

An Integrated Value Chain Finance in Agriculture: Experience of Agricultural Cooperatives in Korea

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Introduction

Agriculture is one of the most important sectors in developing world. In developing countries, the sector shares substantially greater portion of the national economy than in developed countries. Larger percent of population make their living from agriculture related activities in rural area. Most of the rural households are usually small farmers especially in Asia and Pacific region. They engage in basically subsistence or semi-subsistence farming. Poverty prevails among them. Many small farm households are caught up in the vicious circle of poverty: low income-low savings and heavy dependence on debt-low investment-low productivity-low income. Poverty is the cause of poverty and the result of poverty for many small farmers in developing countries.

Supply of farm credit is critical to help poor farmers break out of the vicious circle of poverty. But the conventional approach to agricultural credit, in general, has clear limitations on the accessibility of small farmers; credit institutions are reluctant to provide loans to small farmers in agricultural sector because they lack collateral against the loan in addition to high costs of loan operation, high risks and low returns on investment.

The concept of Microcredit (MC) is regarded as a useful instrument in fighting poverty in developing world. MC usually means small sized loans extended to very poor people for self-employment projects allowing them to care for themselves and their family. The success of Grameen Bank (GB) has attracted worldwide attraction. It seems to be clear that GB approach which does not require any collateral against small credit provided valuable implications to agricultural/rural credit. Nonetheless it is generally observed that loan products under the microcredit are not sufficient to address a wider range of financial needs of the agricultural sector.

On the other hand, value chain financing pays attention to a wider range of input-output relationship between industries that have linkages with agriculture. It is clear that the development of production and supply of farm-input such as improved seeds, farm machinery, fertilizer and pesticide is essential for the benefit of small farmers. More efficient business activities of market participants of the farm products including assemblers, wholesalers, processors can encourage the productive activities of small farmers. Moreover those economic agents in the value chain of farm commodities may even provide credit to small farmers, who have very limited accessibility to ordinary financial institutions, in the form of farm input sale on account, advanced payment or forward sale for farm outputs, contract farming with diversified financial arrangement, and so on.

It is generally observed, especially in developing countries, that the economic activities of the value chain actors are not sufficiently active or efficient to keep pace with overall economic growth or to shepherd agricultural/rural development in favor of smallholder farmers. Value chain finance as a systematic/holistic/comprehensive approach to rural development attracts people's attention. It emphasizes the interrelationship between agricultural production, manufacturing and service industries to remove any bottleneck in the value chain and enhance interdependency to improve efficiency of agricultural sector as a whole

Korea is known to be the first country in the world that transformed herself from an ODA recipient to a donor country. In the process of the transformation, an integrated value chain finance system of multi-purpose agricultural cooperatives has been evaluated as an integral part of agricultural development of the country. Calvin Miller and Linda Jones (2010) noted that the National Agricultural Cooperative (NACF), the national level cooperative organization in Korea, was a successful integrated value chain finance model as Rabo Bank.¹

In this regard, this paper introduces Korea's experience of value chain finance in agriculture focusing on the role of the NACF. It tries to describe why and how the integrated value chain finance system has evolved and contributed to the Korea's transformation from a predominantly agrarian society to an industrialized country during the last several decades.

Farmland Reform and Rural Usurious Loan Relief Program

Korea was a very poor agrarian society when it was liberated in 1945 from 36 years of Japanese rule. Most farmers were landless and sharecropping was prevailing in rural areas where a handful of landlords including Japanese owned major part of arable land. It was noted that the top 4% owned or managed 50% of farmland. Farmland reform implemented in early 1950's distributed 604,000 hectares or about 40.4 percent of nation's total farmland to 1,671,000 farm households²/. The farmland reform under the principle of "land to the tillers" set a land ownership ceiling of 3.0 ha per farm household, characterizing Korean agriculture as a small-scale independent owner farmer system.

Tenant farming and sharecropping was illegal according to the Farmland Reform Law until late 1980's. Farmers are not allowed to mortgage their farmland or to use their farmland as collateral to secure credit until mid 1960's.³ This legislation was an additional constraint to supply of agricultural credit in rural area.

¹ Calvin Miller and Linda Jones (2010), *Agricultural Value Chain Finance: Tools and Lessons*, FAO. P.44

² Ministry of Agriculture and Forestry (2003), "100 Year History of Korean Agriculture and Rural Economy", 2003. p. 881

³ Farmland began to be used as collateral from 1966 when Farmland Mortgage Law was legislated. However the law prohibited financial institutions and individuals other than agricultural cooperatives, fishery cooperatives and forestry cooperatives from being a mortgagee. This law was in effective until early 1990's.

Average land size per farm household was only 0.6 hectare in early 1950's and agricultural productivity was very low due to the lack of agricultural input (seed, fertilizer, farm chemicals etc.), low technology, and poor infrastructure including energy, transportation and irrigation.

National economy also suffered from an extremely high inflation, severe food shortage and social instability. Some of the important reasons include:

- 1) With the liberation from colonial rule, Korea was divided into two: South and North Korea. The supply of electricity and fertilizer from the North to the South was completely stopped;
- 2) With the liberation the country experienced a vacuum of capital, technology and managerial know-how in both public and private sectors. It was because those had been held and maintained by Japanese who left Korea; and
- 3) Korean War between the North and the South Korea broke out in 1950, and continued for three years. The war which incurred millions of casualties, devastated social infrastructure and other productive resources.

Until the early 1960's, severe poverty was pervasive all over the country. In 1961 when the "First 5 Year Economic Development Plan" was prepared, farm population was 17 million or 66.4 percent of total national population of 25 million. Per capita income was US \$89 dollars and the nation heavily depended upon foreign aid. Foreign aid covered over 50 percent of the annual government revenue in 1957 and 1958 although it declined to 35 percent in 1960.

Illiteracy rate in rural areas was very high because the average schooling year remained only 1.9 years among rural adults in 1960. The amount of chemical fertilizer used for farming in the year was estimated to be 308,000 metric tons averaging about 10 kilogram per hectare of cultivated land, and domestic production of chemical fertilizer amounted to 30,000 metric tons⁴ a year. Moreover farm income continued to fall due to low food grain prices. The low farm prices could be maintained by large amount of food aid from US. Korean government preferred low food grain prices because it could curb the inflation in the country.

Farmers were likely to be caught in a debt trap attributable to a one-time demand for credit such as funeral, wedding, disease etc., because they had to rely on usury loans at very high interest rate. Being caught in the debt trap, small farmers could not break out of the trap.

Korean government under the military regime led by President Park Chung-Hee implemented Rural Usurious Loan Relief Program (RULRP) in 1961. This program was designed to ease the financial difficulties of farmers and fishermen suffering from usury loan in prevailing in the rural area.

⁴ *Op. cit.* 970

The key features of the program based on the RULRP Law include:

- 1) Loans amounting 15,000 Won or less with an annual rate of 20 % or more were qualified for the debt relief program;
- 2) The borrowers as well as lenders were required to report their loans within a given date. Lenders were not allowed to claim repayment on the unreported loans. Any false report or improper claims were subject to punishment or penalty;
- 3) Arbitration committee composed of senior village members took the role of overseeing the whole process of the program at each village level. The committee evaluated the reports from the borrowers and lenders and arbitrated cases of disagreements between lenders and borrowers;
- 4) For qualified loans, borrowers were allowed to repay under the following conditions; one year grace period, installments payment over four years, and at an annual interest rate of 12 percent;
- 5) For the lenders, Agricultural Bank issued promissory note with the similar conditions under which the borrowers were supposed to repay their loans. However, it was notable that interest rate for the lenders was 20 percent compared to 12 percent to the borrowers. The 8 percent point interest difference was to be compensated by the government; and
- 6) The National Agricultural Cooperative Federation, which was launched by the amalgamation of the Agricultural Bank and the former Agricultural Cooperatives, undertook the implementation of the RULR program.

The number of loans transactions reported totaled to 1,171 thousand, and the reported loan value amounted to 4.8 billion Won, from which 890 thousand loans with the loan value of 2.9 billion Won were identified to be program targets by arbitration committees. A total of 685 thousand or 29% of rural households were involved in the debt relief program as borrower or lender.

Considering that nearly 90 percent of rural households had usury loan, which was estimated to be about 15.1 billion Won in 1960, the RULR program covered only a small portion of the total usury loan. It was the result of the fact that the program target was limited to the loan value of 15,000 Won or less. In addition, it is important to note that there existed many unreported loans because many lenders were not willing to take a haircut while borrowers were afraid of not being able to borrow from the lenders later on.

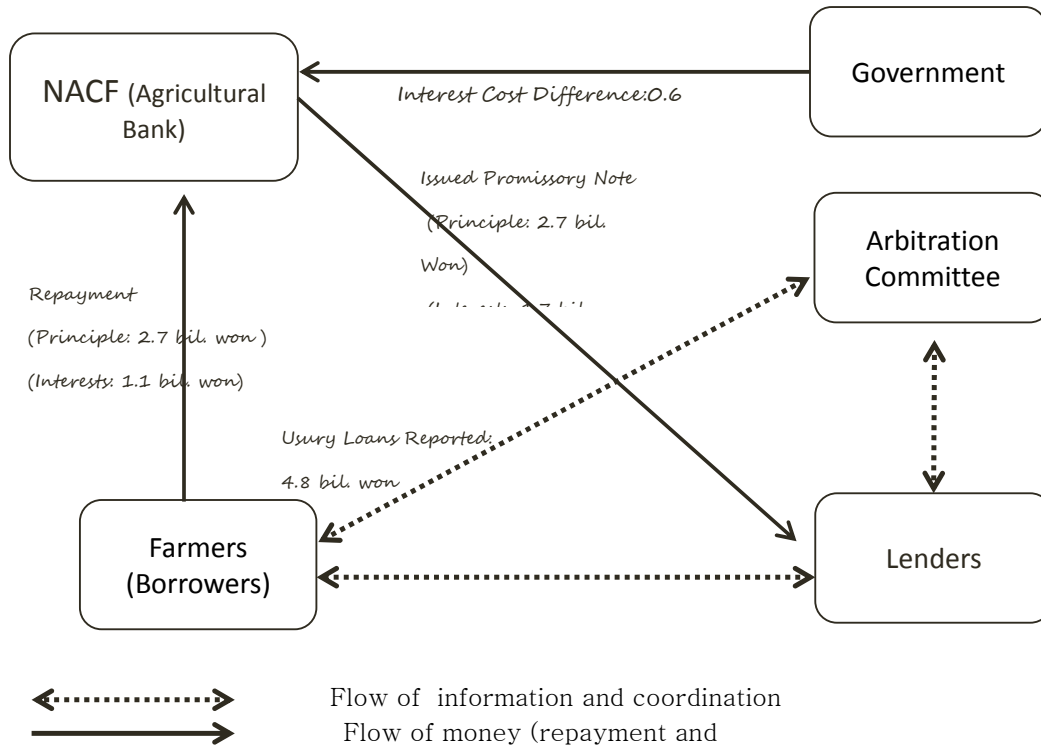
With respect to the reported and modified loans, most borrowers who were supposed to pay back their loans during the subsequent years failed to redeem their duties. A total of 2.0 billion Won of modified loans were not collected as of the end of 1968. It was observed that most of the uncollected loans were forgiven or wrote

off by the implementation agency, the National Agricultural Cooperative Federation. For this reason, there exist criticisms that the program invited moral hazard among farmers by forgiving the loans and creating expectations for further loan forgiveness or write off.

Figure 1. Flow Diagram of Rural Usurious Loan Relief Program

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Formalized Loans:
2.9 bil. won



⁵ Korea Development Institute (2012). *Institutionalization of the Informal Credit Market and Financial Inclusion in Korea*, p.40.

With the limited performance of RULR program and limited supply of finance from the formal institutions, the informal credit continued to dominate the rural economy. The share of informal loans remained to over 60 percent until 1971 although it declined to 13.9 percent in 1990. Annual interest rate of the informal loans was averaged to over 50 percent in 1971, much higher than that of formal loans extended by agricultural cooperatives.

Table 1. Farmers' Dependence on Informal Credit

(Unit: %)

	1971	1980	1985	1990
Share of Informal Loans by Farmer's	60.0	49.0	28.9	13.9
Annual Interest Rate for Informal Loan (A)	54.0	46.8	26.4	21.0
Annual Interest Rate for NACF loan (B)	28.0	22.0	14.5	14.0
Interest Rate Differential (A-B)	26.0	24.8	11.9	7.0

Source: NACF, 30 Years of Agricultural Cooperative History, 1991.

Value Chain Finance and an Integrated Model of Agricultural Cooperatives

One may imagine the financial situation of farmers and other agricultural value chain participants in 1960's. The division of the Korean Peninsula into two nations, Korean war, farmland reform, political and social instability which caused military coup in 1961 and the rural debt relief intervention hampered a smooth flow of credit and worsened the tight money market.

After a long policy debate, for about 10 years, on the issue of agricultural cooperatives and agricultural credit⁶, Korean government established both Agricultural Bank and Agricultural Cooperatives in 1958 based on the Agricultural Bank Law and Agricultural Cooperative Law respectively. This implies that both of the organizations were set up according to top-down approach. However, the cooperation and coordination required for agricultural development between the two organizations was not sufficient as had been desired by government and farmers. The agricultural cooperatives were in need of finance but the Agricultural Bank was not supportive to cooperatives. Controversy and heated debate over the two independent organizations continued even right after their inauguration.

In this situation, a new military government led by Gen. Park Chung-Hee made a decisive action on the issue. The Agricultural Bank was merged with Agricultural Cooperative System to form a multipurpose agricultural cooperatives system with its national level organization National Agricultural Cooperative Federation (NACF). This merger made an important turning point to value chain finance in Korean agriculture. Under the new multipurpose cooperative system, the NACF was authorized to perform almost full range of banking activities, including deposit receiving and

⁶ *The core issue of the debate was whether or not to allow the cooperatives engage in agricultural financing.*

offering credit for the development of member cooperatives and member farmers. Moreover, primary agricultural cooperatives were also allowed to offer credit.

Compared with the old system where the Agricultural Bank was an independent financial institution while the Agricultural Cooperatives were value chain participants in charge of purchasing and marketing business for member farmers, NACF and its member cooperatives became financial institution as well as value chain participants under the new multipurpose cooperative system.

Being value chain participants in agriculture the NACF and its member cooperatives has engaged in almost every area of agricultural value chain activities from agricultural input manufacturing to marketing of farm output including assembling, warehousing, packing, promoting, processing, transporting, wholesaling, retailing, exporting and so on. As a result, agricultural cooperative system has performed significant role in the value chain finance in Korean agriculture. Figure 2 shows basic structure of value chain finance in Korea. It indicates that both internal and external value chain finance have been provided within the multi-purpose cooperative system and outside the system.

Figure2. Basic Structure of Value Chain Finance in Korea

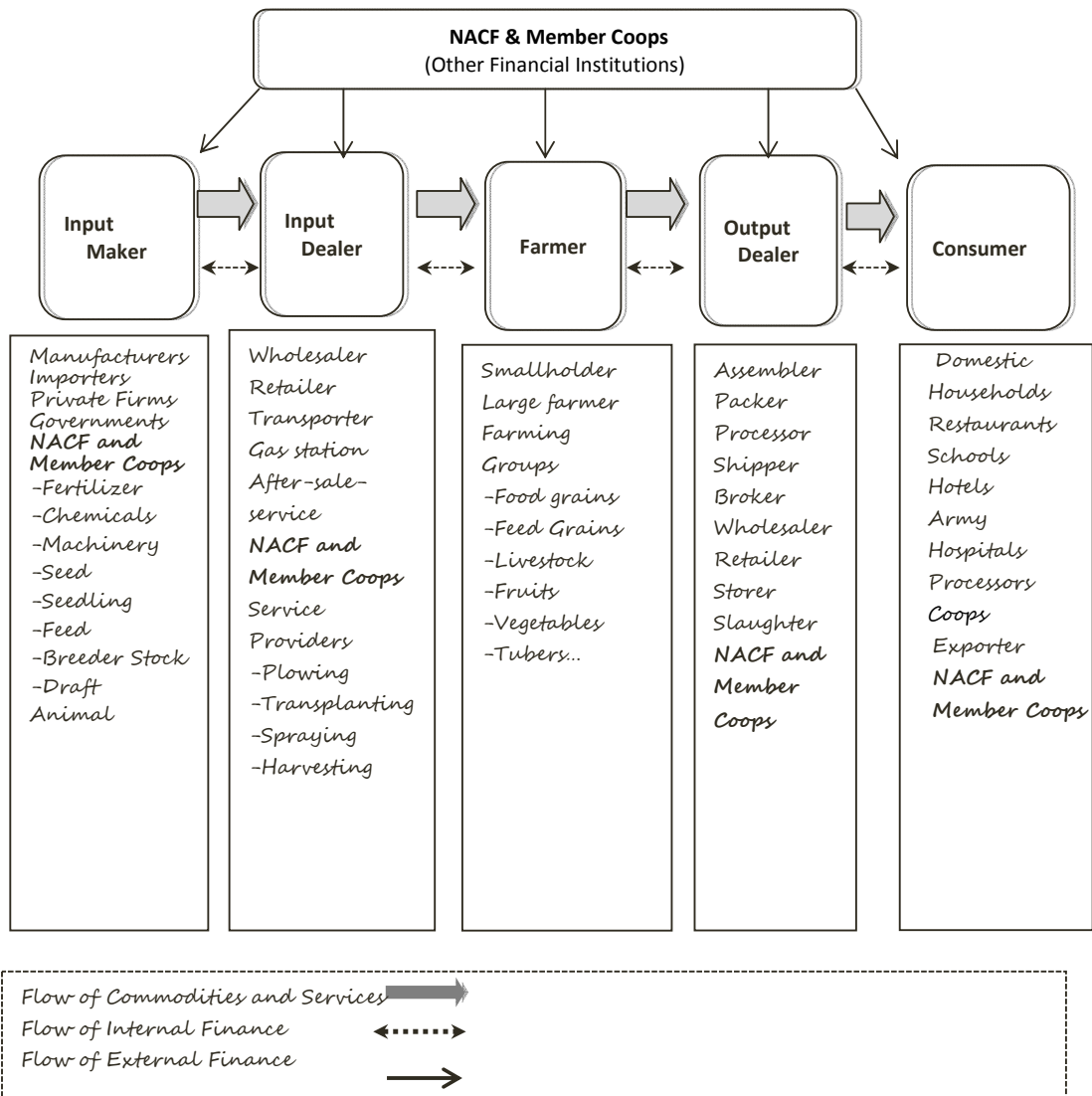


Table 2 shows the major facilities owned and/or operated by the NACF and its member cooperatives at the end of 2011. It indicates that the multi-purpose cooperatives are directly involved in the very wide range of business activities in the agricultural value chain. With the diverse facilities, the annual business turnover in agricultural value chain in 2011 totaled 13,655 billion Won for the NACF and 29,208 billion Won for member cooperatives. For livestock subsector the turnover amounted to 349 billion Won for NACF and 12,814 billion Won for member cooperatives in the same year.

In addition to the activities of the NACF and its member cooperatives, a total of 13 subsidiary companies of NACF are active as agricultural value chain participants. They include the largest chemical fertilizer manufacturer in the nation Namhae Chemical Co., Ltd., the largest feed grain importer and the largest formula feed company NH Feed Co., Ltd., and one of the largest agricultural product distribution center NH Marketing Co., Ltd. Other subsidiary companies include a pesticide

manufacturer, a meat processor of which main products are ham and sausage, a logistics service company, and a ginseng processing company. Business volume in terms of 2011 sales value totaled to 5,565 billion Won⁷ for the 13 NACF subsidiaries in the area of agricultural value chain excepting those in the area of finance and education and support.

Table 2. Selected Value Chain Facilities operated by NACF and its Member Cooperatives in 2011

Facilities for Value Chain Activity	Total	NACF	Member Coops	Major Function
APC (Agricultural Packing Center)	270	-	270	Bulking, cleaning, storage, cooling packing of fruits and vegetables
RPC (Rice Processing Complex)	168	-	168	Drying, storing, milling packing
DSC (Drying and Storage Center)	843	-	843	Rice drying and storing
Agricultural Processing Plant	114 ^{1/}	1	113	Extracting, canning, roasting...
Ag. Wholesale Marketing Center	82	13	70	Wholesale through auction
Distribution Center	15 ^{2/}	14	-	Wholesale distribution, large scale supermarket
Hanaro Mart	2,159 ^{3/}	56	2,103	Supermarket
Farm Machinery Repair Center	615	-	615	Repair service
Gas Station	548	6	542	Retailing
Fuel or Propane Gas Store	513	22	491	Retailing
Formula Feed Mill	23	8	15	Large scale feed mill
Livestock Market	81	-	81	Transaction of live animals
Livestock Wholesale Center	8	4	4	Slaughtering and selling of dressed carcasses through auction
Dairy Plant	9	-	9	Collect and process milk

1/ Includes a Ginseng Processing Plant of a NACF's subsidiary company NH Korea Ginseng Co., Ltd.

2/ Includes five distribution centers of NACF's subsidiary NH Marketing Ltd. and a Grain Marketing Center

3/ Includes 14 Ginseng Retail Stores of NH Korea Ginseng Co., Ltd.

Consequently, it is clear that various forms of value trader credit is involved in the transactions between the value chain participants. Most common forms of trader credit associated to the transactions are sale on credit, advanced payments or deferred payment, forward buying and contract farming.

Considering the business turnover of the NACF, its member cooperatives and subsidiaries, the trader credit involved must be huge amount although it has not been reported or estimated. It is notable that the trader credit is provided not only to the value chain participants within the system of the NACF and its member cooperatives but also to those in private sector whenever they have linkages with the value chain transactions.

⁷ The exchange rate of the Korean currency remained approximately 1,150 Won for 1 US dollar during 2011

On the other hand, the NACF and its member cooperatives, as financial institutions, also supplied financial services for the private value chain actors including various intermediaries, dealers, firms, and service providers in farm input market and output market. This function as financial institutions has been very important in a sense that the NACF and member cooperatives encouraged the active role of private sector value chain participants rather than crowding them out.

Note that there exist a total of 10 NACF's subsidiary companies engaging in the business in financial market. They include the NACF Futures Co., NACF Asset Management Co., Ltd., Nonghyup CA Asset Management Co., Ltd., and NH Investment and Securities Co., Ltd. in 2011.

Moreover, agricultural credit guarantee service, life insurance, fire insurance, and crop insurance services are provided by the NACF and its member cooperatives under the cooperation and coordination with/by Korean government.

A number of training institutes operated by the NACF have contributed to the development of human capital in agricultural sector. It is known that thousands of farmers, cooperative leaders and staffs are participating in the training provided by those institutions.

This type of integrated model has been considered to be useful in developing world where the immediate and coordinated intervention to break out the vicious circle of poverty is a pressing need. It was emphasized that the integrated model of the NACF was able to take advantages of:

- 1) Possibility to minimize transaction costs in value chain;
- 2) Possibility to reduce costs of loan and risks associated there of;
- 3) Possibility to increase turnover ratio of financial resources, especially when excessive demand for money persists in the market; and
- 4) Possibility to generate a strong synergy effect for various business area of the cooperatives.

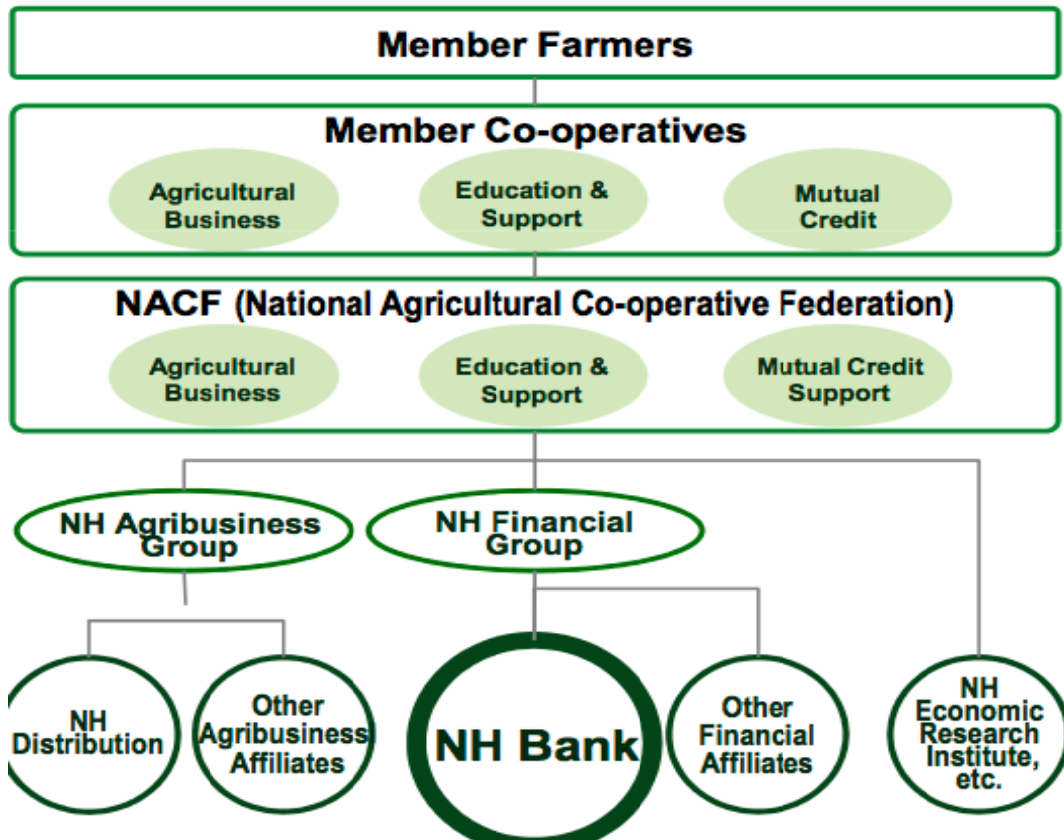
However, after a long policy debate, some of the NACF activities in the areas of banking and insurance were separated from the NACF and became independent corporate body in 2013. The rationale behind the restructuring was that the NACF had to respond to the changes in financial market. They included:

- 1) Excessive demand for money in the financial market disappeared, especially in rural area, resulting in the declining interest rate;
- 2) Competition in financial and capital market is getting severer so more specialization is required in every aspect of banking business; and
- 3) NACF had been a too big organization like a dinosaur to be an efficient service provider for agricultural sector in the future.

It is too early to evaluate the restructuring of the NACF in 2013. Many stakeholders and academic persons in Korea now are paying attention to the advantages and

disadvantages of the new system. The overview of the new structure is presented in the following figure.

Figure 3. Overview of the Current Organizational Structure of NACF and Member Cooperatives after the Restructuring in 2012



Sources of Funds for Value Chain Finance

In the process of rural development in Korea, especially at the early stage in 1960's and 1970's, one of the most important challenges was how to secure funds for financing the value chain. Demand for money at the market continued to be excessive and interest rate tended to be very high under inflationary economic development. Government regulated the interest rate of the formal financial institutions. Securing money for lending was the most challenging for the NACF as well as for any other credit institutions until late 1980's.

Savings campaign was an important strategy not only for agricultural sector but also for the whole nation. Diligence and thrift was regarded as only way to overcome the chronic poverty and hunger. The NACF and its member cooperatives used every means to mobilize idle money both in rural and urban areas to increase available resources to finance agricultural development. Government designated 25th day of

every month Monthly Savings Day, and 25th September was celebrated nationwide as annual Savings Day⁸ to motivate people to be frugal and to save more. The thrift and saving was respected as one of the most desirable virtues for the people themselves and for the nation in the famous New Village Movement or Saemaul Undong in 1970's. The NACF and its member cooperatives organized rural housewives into Savings Groups that encouraged their members to save "a spoonful of rice movement"⁹ whenever they cook.

Banking business of the NACF contributed to secure financial resources for the supply of agricultural credit in rural areas. Mutual insurance business also was helpful to mobilize financial resources. In addition to the banking and insurance business of the NACF, the mutual credit business of the member cooperatives, which began in 1969 among some of agricultural cooperatives and expanded to all member cooperatives nationwide, became a major source of funds for rural credit.

Thanks to the continuous and diversified efforts to secure financial resources, the NACF and member cooperatives enjoyed steady increase in available resources mobilized from the financial market. At the end of 2012, the total amount of deposits received by NACF banking business was 194,756 billion Won¹⁰ while deposit received by mutual credit business of member cooperatives recorded to 223,179 billion Won. The NACF and member cooperatives also received a total of 9,322 billion Won of insurance premium during 2012

The financial resources supplied by Korean government also comprised major source of funds for value chain finance by the NACF and its member cooperatives. Most of the government intervention programs in agricultural sector were closely linked with value chain. Some of the examples include farm mechanization program, pest and disease control program, farm price stabilization program and agricultural marketing development program. From the standpoint of the NACF and its member cooperatives, the government fund was welcomed because they were suffering from the lack of financial resources at the early stage of development in 1960's and 1970's.

As a matter of fact, the multi-purpose cooperative system was used as a policy instrument of authoritative government during most of the time from early 1960's to late 1980's. The military government passed the temporary law in 1962, which basically enabled the government to control the NACF by, among others, authorizing the President of the nation or the Minister of Agriculture to appoint and dismiss the top management of the NACF and member cooperatives. In 1960's, the NACF board members included Minister of Agriculture and Forestry, Minister of Finance, and Deputy President of the central bank, the Bank of Korea. Consequently, the cooperation and coordination between the government and the NACF was very close, although there did exist strong criticism that autonomy of the cooperatives was

⁸ The Annual Savings Day designated in 1964 was Sept. 25, and changed to Oct. 25 in 1973 and to the last Tuesday of October in 1984.

⁹ Agricultural cooperatives distributed a small jar to each member farmer and encouraged farmwives to set aside a spoonful of rice into the jar for saving.

¹⁰ Based on the exchange rate, 1,063 Won was equivalent to 1 US dollar at the end of 2012.

constrained too much. However, it was generally understood that it was an unavoidable choice considering the chronic poverty and hunger at that time¹¹.

Based on the close coordination, the NACF and its member cooperatives participated in almost every government programs as an implementation agency. From the viewpoint of government, the NACF and its member cooperatives were believed to be a most credible and most convenient organization to work with for the reasons;

- 1) All of the farmers in the country were virtually members of the cooperatives;
- 2) As a financial institution the NACF had public confidence and reputation;
- 3) As multipurpose cooperatives the NACF and its members directly participate in the wide range of value chain activities;
- 4) The NACF and its member cooperatives had nationwide network of business organization (they began to be connected to computer network which enables online-transactions);
- 5) The NACF and member cooperative had trained human resources particularly; and
- 6) The NACF and its members owned and operated diverse value chain facilities.

To summarize, the mainstream of the financial inflow to the NACF and its member cooperatives can be classified into two: one is the funds mobilized at the financial market, and the other is the policy fund from the government. Major sources of funds from financial market consist of deposits received by banking business of the NACF, deposits received by mutual credit business of member cooperatives, and finally insurance premiums received. Funds from other sources including overseas borrowings were also utilized for value chain financing.

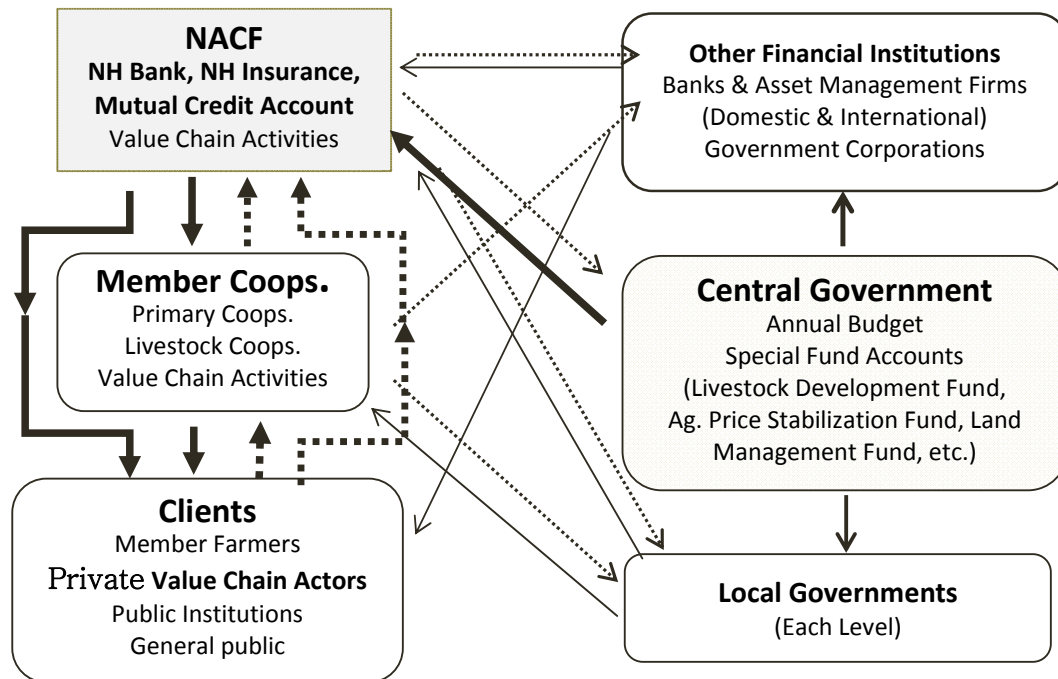
Figure 4 is a simplified flow chart of funds associated with the NACF and its members. Dotted line in the figure represents the mobilization or the process of deposit while the solid line indicates the flow of loans or financing. It is interesting to note that the NACF deposits to central government (dotted line from NACF) and borrows from the central government. This does not mean actual money flow or financial transaction between them.

What it implies is that the funds mobilized from financial market by the NACF are utilized for the government policy fund as if the NACF deposits to government but actually the fund flows from the NACF to value chain participants at lower interest rate than market rate. The NACF and member cooperatives take the responsibility of securing funds, lending loans, and loan recovery. While the government reimburses the interest difference between market and government rates. This type of Interest Compensation Fund (ICF) began to be utilized as the NACF mobilized sufficient money from the financial market to meet demand for its lending. It is mutually beneficial to the government and the NACF. For the government ICF reduces the

¹¹ The temporal law on the appointment and dismissal of agricultural cooperative management passed in 1962 was in effect until 1989 when the President of cooperatives began to be elected by direct voting of member farmers and the NACF President by began to be directly elected among the presidents of member cooperatives.

financial burden and for the NACF it eases the fund operation. This ICF model is also widely adopted by local governments in rural area for the implementation of regional/agricultural development programs under the strong initiative of the local governments.

Figure 4. Simplified Flow Chart of Funds Associated with NACF and Value Chain in Agriculture



Farm Mechanization and Lessons to Value Chain Finance¹²

Urbanization and Rural Wage Rate

The success of a series of “Five-year Economic Development Plans” launched for the first time in 1962 caused a rapid income growth, urbanization and industrialization in Korea. Per capita income increased sharply (Figure 4) from less than US\$ 100 in early 1960’s to over US\$10,000 in mid 1990’s. The growth in the national economy invited a rapid urbanization.

¹² This section depends heavily on Kyeong Uk Kim (2009). *Farm Mechanization Policies in Korea. Engineering in Agriculture, Environment and Food. 2(4): pp. 132-143*

Farm population decreased by 5 million from 15.8 million to 10.8 million during 1965-1980 while total population increased by about 10 million from 28 million to 38 million during the same period. Farm population decreased further at an increasing rate in 1980's and 1990's. The number of farm population decreased by 63 percent from 10.8 million to 4 million during 1980-2000 as shown in Table 3. The share of farm population dropped from 55 percent in 1965 to only 6 percent in 20

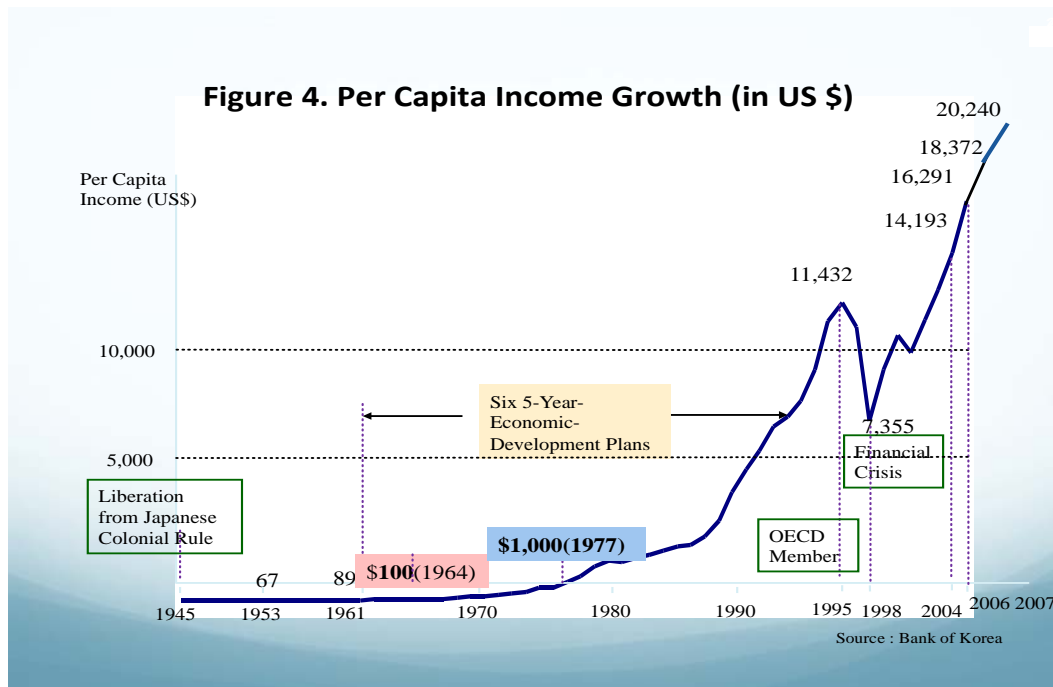


Table 3. Selected Indicators of Farm Population in Korea (Unit; million)

Year	Total Population	Farm Population	Farm Household	Farm Population Aged 60 or more
1965	28.7	15.8	2.5	0.6
1970	32.2	14.4	2.4	1.14
1975	35.2	13.2	2.3	1.16
1980	38.1	10.8	2.1	1.14
1985	40.8	8.5	1.9	1.18
1990	42.9	6.7	1.7	1.19
1995	45.1	4.9	1.5	1.26
2000	47.0	4.0	1.4	1.33
2005	48.1	3.4	1.3	1.35
2011	49.8	3.0	1.2	1.31

Sources: Ministry of Agriculture, Forestry and Fisheries. Major Statistics in Agriculture, Forestry and Fisheries, various year.

The rapid and continuous urbanization or rural-urban migration of the young resulted in the sharp increase in rural wage rate. An analysis depicted that farm wage rate increased by annual rate of more than 20 percent during 1962-1982. For the period of 1977-1982, the 4th Five Year Economic Development Plan Period, the farm wage increase rate reached as high as 30 percent annually¹³. Looking at the change in the relative price of farm machines to farm wage rate, the price of a power tiller in 1975 was equivalent to wage of 438 man-days but declined to 64 man-days in 1995 while the price of a tractor declined from 2,425 to 297 man-days during the same time.

The soaring rural wages stimulated the change in farm labor from animal or human power to make use of small power driving machines such as water pumps sprayers, power tillers in 1960's. Power tillers were manufactured domestically from 1963. They were used as a means of transportation in rural as well as in urban areas before they were accepted by farmers and utilized in tilling, spraying, water-pumping, and carrying farm inputs and agricultural products. In other words, farmers were not ready to make use of power tillers at early stage of introduction. Much more was true for rice trans-planters, combine harvesters, and tractors that began to be introduced quite later than power tillers. Farmers were uncertain about the performances of the machines and doubtful about economic advantage of using them. Farmers were not familiar with operating, maintaining, and repairing those machines. As a matter of fact, farm size of individual farmers was too small compared with the prices of those machines. Moreover most farmers could not afford farm machines.

Government Initiative in Farm Mechanization

Korean government began to provide farmers with financial support, loan and/or subsidy, to promote farm mechanization in 1967. Individual farmers or farmer groups were given government subsidy and/or loan on the purchase of farm machinery strategically selected and announced by the program. The ratio or amount of subsidy and/or loan was different by supply models and modified as agricultural situation changed. If the machine would be put on the joint use by a group of farmers the higher rate of subsidy and loan was made available.

At the initial stage of the financial support for farm mechanization in 1960's, a subsidy of 60% of the purchase price was paid for sprayers, water pumps, and power tillers. But the subsidy rate was reduced to 40% at the end of 1960's until early 1970's and a loan of 25-40% was introduced to supplement the reduced subsidy.

From mid 1970's, farmers were encouraged to organize various forms of farmer groups for the joint utilization of farm machinery and larger machines such as tractors, rice transplanners and combines were supplied to the farmer groups under the subsidy and loan program. For those farmer groups, machines were supplied at a

¹³ Kyeong Uk Kim (2009). *Farm Mechanization Policies in Korea. Engineering in Agriculture, Environment and Food*. 2(4): pp. 132-143

special rate of 40 % subsidy and 60% loans compared with 10 % subsidy and 60 % loan for individual farmers.

Up until 1993, when the so-called “Half Price Machine Policy (HPMP)”¹⁴ was implemented, government policy in general showed a decreasing rate of subsidy and increasing loan support ratio with substantially higher rate of support to farmer groups than individual farmers. Under the HPMP implemented for several years from 1993, 50% subsidy was given for machines priced lower than 2 million Won, while one million Won was paid in cash to farmers for machines priced over 2 million Won¹⁵. The HPMP did not have any preferential treatment in favor of farmer groups for joint utilization of farm machines. The subsidy ratio was reduced to 10% and loan rate was increased to 70-90% after the HPMP was suspended.

Table 4. Financial Support for Farm Mechanization (1991-1995)

Unit: billion Won

	1991	1992	1993	1994	1995	91-95 Total
Government Subsidy (A)	54.6	59.5	224.3	287.6	318.7	944.7
Loan, Total (B)	427.7	503.7	472.5	413.1	438.0	2,255.0
<i>Loan from Govn't Fund</i>	<i>196.0</i>	<i>223.4</i>	<i>128.5</i>	<i>274.5</i>	<i>325.4</i>	<i>1,147.8</i>
<i>Loan from NACF Fund</i>	<i>231.7</i>	<i>280.3</i>	<i>344.0</i>	<i>138.6</i>	<i>112.5</i>	<i>1,107.1</i>
Buyer Self Finance (C)	171.0	181.2	166.7	210.4	239.4	968.7
Total (A+B+C)	653.3	744.5	863.5	911.1	996.0	4,168.4

Source: Koh Young Kon (1998). "Recommendations for the Improvement of Efficiency in Rural Investment Policy: Farm Mechanization" Korea Development Institute (KDI)

A huge amount of money has been invested in farm mechanization in Korea. It was estimated that a total of 4,168 billion Won was invested in the farm mechanization during 1991-1995. Out of the total, 945 billion Won (22.7%) was government subsidy, 2,255 billion Won (54.1%) was loan while the self-financed by farmers was 969 billion Won (23.2%). Approximately 50 % of the resources for the loan was provided by the NACF under ICL system as mentioned earlier.

Distribution Channel of Farm Machines

The subsidy and loan services have been under the responsibility of the NACF and its member cooperatives. Interest rate applied to the farm mechanization loan has been substantially lower than market rate. Initially annual interest rate for farm mechanization loan was 10 % and lowered gradually to 4.5 % in 1990's and 3 % in 2000's. Farmers were supposed to repay the loans by 4-7 year equal installment after one year of grace period. The repayment period depended upon type of machine or the loan value.

As mentioned above, engine powered farm machinery was quite new to Korea in early 1960's. It was 1963 when the power tillers were first manufactured in the

¹⁴ The HPMP originated from the presidential electoral campaign by President Kim Young Sam in 1992. He pledged that he would supply farm machinery at halved price, if he elected.

¹⁵ Two million Won was equivalent to approximately US \$2,000 at that time

country. Tractors, combines, and rice trans-planters were introduced in 1969, 1972, and 1973 respectively. Initially, those farm machines were assembled in Korea with numerous parts under the technical collaboration agreement with leading companies in Japan, Italy and the U.S. They include Kubota, Fiat, and Ford.

Government provided various financial assistance to promote import substitution, improve the quality/performances of locally made machines, and increase production at reasonable prices. Due to the heavy financial support by the government, distribution channel was not established at that time, the market channel was under the control of the government.

Between 1962 and 1971, farmers could only buy farm machines only through the NACF/member cooperatives because the cooperatives had well organized business network nationwide while the other distribution channels, dealerships or agents network of manufacturers for example, were in its infancy for the relatively new products. The NACF/member cooperatives also were in charge of handling subsidy and loan with public confidence. Moreover, the NACF/member cooperatives were considered to be in a position to exercise bargaining power against the manufactures by preventing any potential monopoly power. However, government prohibited NACF/member cooperatives from selling farm machines in 1972. Only manufacturers' dealerships were allowed to distribute farm machines with after-sale repair services during 1972-1973. Two years later, the system returned to the former one under which farm machines were distributed only through the NACF/member cooperatives channel while the dealers took charge of repair and maintenance service.

After repetition of similar type of trial and errors with some modifications, the farm machine distribution system in Korea was stabilized in 1984 when the farm machines began to be distributed through both NACF/member cooperatives and manufacturer's agents (dealers). The repeated trial and errors were attributable to the complicated issues of 1) competition between manufacturers, 2) farmers complaints on the training and repair services, 3) infant stage of the overall distribution and service system 4) lack of nationwide network of manufacturers' agents and 5) inadequate after-sale services and bureaucratic rigidity of the NACF/member cooperatives at that time.

Lessons from Korean Experience of Farm Mechanization

For Korean smallholder farmers in general, it has been regarded that investment in farm machinery is uneconomical from the micro economic viewpoint. Nevertheless, policy makers thought that mechanization was an urgent task for the agricultural development and food security. Consequently, farm mechanization in the nation has been promoted under the strong intervention by the government. Heavy financial support of subsidy and/or low cost loans were given to the farmers as well as to machine manufacturers, repair service providers, training of driving and maintaining machines, subsidized (or tax exempted) fuel supply for farm machines and so on. The NACF/member cooperatives have deeply involved in the formulation and implementation of the farm mechanization policy as a sole financial institution for

the policy and value chain participant. As value chain participants, the NACF/member cooperatives continued to engage in various activities as machine distributors, repair and maintenance service providers, training and education service providers, and tax-exempted fuel suppliers.

Thanks to the diverse efforts of the government and to the integrated value chain finance model of the NACF/member cooperatives, the number of farm machines in use increased rapidly during the last several decades as shown in Table 4. The rate of mechanized farming practices in rice farming reached over 95% in 2000's for land preparation, transplanting and harvesting. Farm mechanization in producing upland crops and livestock has also shown a remarkable progress to such an extent that robots are used in milking by a number of dairy farmers.

Table 5. Population of Selected Farm Machines in Korea

(unit: each)

	Power Tiller	Tractor	Rice Trans-planter	Combine
1970	11,884	61	0	0
1975	85,772	564	16	56
1980	289,799	2,664	11,061	1,211
1985	588,962	12,389	42,183	11,667
1990	756,489	41,203	138,405	43,594
1995	868,870	100,412	248,009	72,268
2000	939,219	191,631	341,978	86,982
2005	819,684	227,873	332,393	86,825
2010	698,145	264,834	276,310	80,973

Source: Ministry of Agriculture of Korea

However, it was noted that the farm mechanization policy has entailed serious problems in Korean agriculture:

- 1) It caused over supply of farm machines compared with economic/adequate level of farm mechanization;
- 2) It contributed to the excessive increase in farm household debt;
- 3) The excessive regulation by the government has distorted efficient functioning of market mechanism;
- 4) Heavy financial support on the purchase of farm machines, particularly by HPMP, discouraged the efforts to seek models of joint utilization among farmers, and
- 5) The system implied the potential existence of corruption among the stakeholders.

Koh Y. K. (1998) analyzed the issue of the oversupply of farm machines and indicated that it would be one of the important factors that would cause weakening of competitiveness of Korean agriculture by increasing production cost, and would worsen the farm household economy by the heavy borrowings for farm machinery purchase. In fact, Korean government had to implement a series of programs from late 1980's to mitigate financial burden of farm household caused by heavy debt. It is interesting to note that the power tiller and cultivator manufacturers suffered from

a slump in sales as the HPMP suspended, although they had enjoyed a boom under the HPMP.

A New Attempt; Combining Equity Fund and Contract Farming

In 2006, a new model of value chain finance in Korean agriculture was introduced. This model was quite revolutionary from the view of conventional financing of lending and borrowing in Korea.

The main feature of the new model is that 1) it combines investment fund with contract farming without any lending or borrowing transaction, 2) it connects financial investors seeking higher return to their money and farmers who want stable income with no market risk and, 3) it incorporates private securities firm into agricultural financing in mobilizing the financial resources.

The name of the investment fund was “Korean Native Cattle Fund (KNCF)”. A leading securities and asset management company in Korea, Mirae Asset Ltd., took charge of private equity fund for alternative investment KNCF with a total volume of 8 billion Won.

A group of NACF member livestock cooperatives that had built reputation on the quality of beef they sell took the responsibility of fund utilization through contract fattening of Korean native cattle. The Beef Brand Unit (BBU) organized among the participating livestock cooperatives bought a total of 1,600 heads of feeder cattle and distributed them to twenty member farmers who applied for and agreed on the terms of cattle fattening project under KNCF.

Major contents of the contracts between BBU and participating cattle fatteners include:

- 1) BBU provide participating farmers with formula feed as well as feeder cattle;
- 2) Participating farmers are required to follow the instructions by the BBU in fattening to secure a standard quality of beef; and
- 3) Participating farmers receive monthly fattening fee of 25,000 Won (about 20 US dollars) per head during about 36 months of fattening period.

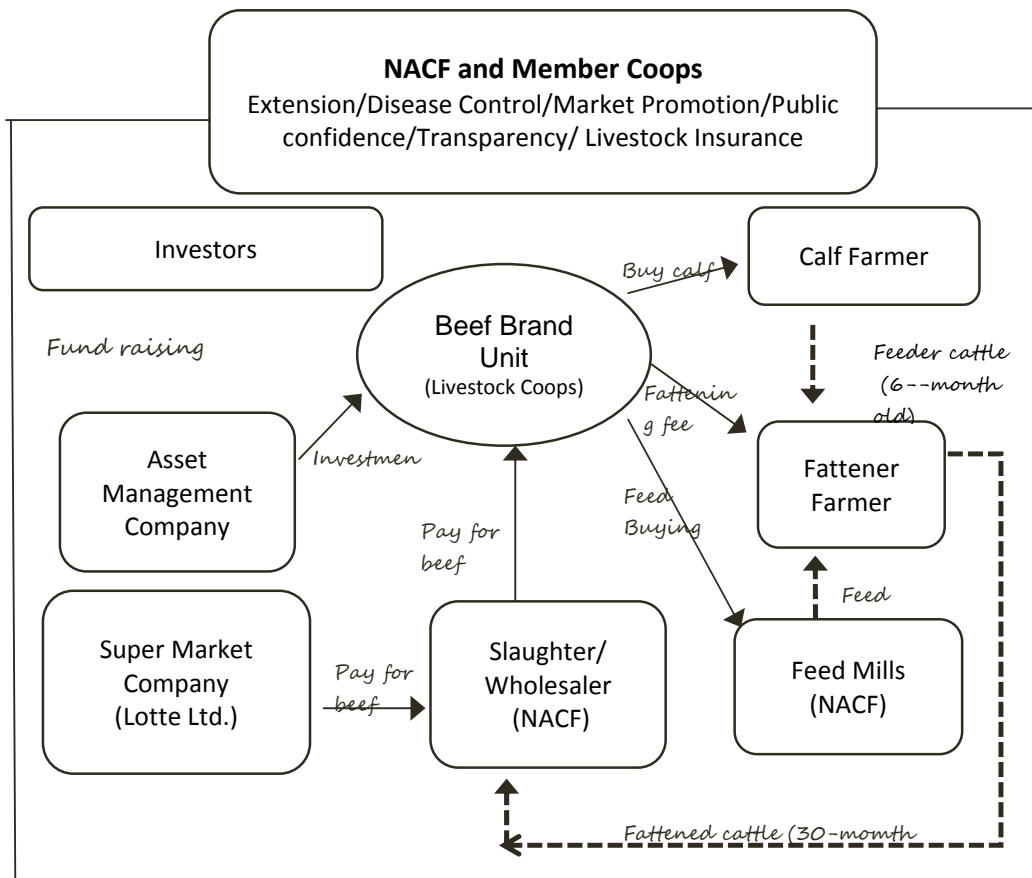
Upon completion of fattening, the cattle were transported to the slaughterhouse operated by the NACF. A supermarket chain company Lotte Shopping Co., Ltd, one of the most famous and largest department stores and supermarket companies, participated in the program as a main retail outlet of the beef produced under the KNCF.

On maturity date of the equity fund after three years of the contract farming project period, the investors to the KNCF received dividend at annual rate of 8 %, which was sufficiently high enough compared with time deposit interest rate. Cattle fattening farmers also were satisfied with income generated by cattle fattening without bearing any risk in cattle fattening. Feeder cattle producing farmers benefited by expanded market. Consumers were able to enjoy the increase in supply of popular

brand beef with reliable quality standards. The BBU or livestock cooperatives were benefited with securing standardized quality beef to maintain the reputation of the beef brand without any additional financial burden or risk bearing because they bought NACF livestock insurance policy against potential disaster on the cattle.

It was observed that a number of similar alternative investment equity fund were raised in Korea following the success of the KNCF. However, all of the subsequent funds were not successful from the standpoint of the investors mainly due to the declining price of beef and soaring feed grain prices while the cattle fattening underwent. Other reasons for the less successful performances of the subsequent funds include the lack of reputation or popularity among beef consumers for their beef brand and failure of securing a good retail outlet to capture the favorable market for their output.

Figure 5. Basic Structure of Korea Native Cattle Fund (KNCF)



Summary and Implications

Value chain finance is a systematic or holistic approach emphasizing the interdependence of various economic agents participating in the value chain from

manufacturing/importing agricultural inputs to processing/consumption/exporting farm products. Korea experienced a process of trial and errors in the course of breaking out of chronic vicious circle of poverty caused by the Japanese colonial rule, division of nation into two Koreas, and the Korean War.

It is considered that the extreme poverty and predominantly small scale farming as a result of farm land reform caused the multi-purpose cooperative system. The NACF and its member cooperatives, as an integrated value chain finance model, have contributed remarkably to the development of Korean agriculture as noted by C. Miller and L. Jones¹⁶.

Many factors have contributed to the development of the value chain finance system in Korea with the pivotal role of NACF in agricultural input market and output market as well as in financial market.

Firstly, it should be noted that the government policy, in most cases, has been favorable to the integrated value chain financing system. The Farmland Reform, implemented under the principle of “land to the tillers” in 1950’s, enabled former tenant farmers to get secured loan. Farmland Mortgage Act of 1962 allowed cooperative institutions to take the farmland as collateral while the commercial banks were prohibited from financing on farmland mortgage. This Farmland Mortgage Act together with the Usurious Loan Relief Program and the establishment of the multipurpose cooperative system through the merger of the former NACF and Agriculture Bank, became an important basis for the development of integrated value chain finance system. Moreover, the implementation of agricultural credit guarantee program since early 1970’s has been an important factor that stimulated the improvement of value chain finance.

Second, the NACF and its member cooperatives were successful in securing financial resources for value chain finance. Agricultural cooperatives promoted “a spoonful of rice movement” and monthly/annual Savings Days were celebrated nationwide to sensitize the virtue of diligence/frugality/saving. The NACF operated banking branches in urban area in order to obtain financial resources for financing in agricultural value chain. Most of the local governments at county level and some of the national level public institutions have designated the NACF as their main bank and their savings deposit has accounted 30-40 percent of the total savings deposit received by the NACF. The growth of mutual credit by primary agricultural cooperatives, development of cooperative insurance, and the introduction of the interest-compensated loans have been important factors that stimulated the development of value chain finance.

Third, the NACF and its member cooperatives succeeded in taking advantage of the multipurpose cooperative system. It was generally noted, among most Korean farmers, that taking the advantages of the multipurpose cooperative system was inevitable to get rid of the extreme poverty of predominantly subsistence small scale

¹⁶ They noted “NACF is a successful integrated value chain finance model as Rabo Bank” in Calvin Miller and Linda Jones (2010), *Agricultural Value Chain Finance: Tools and Lessons*, FAO. P.44

farming. Some of the advantages, the multipurpose cooperatives system or integrated value chain finance had, include:

- It reduces transaction costs and risks in value chain financing by reducing the need of collateral and financial status inquiry and so on;
- It can increase the turnover ratio of financial resources; and
- It enhances synergy effect through economy of scope as well as economy of scale.

Fourth, it seems to be important to recognize that concerted and harmonized efforts among different ministries, agencies and institutions for the rural development could facilitate the role of the integrated value chain finance. It is observed in many developing countries that agricultural production, farm input production such as fertilizers and farm machinery, agricultural finance, agricultural cooperatives, and processing/marketing/trade of agricultural products are regulated/supported by different institutions. For the coordination among the related agencies for agricultural finance, the NACF included Minister of Agriculture, Minister of Finance, Deputy Governor of the Bank of Korea (the central bank) in its Board members in 1960's. In 1970's, the Saemaul Undong or New Village Movement contributed to the harmonization/coordination of various programs for rural/agricultural development.

Fifth, the NACF and its member cooperatives have made great efforts to develop their human resources and management through diversified training and education. In addition, they were successful in maintain the public reputation and public confidence on their business activities. Many illegal uses of the NACF brand by private businessmen may be the evidence of the competitiveness of the NACF brand.

Nevertheless of the past development, it must be noted that there have existed pros and cons of the integrated value chain finance system in Korea. Major criticism on the NACF and the integrated nature of the multipurpose cooperative system include:

- It lacks the specialization and division of labor in each business area due to the complex and diversified role of the NACF and its member cooperatives;
- It became a dinosaur business organization hampering speedy adjustment to a changing economic and social environment; and
- Korean agricultural sector has faced with the financial market where excessive money supply prevails compared with excessive demand for money in the past when the multipurpose cooperative system was successful.

It is true that the integrated value chain system appreciated as successful in the process of economic and social transformation from a very poor subsistent agriculture to commercialized modern agriculture may not necessarily guarantee the success in the future. Therefore in 2012, the NACF made an effort to reengineer its organizational structure. The most noticeable change was the separation of banking/finance business and economic business in terms of legal framework. The new system has not been completely settled down and thus it is too early to assess it.

It is certain that a value chain finance system successful in a country or in a certain time may not always be successful in other countries or in other time context although some useful lessons or implications can certainly be derived from the success or failure experiences of a country.

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