fact that the local government had limited jurisdiction over these matters, there were delays and often difficulties in the implementation of planned changes. Finally, the capital needed to successfully implement the TRADP/GTI was in severe shortage. The main reason for this was the lack of a strong market base. The regional economy lacked the scale to attract enough capital investment for infrastructure development. Lack of a strong local economy also served to discourage foreign investors from placing their bets on the success of the TRADP/GTI.

The Changjitu Project

Background

The Chinese government began the new millennium with a plan to modernize the old northeastern industrial base. The goal was to further strengthen the market economy through reform of the state enterprises located in three northeastern provinces: Heilongjang, Jilin, and Liaoning. The project, which began in 2003, successfully completed its first phase in 2008.

The second stage involves declaring the northeastern region as a new growth hub for China through the announcement of "the State Council's Plan to Promote the Old Northeast Industrial Base" (in September 2009). The focus turned from reform of state owned enterprise (SOE) to periphery (or rural) development. In July 2009, the state council ratified plans to develop the Liaoning coastal areas and Shenyang. Earlier in January 2008, the state council also announced plans for developing the Guangxi Beibu Gulf Economic Zone (BGEZ), which effectively became a stepping stone for increasing China's involvement in the ASEAN. The Russian government responded by announcing its intention to invest USD 23 billion to its eastern region, creating a favorable condition for the TRADP/GTI. During the 1980s, China's development planning was directed toward the Southern coastal area, focusing on the Pearl River Delta. The Chinese government was focused largely on the Shanghai Pudong, Yangtze River area during the 1990s and Tianjin Binhai-Bohai Bay area during the 2000s. As of 2010, the focus has been on the northeast. The development strategy for the old northeast industrial base has been switched from SOE reform to local development, designating three growth hubs in Liaoning, Changjitu, and Shenyang. Due to large differences in domestic and international environment, the state council drafted "the Outline for the Tumen area's Cooperative Development Plan" in August 2009 and approved it in November 2009.

Differences between the Changjitu Project and UNDP's TRADP/GTI

The key difference in the Changjitu and TRADP/GTI is the involvement of the Chinese government. The Chinese government is the central driving force behind the Changjitu Project with regards to investment and execution whereas the TRADP/GTI is a multilateral effort involving an international organization.

Secondly, the investment climate is different. One of the critical requirements of the Changjitu Project was outside investment. The UNDP planned to attract USD 30 billion to finance its project, but this became difficult due to the elevated political risks in Northeast Asia. The Chinese government was also not interested in absorbing these risks even if the long run expected payoff was large.

Finally, the Changitu Project requires bilateral cooperation while GTI is more multilateral. The cost for cooperation in bilateral setting is significantly lower than in a multilateral context – especially when variance among participat-

ing economies is large.

The Changjitu Plan

In the "Outline" for development, the Changjitu Project aims to connect and open China's northeastern region, assigning Hunchun to be the center, Yanji-Longjing-Tumen as outposts, and Changchun-Jilin as the window. More specifically, the Chinese government plans to completely open its northeast area as well as Jilin province through capital inducement from South Korea and Japan while encouraging regional interchanges among the coastal and inland areas. Easier access to Harbin, Daqing, Qiqihar, Liaoning, Heilongjiang and inner Mongolia would be necessary in order to deepen the process of industrial development in this area.

Tumen River region is considered to have high growth potential. The key to this region is Jilin province which connects the Yanbian Autonomous Region with Changchun and Jilin city. If seen through its completion, the development of this region will allow Hunchun to be the pivot for Changchun and Jilin. There is also the added leverage gained from the connection between Harbin and Dalian. Infrastructure and industrial development will facilitate the connection to the inner northern country and the eastern border of the Tumen river region.

The "Project Plan" identifies eight programs, first of which seeks to establish free trade zone in Tumen River region. The goal is to expand trade with South Korea, China, Japan and Russia. Second project seeks to establish open ports in Changchun and Jilin. In doing so, the planners look to create a northeast regional hub for customs, quarantine, border screening and facilities in Changchun and Jilin. The third project seeks to establish a Science Technology Development Zone (STDZ). The center of this STDZ will be Changchun where Bio-information Industry Park and National Opto/electronic Industrial Base will be established to house Hi-Tech R&D firms and facilities. Fourth project seeks to establish joint venture industrial zones for bilateral partnerships with firms from Korea, Japan, and Russia. Fifth project looks to establish modernized distribution complex by building bonded processing, distribution, storage warehouse complex near Changchun Longjiang Airport, Yanji airport, and Fushun. Sixth project involves building an ecotourism district in the region. Seventh project seeks to establish advanced specialized service complex. Finally, the last project aims to modernize the agricultural system.

One critical dimension of the Changjitu Project is the Silk Road. Revival of this idea has implications for Changjitu as well as countries in the region and Europe. This dimension consists of two separate undertakings. One is the road and rail connection through Hunchun, North Korea, and Russia. The other is the connection between Aershan in Inner Mongolia to Wuwei. The starting point for this distribution channel is Rajin – making economic cooperation between China and North Korea a key to this undertaking.

North Korea-China Cooperation on the Changjitu Project

Bilateral Cooperation and Current Status

As of this point in time, the Changjitu Project has 200 shovel-ready programs in various sectors, such as energy, food and agriculture, automobile, petrochemical, tourism, bio-medicine, service, transport, steel, information technology, mineral, construction, among others. China and North Korea are poised to develop transportation and distribution channel in the Tumen region. Constructing distribution channel in Changjitu Project has two important implications. First, it establishes a robust connection between the inner Northeast China and the global market. Although it is one of the major urban centers in the northeast, Jilin's potential has yet to be realized largely due to poor infrastructure. Building Changchun and Jilin's industrial capacity and distribution capacity are important to remedy these shortcomings.

Second, Tumen River region will become the domestic trading post for Northeast China and Southern coastal region. China's southern coastal region maintains a high demand for goods produced in the northern region but this demand is tempered by relatively high cost of transportation. If connected, North Korean port of Rajin can significantly reduce the shipping fee. There are alternatives to Rajin, such as Russia's Zarubino; however, having alternative points of entry would reduce the risk arising from overdependence on a single port, especially when these ports are located in other countries. Of course, when those countries happen to be North Korea or Russia, there is an added incentive to rely on more than one point of entry. North Korea, for one, is a challenging case with international sanctions and friction with South Korea, Japan, and the US.

As mentioned above, however, North Korea looks to figure into China's northeast regional development strategy. Changjitu project is the platform to realize these goals. Five joint projects are underway in conjunction with the Changjitu Development Project: i) bridge between Wonjeong-ri and Rajin (started 6/9/2011); ii) ground tourism in Rajin SEZ; iii) Special Agricultural Science and Technology Zone; iv) development of shipping industry; and v) cement production (i. e. the Yatai Group).⁷³ The project to construct a special zone for agricultural science and technology has made some progress. Beidahuang group invested RMB 20 million in two collective farms in Rajin to cultivate rice and vegetables. Ground tourism is already well underway. As a part of domestic shipping industry project, 0.1 tons of coal has been shipped to Shanghai.

Bilateral economic cooperation for developing Rajin, Hwanguempyong and Wihwa Island received a boost when then-chief of the Central Administrative Department of the Korean Workers' Party, Jang Song-thaek visited China in August 2012. The purpose of his visit was to find a way to solidify bilateral economic cooperation and upgrade China-DPRK relations to the level of practical implementation. During the third meeting of China-DPRK Joint Steering Committee on Cooperation in Development and Management of the Rajin Economic and Trade Zone and the Hwanggumphyong and Wihwa Islands Economic Zone, the parties decided to establish management committees for each special zone. For Rajin, seven members were assigned in total, consisting of four Chinese and three North Koreans.⁷⁴ The ultimate goal of the agreement was to build an advanced manufacturing industrial complex, which would make Rajin SEZ the center of logistics and regional

73. The total cost of the bridge project is RMB 230 million. It was originally scheduled to be completed by 10/26/2011. New bus routes have been established between Hunchun and Rajin. This project also led to newly paved roads in and around Rajin, Sonbong, and Yanbian. The Yatai Group's project to produce 100 tons of cements was a part of "The Bilateral Agreement on Investment Cooperation of the Industrial Complex in Rajin SEZ" signed in August 2012 with Rajin City People's Council of North Korea. The 50 year agreement outlines plans for a complex that is 500,000 square meters, near Ungsang Port. Construction has been delayed due to lack of electricity in the city but will resume once China begins to provide supplemental power to the area.

74. A Chinese member took the chair and two North Korean members took the positions for deputy-chair and secretary. tourism. In the process, the two countries aim to develop industries for processing raw material, machineries, high-tech, light manufacturing, service, and modern agriculture.

On September 26, 2012 China and North Korea convened a conference in Beijing about investment opportunities in Rajin, Hwanggumphyong and Wihwa SEZ. About 200 firms and commercial unions participated in this meeting. Rajin encourages investment through preferential policies on tax, property lease, and repayment. Minimum wage was set at EUR 30 a month and both RMB and North Korean Won are accepted. Investments have been made in about 50 areas including mining, metal processing, railway, machinery equipments, factories, and textiles, among others.

Out of the total 470 square kilometers of the joint development area, only 30 square kilometers is to be developed under the six projects. Supplemental power is to be supplied through the expansion of the Datang Hunchun Power Plant Unit 3. Chinese electric utilities are cooperating with North Korean government to complete the construction, which is expected to be finished by 2014.

There are two additional projects: Domun – Rajin Railway project and Quanhe Wonjong Border Bridge Construction. The latter is funded by China Road and Bridge Corporation. Musan iron-ore mine development is also included in the mix, though it is outside of the Rajin SEZ. Regarding port development in Rajin, currently China has the rights to use Piers 1 and 2 and is to build additional Piers 4, 5 and 6 for use over the coming 50 years. Russia rents Pier 3 for 49 years in exchange of its investment of USD 180 million made in 2008. The last project involves infrastructure development in the SEZ, which attracted joint investment of 3 billion won. Under the agreement, China is set to oversee the construction of a 55 square meter long railway linking Domun and Rajin as well as airfields and thermoelectric power plant.

DPRK intends to develop the zone as an international hub for logistics, shipping, trade, investment, finance, tourism and service. To achieve this goal, Pyongyang is trying to attract substantial amount of foreign investment in such areas as infrastructure construction, science and technology, energy, manufacturing, tourism, and agriculture.

Prospects of the Changjitu Development Zone

Changjitu development has the potential to leave a large footprint on neighboring economies. The impact would be considerable on DPRK as it can take advantage of the zone's access and abundant resources. Pyongyang would benefit from increased cooperation with China and Russia. The centrality of the Tumen River would allow DPRK to gain a geopolitical advantage since it would mean that DPRK would be an intermediate link to the region. China Jilin · Northeast Asia Investment and Trade Expo was convened in September 2010 to discuss practical matter such as infrastructure, tourism, customs, and shipping. China and North Korea signed an agreement to expand cooperation between the local governments in the region (i.e. Yanbian and Rajin).

The Changjitu development project has temporarily been stalled after China joined the international sanction against DPRK followed by its third nuclear test. However, this stoppage is expected to be temporarily and not expected to stay in place in the long run.

Conclusion

The concept of reform or change is likely to be a taboo in a country which has seen such little change since its founding. Nonetheless, the contributions within this report all suggest concrete recommendations as to what the stakeholders in North Korea might consider if they are looking to improve the livelihood of ordinary people in their country. In general, the policy suggestions all place primacy on the role of the North Korean state with emphasis on commitment to long term planning. We outline the key features of these recommendations below.

- 1. *Introduction of market incentives and resources.* Two essential elements with regards to the agricultural sector: 1) land tenure arrangements that provide returns for effort, encourage investments in rehabilitation of the soils and ecologically sound farming patterns; and 2) market structures that provide correct price signals for inputs and outputs.
- 2. *Decentralized production, marketing, and distribution.* For agriculture, this means giving farmers more discretion to select the type of crops they wish to cultivate and implementing a mixed production marketing and distribution system whereby farmers can sell to both government and individual consumers. Similar kind of arrangement can be utilized for inputs (i.e. seeds and fertilizers) where the sale of minimum required inputs can occur through state or cooperative outlets but farmers can access open markets to purchase additional inputs as needed. In the manufacturing sector, this means phasing in open market reforms through joint ventures and foreign investments.
- 3. *Focus on export oriented industrialization*. While North Korea may continue to maintain a small agricultural sector, it will inevitably require a larger commitment to developing the domestic industrial capacity. The focus should be on exports. Much of the decline in domestic food production can be managed through trade.
- 4. *Modernization of infrastructure and manufacturing capacity*. Introduction of automation and mechanization in all sectors of the economy. For the most part, basic infrastructure in North Korea is outdated. Lack of modernization in basic transportation, roads, and energy are critical for not only managing the development of the Special Economic Zones (SEZs) but also serve as an important basis for increasing the productive capacity in other sectors of the economy. Instead of taking on this task single-handedly, the government may benefit from introducing competitive bidding system on public construction projects.
- 5. *Diversification of trade partners and goods*. Manage the risks from overdependence on limited trade partner(s) and good(s) through increased diversification.
- 6. *Reduce geographic and institutional barriers to labor mobility.* One reason for the success of China's economic reform, for instance, was the ability to shift qualified workers to areas of the economy that was short on labor supply. Increased mobility proved crucial in allowing the input side of the economy to make quick adjustments to meet the productive demands.

While above measures are changes that North Korea may consider implementing on its own, there is some room for cross-border cooperation with external

actors.

- 7. *Capital investments and joint ventures*. As all of the contributors noted, initial capital for development of industrial capacity in North Korea will inevitably require foreign capital. While private investments can be drawn by preferential terms and conditions, North Korea may want to utilize joint ventures and/or assistance from international financial institutes, such as the World Bank or the Asian Development Bank, to reinforce its own public financing.
- 8. *Investments in research and development (R&D) and technical knowledge.* One way to manage the problem of food shortage arising from the harsh ecological and climate conditions in North Korea is to develop and introduce more hardy and drought resistant crops. Collaboration with other countries, such as China, South Korea, Japan or even the US could prove useful in this regard. As for the manufacturing sector, the key to continual development and staying ahead of the middle income trap is development of human resource capacity. Basic investment in secondary and post-secondary education will prove critical in this regard. Much of the joint business ventures could also incorporate elements that encourage skill transfer.

One advantage for North Korea is the proximity to neighboring countries that have extensive knowledge and experience in developing an economy. While each country is unique in its own regard, there are important lessons that North Korea can take away from the developmental experiences within the region. We have outlined a few above.

Of course, the above recommendations come with some important caveats.

Many of the recommendations hinges on the availability of abundant supply of capital, much of which is likely to come from foreign sources. Foreign investors, however, are not likely to make significant investments in North Korea unless someone (i.e. state) is able to provide assurance that those investments will be protected. Given the recent leadership change within North Korea, along with series of provocations, including the temporary closure of Kaesong Industrial Complex in 2013, nuclear tests and rocket launches (among others), it is unclear whether the North Korean state can do much to buttress this guarantee in any credible manner. The goal of this report, however, was not to advocate for policy change within North Korea but to suggest some concrete measures that the decision makers can take when the opportune moment arrives.

Appendix 1

In this analytic exercise, we utilize a family of state-space or time varying parameters model to analyze the relationship between the Bank of Korea's real GDP data and the current accounts data from Haggard and Noland (2007).⁷⁵ The model allows the conditional distribution of y_t (in this case real GDP) to depend on stochastic parameters that depend on both x_t and y_{t-1} . More specifically, the state-space representation can be stated as

$$y_t = \mu_t + \gamma_t + \psi_t + \sum_{\tau=1}^p \phi_\tau y_{t-\tau} + \sum_{i=1}^k \sum_{\tau=0}^q \Delta_{i\tau} x_{i,t-\tau} + \varepsilon_t$$

where μ_t is the trend, γ_t is the seasonal factor, ψ_t is the cyclical component, respectively. There are *k* predictors for time period $\tau = 0, 1, 2, ..., q$. ϕ_τ and $\Delta_{i\tau}$ are the unknown parameters and $x_{i\tau}$ is the set of corresponding exogenous predictors, which in this case is only the current accounts of North Korea. Note that when we do this, we are assuming that the real GDP is a function of stochastic parameters that depend on the current accounts and real GDP at t-1. ε is the random disturbance term, which in essence is "white noise" $\varepsilon \sim NID(0, \sigma_{\varepsilon}^2)$, t = 1, 2, ..., T. The trend term can be further decomposed into two parts: the level (μ_t) and slope (β_t).

$$\mu_{t} = \mu_{t-q} + \beta_{t-1} + \eta_{t}, \quad \eta_{t} \sim NID(0, \sigma_{\eta}^{2})$$
$$\beta_{t} = \beta_{t-1} + \zeta_{t}, \qquad \qquad \zeta_{t} \sim NID(0, \sigma_{\zeta}^{2})$$

^{75.} Stephan Haggard and Marcus Noland, "North Korea's External Economic Relations" *Working Paper Series, Peterson Institute for International Economics,* August 2007.

This type of specification, where both the level and slope are characterized as a "random walk plus noise," is referred to as the *local level trend model* (see Brockwell & Davis, 2010; Hamilton, 1994). Initial univariate diagnostics of the real GDP indicate that it is not necessary to account for the seasonal or cyclical effects.

The regression output indicates that the coefficient for the upper bound estimate on current account provides the best fit (see Table 5.1); however, about 40~50 percent of the variance in GDP can be explained by the state space regression with current accounts data. Residual analysis along with the Durbin Watson and Box-Ljung Q test statistics reveal that the basic model assumptions are holding (See Figure 5.1). Most importantly, the predictive forecasting derived from the model corresponds with the actual observed real GDP data for periods after 2005 (See Figure 5.2).

Table 5.1: Relationship between Current Accounts and Real (GDP
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Current Account Estimates	Coefficient	R-squared	DW	Q(2,0)
Low	-1.12 (0.256)	0.409	1.814	0.695
High	1.22** (0.05)	0.528	1.77	1.03
Best Guess	-0.52 (0.584)	0.411	1.78	0.7









Figure 5.2: Predictions on GDP and Forecasts



---- Residuals BOKgdp

++ Standardised residuals

2005

2000











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