Current Status of the Tornyok Management Entities in Suburban Area of Jeollabuk-do Province, Korea

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Current Status of the Tornyok Management Entities in Suburban Area of Jeollabuk-do Province, Korea[1)]

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Abstract

The Tornyok Management Entity was conceived as regional agricultural management organization in Korea. In the conceptual phase of the plan, the objective was to integrate rural communities to reduce disparities within rural areas. Two measures were designed for integration. The first was the joint use of farmland, and the second was the cooperative work of farmers, including the elderly. For the latter, the aim was to integrate rural society through cooperative work between large-scale farmers and small-scale elderly farmers. While joint use of farmland and cooperative work among farmers have not been realised, among the Tornyok Management Entities, some groups of large-scale farmers have succeeded in processing and distributing agricultural products and in sharing work. They have also had some success in reducing operating costs and increasing income. However, this is different from the social integration envisioned in the original planning concept.

Keywords: Tornyok Management Entity, Farmland, Rural Society, Elderly Farmers

1. Introduction

Since the 1990s, the Republic of Korea (hereafter Korea) has aimed to improve its competitiveness as a measure to open up the domestic agricultural market, and it has achieved a certain degree of success through its policy of fostering large-scale farmers. However, in this process, the gap between large-scale farmers and small-scale farmers widened, and small-scale farmers who were not eligible for support remained, leading to the polarisation of rural areas[3)]. The aging of farmers in the 2000s led to further polarisation of rural areas. During this period, management succession for elderly small-scale farmers and the survival of rural society also became an issue[4)].

Around 2010, the restructuring of rural society began to be discussed, and the Tornyok Management Entity was conceived as an alternative to family farming. The Tornyok Management Entity was designed to

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3) For details of structural policy projects in the 1990s, please see Fukagawa (2002).

4) For more information on the aging and polarisation of rural areas, please see. Fukagawa (2018, 2019a).

be localised an agricultural management organization that spanned multiple villages, with a joint management system consisting of large-scale farmers and small-scale farmers planned for the initial stage[5]. The establishment of the Tornyok Management Entities was supported by the government, and in the 2010s, the management entities achieved some success in improving productivity and reducing production costs. However, they have evolved into large-scale farmer-centred organisations, as opposed to the joint management system of large-scale and small-scale farmers envisioned in the original plan. As the original concept of integrating rural society has been diminished, Korean rural society is being reconstructed mainly by large-scale farmers.

Previous studies on the Tornyok Management Entities have considered the possibility of rural social integration through the collective use of farmland and the future formation of cooperative relationships among the several farmer classes, as some of the tasks have already been shared. However, collaboration in the overall production and collective farmland use is not easy, and the Tornyok Management Entities do not necessarily guarantee the survival of rural society. With the opening of agricultural product market, improving international competitiveness has become a top priority. In this context, the Tornyok Management Entities have also been sought to improve their competitiveness, and the development of these organisations has led to a restructuring of rural areas with a focus on large-scale farmers.

There is a reason why large-scale farmers have become the focus of organizational restructuring. In the case of rice cultivation, if rice prices fall to the same level as international prices in the process of improving the country's international competitiveness in the rice market, marginal farmers with high production costs will be forced to exit production, and only large-scale farmer-centred business entities may remain. In such a case, the Tornyok Management Entities will not be responsible for the integration of rural communities but for the re-centring of these communities on large-scale farmers. Analysing the Tornyok Management Entities under the pressure of the price competition and cost reduction associated with the opening up of markets will be key to clarifying the direction of the restructuring and integration of rural communities in Korea.

In this paper, we review the debate and progress surrounding the planning concept of the Tornyok Management Entity and have a discussion of the current status of these entities based on a rural survey conducted in August 2019.

2. Background of the Tornyok Management Entity

1) *The planning concept of the Tornyok Management Entity*

Rural society in Korea has undergone rapid changes in recent years as the country continues to open up its markets. In the 1990s, with the opening up of the agricultural product market, the development of large-scale farmers was promoted to improve international competitiveness, but small and medium-sized farmers

5) The Tornyok Management Entities were first introduced to Japan by the author in Fukagawa (2013).

were left behind, resulting in the polarisation of rural society in the 2000s. As the polarisation of rural society has increased, elderly small-scale farmers, in particular, have found it difficult to succeed in managing their farms, putting the survival of rural society in jeopardy (Fukagawa, 2019b, p.33.). Since the 1990s, structural policies have been used to encourage individual farmers to expand their scale and raise the level of international competitiveness of agriculture, with a focus on large family farm operations, but this approach has had some limitations.

According to Kim, Jeong-ho et al.:

> "The production cost of domestic rice is determined by the production cost of small-scale farmers, who have the lowest productivity. The production costs of small-scale farmers are high, which raises the market price of domestic rice. For this reason, the policy of liquidating farmland (promoting the sale and lease of farmland) was implemented to get the small-scale farmers with high rice production costs off the farm. However, unless the liquidation of farmland (expansion of scale through sale or lease) is coordinated with the regional collective use of farmland, the advantage of large-scale farmland is limited in terms of efficient use of machinery. The solution to this problem is a regional agricultural management organization, such as an unit of village (Kim, Jeong-ho *et al*. 2011, p.v.)."

To improve the country's international competitiveness in the rice market, it would be necessary to lower the domestic rice price to the same level as the international price. However, since the rice price under the protective agricultural policy is determined by the production costs of marginal elderly small-scale farmers, it cannot decrease as long as these farmers remain in the market, thus delaying the opening up of the market.

In an effort to encourage marginal farmers to leave their farms, policymakers attempted to integrate the small-scale farmlands into large-scale farmland, but the dispersed farmland became a problem. A farmer who rents or buys a lot of dispersed farmland would be shown as managing large-scale farmland, according to statistical figures. However, in reality, these pieces of farmland were not grouped together; thus, farmers would have to move their machines frequently among the fields, which is inefficient for the use of large machinery.

As such, the integration of small-scale farmers' farmland with large-scale farmers was unable to progress, and as a result, small-scale farmers were unable to leave their farms. Therefore, in order to encourage small-scale farmers to leave their land and, consequently, lower production costs by promoting both farmland collectivisation and farmland expansion, the creation of "community-based agricultural management organizations", referred to as the Tornyok Management Entities, was conceived (*Ibid.*). Thus, Kim, Jeong-ho et al. (2011) points out that this policy, while advocating rural integration to correct the disparity, was actually a large-farmer-centred rural reconstruction that encouraged small farmers to leave farming.

Another objective of the Tornyok Management Entity was to promote farmland mobility to improve

international competitiveness. In the process of improving competitiveness, it was necessary to liquidate farmland by small-scale farmers to give up farming in order to reduce production costs. Since it is difficult to liquidate ungrouped farmland, the grouping of farmland is a priority issue.

The collectivisation of dispersed farmland requires cooperation not only within the village but also at the regional level beyond the village. However, the collective use of farmland was hampered by farmland leases and scattered plots. In Korea, more than 40% of farmland is leased farmland, and most of them are owned by urban residents and leased to farmers in the villages. This is a likely constraint on the collective use of farmland, as it is extremely difficult to obtain the consent of many farmland owners. Through the Tornyok Management Entities, the integration of dispersed farmland into a single management unit would pave the way for collective use. Therefore, the focus of the policy planning concept shifted from the correction of disparities to the collectivisation of farmland.

2) *Collective use of farmland*

Kim, Tae-gong *et al*. (2007) stated that the conversion of elderly small-scale farmers to "territorial organization management" (farming organization in each village) could be considered as a way to collectivise farmland. With the conversion, they would not deal with the complicated ownership relationship but would promote the collectivisation of farmland through its joint use.

> "Small-scale and elderly farmers who cannot expand their scale of production can consider switching to 'territorial organisation management', which can realize the advantages of cooperation and collectivisation at the same time. We can separate the ownership and use of farmland and aim to collectivise the use of farmland. In order to overcome the disadvantages of the small size and decentralisation of the farmland, the ownership of the farmland will be kept as it is, and the use of farmland will be coordinated to implement the joint use of the regional units (Kim, Tae-gong *et al.* 2007, p. 7.)."

In other words, the purpose of establishing a management organisation would be to use farmland collectively, and it was assumed that the ownership of the farmland would be kept as it was, with the land being used jointly by the local community. In Korea, farmland ownership is complicated due to the widespread leasing relationships. It is difficult to promote grouping and collectivisation while organising ownership. Therefore, they say that they would promote "joint use in regional units while leaving the ownership of farmland intact (*Ibid*)."

According to Kim, Tae-gong *et al*. (2007), "There is a side-effect in the process of renters' farmland exceeding 40% of the total farmland, and we need to consider measures to promote structural improvement by making the system of farmland leasing more transparent (*Ibid*)." He added, "Farmers are paid subsidies in the form of 'direct payments' by the government. These subsidies, in the form of rents, are leaked out from farmers to landowners living in cities. The cost of agricultural production is higher than it would be without

the rent. In order to expand the scale of management and collectivization of farmland, transparency of this farmland lease is an issue (*Ibid*, p. 17.)." In practice, however, "transparency" is not easy to achieve because of the complexity of ownership. For this reason, it was envisaged that only the use of farmland would be shared, without dealing with the actual ownership of the land.

The remaining 60% was self-cultivated farmland and, as such, not necessarily easy to use. Given the large number of smallholdings of elderly small-scale farmers in rural areas, cooperative relationships are necessary for their joint use. In the Management Entities, the conditions for joint use of farmland still have not been established. The actual organisation of agriculture has not developed to the stage where it is involved in the management of farmland beyond the sharing of some farm work and the organisation of the distribution stage.

One of the reasons for the lack of joint use of farmland is the treatment of elderly small-scale farmers after they leave farming. Small-scale farmers who do not own machinery outsource heavy work, such as harvesting, during the busy farming season to large-scale farmers, while they themselves are only responsible for light work. Elderly small-scale farmers who outsource their mechanical work do not need to entrust their farmland to joint use. Large-scale farmers who undertake their work also benefit through the income from contracting fees and depreciation costs of machinery by expanding the scale of work. Elderly small-scale farmers and large-scale farmers are in a stable equilibrium relationship with the outsourcing of heavy work while maintaining their own farm management, and there is no reason for them to move to joint use of farmland (Fukagawa, 2018 p.45.).

It has been difficult to make progress in sharing the use of farmland and work in Tornyok communities instead of outsourcing. This is because older small-scale farmers will lose the opportunity to do light work and the related income if they cease their outsourcing arrangements. Instead of cooperating in the joint use of farmland, older small-scale farmers need to be offered the possibility of getting a certain amount of work within the organisation that allows them to survive as a member of the rural community. As the joint use of farmland can only be made possible when elderly small-scale farmers cooperate, several planning concepts have been proposed for cooperation within rural communities.

3) *Cooperation within rural communities*

A prerequisite for the joint use of farmland is cooperation within rural areas, which was established as a core policy principle when the policy shifted from fostering large-scale farmers in the 1990s. According to Kim, Jeong-ho *et al*. (2011),

> "The policy principles of agricultural structural policies need to move away from market, competition, and survival of the fittest to consider the opposite principles of community, cooperation, and coexistence. It is never efficient for a small number of survivors to survive through free competition and for a large number of dropouts to occur, inducing huge social costs for the national economy as a whole. One

way to prevent polarization and conflict in society is to establish a system within the community where agricultural management entities form organizations to cooperate with elderly small-scale farm families. In this case, participation rather than dropout or withdrawal would not only be advantageous for expanding the scale of farming, but also for promoting multiplication and diversification of management, as well as providing opportunities for elderly small-scale farmers to participate in farming operations and take up partial employment (Kim, Jeong-ho *et al*. 2011, pp. vi - vii.)."

Based on the above context, the Tornyok Management Entities were planned and conceived as a "community-based agricultural management organization", in which large-scale farmers and small-scale farmers would work together to maintain and manage local agriculture. Within this organisation, it was not intended to encourage small-scale farmers to leave farming, but rather to employ small-scale farmers so that they could manage farmland together with large-scale farmers. In such an organisation, it would be necessary to allocate work according to the abilities of each individual and maintain the level of communication required among the parties. After engaging in such collaborative work, the joint management of farmland could be envisioned for the future.

According to Cho, Gaok *et al*. (2011), the Tornyok Management Entities include small areas, but areas of less than 50 hectares are expected to cooperate with neighbouring Tornyoks to establish management systems. In principle, all farmers in a Tornyok should participate in the Management entities. The local Tornyok, ensures that roles are shared among farmers. For example, the young people who own agricultural machinery might share the work requiring major agricultural machinery, while the elderly and small farmers share the work of assisting with water management (Cho, Gaok *et al*. 2011.).

However, there are not enough incentives to move farmers to achieve these goals. In Kim, Tae-gong et al. (2007)'s study on territorial organizational management, it was assumed that elderly small-scale farmers would be incorporated into a territorial organizational management structure in order to collectivise farmland, but no method was presented for how to incorporate them, and it has been difficult to find an incentive to organise these farmers in rural communities.

Park, Mun-ho (2012) presented the idea of providing incentives to farmers through a "business approach", while using the same name of "territorial organizational management". He proposed this as an incentive for farmers themselves to engage in organising (Park, Mun-ho 2012.). Although Park, Mun-ho (2012) does not elaborate on the content of the approach, he seems to assume that the Tornyok Management Entities are not only agricultural Management entities but also organisational entities that solve social and economic problems in the region. Therefore, in running these organisations, it seems to be assumed that a profit motive, or "business approach", is a possible incentive.

According to Park, Mun-ho (2012), a "local-connected management organization" aims to improve economic rationality and revitalise the local economy through farmland utilisation and related organisational activities based on the consensus of local farmers in a village or a certain area. To achieve this, it is necessary

to build a production organisation that is territorially and geographically related. Here, the purpose of community farming is to secure the conditions for settlement in the village, and for this purpose, the "business approach" is also necessary. It is also important to gather the remaining labour force in the village and ensure that everyone protects the agriculture, thereby preserving the paddy fields and creating a settled space where people can live. Furthermore, local rural communities need to be recognised and utilised as part of a business-like organisation that solves social and economic problems in rural areas, moving away from the concept of simply being a space where local farmers live (*Ibid.*).

It has been said that, socially and culturally, Korea does not have a deep-rooted territorial community[6]. Since blood relations are more important than territorial relations in Korea, the concept of maintaining territorial villages and communities is limited. In the planning concept of "territorially related organizational management bodies" in Korea, it is recognised that the intention is to build new social ties and unite people in villages by introducing the business concept. The emphasis on territorially connected organizational Management Entities may also be seen as an attempt to complement the absence of territorial connectedness. The construction of an environment and relationship that allows people living in the same region to collaborate in promoting projects for the region is being sought.

3. Progress and current status of the Tornyok Management Entities

1) *Development policy*

In response to the growing momentum for the creation of the Tornyok Management Entities, the Korean government launched a policy in 2010 to provide continuous support for agricultural organisations through the Tornyok Management Entity Development Project. According to Hwang. Jae-hyeon, a professor at Dongguk University, this project "aims to expand the scale of rice farming by consolidating a minimum of 100 hectares of collectively farmed rice land to young farmers." Applicants need to prepare a plan and apply for the subsidy; if they pass the screening process, the subsidy is provided. In general, a Tornyok consists of one to three villages. Therefore, a Tornyok is a different concept from a village. The government's aim is to support local leaders in the thousands of Tornyok (mainly in plain areas with favourable conditions) and increase the competitiveness of their businesses to open up the market[7].

In Japan, there is a community farming system in which land is collectively used and machinery is shared. However, the Tornyok system differs from the Japanese system in that it combines the sharing of certain tasks with the integration of the distribution process. The details of the Tornyok project are explained in the "Five-Year Comprehensive Plan for the Development of the Rice Industry (Draft)" (hereinafter

6) According to Tashiro (2005) and Shinagawa (2010) in contrast to Japanese villages, which are characterized by a sense of territorial community, Korean villages place more emphasis on blood relationship, and have less of a sense of maintaining the village or hamlet. Therefore, it seems to be difficult to expect the same results even if the Japanese village farming system is directly introduced to Korea (Tashiro, 2005, Shinagawa, 2010, and Itoyama, 2005).

7) Author's interview with Hwang, Jae-hyeon, Vice Professor at Dongguk University, Korea (21 August 2012).

referred to as the "Draft Plan") of the Food Policy Division of Korea's Ministry of Agriculture, Forestry, Fisheries and Food[8]. According to the "Draft Plan", the problem with the current state of rice farming is that "income conditions are worsening due to falling rice prices and increasing production costs, despite the direct payment system", and the Tornyok Management Entity Development Project is to be promoted as an income measure.

As of 2010, Korea had 856,000 hectares under rice cultivation, but this area was expected to be reduced to 700,000 hectares by 2015, assuming a supply-demand equilibrium along with the promotion of pro-environment, high-quality edible rice production. The remaining area would be used for the "cultivation of various varieties of crops to maintain rice production capacity and achieve supply-demand balance. The farmland not included in the 700,000 ha and farmland for field crops was 1.27 million ha. In this area, functional rice (special rice), rice for processing and alcoholic beverages, and other crops (such as soybeans) will be cultivated to improve food self-sufficiency. Roughage can also be grown (*Ibid.*)." Considering this macroscopic production plan, the "Draft Plan" contained a specific plan for the creation of the Tornyok Management Entity.

The Tornyok Management Entities could take a variety of business forms, such as farming cooperative corporations, agricultural company corporations, Management entities of field and horticultural crop brands, and management bodies of minor grain production projects. This policy was oriented towards "integrated scaling"[9], or the integration of several farmers of different scales of operation, rather than a mere scaling up of farmers, to reduce production costs. Support for Tornyok Management Entities was to be provided at a cost of 10 million won per entity for consulting services, and in the long term, it would be extended from Tornyok corporations to village corporations, which would be responsible for community development in their respective areas (Food Policy Division (2010).).

Unlike the original plan, the Korean government's development project has focused on supporting large-scale farmers and aims to improve the management of large-scale farmers by reducing production costs. The original plan envisioned cooperation with the elderly and joint use of farmland, but these were not included in the government project. The priority of this project is to improve the management of large-scale farmers rather than to integrate rural communities. It is assumed that the large-scale farmers will take the lead in the restructuring of rural society.

This project aims to foster leaders of competitiveness by improving the management of large-scale farmers. The policy document states that "integrated scaling up" will cover "multiple farmers with different management scales". Now, approximately 10 years after the formulation of the Fostering Policy, it is

8) Food Policy Division, Ministry of Agriculture, Forestry, Fisheries and Food of Korea. 2010. "Five-Year Comprehensive Plan for the Development of the Rice Industry (Draft)".

9) The term "integrated scaling" here means that the integration and scaling (expansion) of different scale Management Entities, such as small-scale farmers and large-scale farmers, will proceed together. In this case, the process starts with the collaboration of work and sharing of the distribution stage. It is envisioned that the integration of management will lead to a shift from family farming to farming managed by a joint management team, and finally to the joint use (or ownership) of farmland.

necessary to examine the results of integrated scaling. In the following section, we will clarify the discrepancy between the plan's concept and the reality of the Tornyok management through a field survey in rural areas.

2) *Current status of the Tornyok Management Entities*

The following are two examples of the Tornyok Management Entity: a rice farming cooperative and a paddy soybean production and processing corporation. This particular rice farming cooperative is a group of farmers that the planner of the Tornyok Management Entity, Professor Cho Gaok, has been involved with since before the formulation of the fostering policy. It consists of a group of relatively large-scale farmers and is considered a successful example of the Tornyok management entity in rice fields.

The paddy soybean farmers' cooperative was organised in response to the conversion of rice cultivation. One of the support menu items of the Tornyok Management Entity's development project is to reduce the rice production area. This paddy soybean farming cooperative receives this support, and the corporation receives support money by converting its rice crops to soybeans.

The large-scale rice farming group and the soybean cultivation organisation are both successful cases, but as their scale expands, the participation of elderly small-scale farmers decreases, and they tend to become disconnected from the local community. In this section, we explore the achievements and problems of these farming cooperatives through a survey of these corporations.

Hangul Farming Cooperative Corporation[10)]

The corporation is located in Geumgan-dong, Iksan City, Jeollabuk-do Province, which is a typical plain rice farming village in Korea. Although support for the Tornyok Management Entities became a matter of policy around 2010, the members of the Hangul Farming Cooperative Corporation had already started to share the workload in rice cultivation in order to reduce management costs. This group started in 2003 as a friendship group for second-generation farmers who were between 27 and 35 years old at the time. Initially, there were only five members, but after a while, the number of members increased to eight, and the meetings came to include their spouses. In 2004, the members had a meeting with Prof. Cho Gaok of Chonbuk National University and started discussing production and marketing strategies.

Table 1 shows the cultivated area, machinery ownership, and working area of the members as of 2004, before the establishment of the cooperative. Initially, the eight members controlled a total area of rice cultivation of 176.4 ha, averaging 22.1 ha per member. All members owned tractors, including used ones, and the total number of tractors owned was 23, an average of 2.9 tractors per member. Each farmer was equipped

10) Management entities surveyed: Hangul Farmers' Union Corporation (Chairman and two directors). Survey location: Hangul Farming Cooperative Corporation, Geumgan-dong, Iksan City, Jeollabuk-do Province. Survey date: August 7, 2019. Business activities of the corporation: rice + paddy soybean and wheat cultivation Agro-processing. Investigators: Fukagawa Hiroshi, Takayasu Yuichi, Hwang Jae-hyeon, Mizuno Atsuko, and Cho Gaok.

Table 1: Total farmland area under management of group members before the establishment of Hangul Farmers' Cooperative Corporation (December 2004)

Farmer Initial of name	Rice cultivation area (ha)	Tractor (horsepower)	Rice planting machine (number of rows)	Combine (number of rows)	Grain Dryer (units of capacity, Seok)	Total work area (ha) : Own farming area + Contract farming area			
						Ploughing and tilling	Rice planting	Harvesting	Drying
LST	23.2	(65),(80),80	6	4,(4)	38,42,54	39.2	47.2	51.2	35.8
KSK	22.8	(35),45,(65),110	6,6	4	38,44,44	41.6	45.6	49.6	34.7
PHW	13.2	42,65	6	4	42,44	22.8	22.8	22.8	16.0
BSC	32.0	(35),(65),110	6	4,4	40,46,46,54	36.0	44.0	40.0	28.0
KWS	32.0	(38),43,(52),115	6	4	42,42,64,(64)	40.0	40.0	40.0	28.0
HDS	11.2	(42),55	6	4	42,45,62	35.2	35.2	39.2	27.4
YJH	20.8	42,(47),90	6	4	40,60,60	28.8	28.8	28.8	20.2
LCS	21.2	(43),113	6	4	(42),42,46	38.8	38.0	38.0	26.6
Total	176.4	23 units	9 units	10 units	25 units	282.4	301.6	309.6	216.7
Average number of machines per farmer	22.1	2.9 (193HP)	6 (number of rows)	1.3 (Number of machines)	3.1 (148 Seok)	35.2	37.7	38.7	27.1

Source: Materials obtained during field survey.

Note: Figures in parentheses related to agricultural machinery are data for machinery either purchased used or after the depreciation period.

with a rice planter, combine harvester, and dryer, and the work was contracted to cover the cost of the machinery. Even though the average area of rice cultivation per farmer was 22.1 ha, the working area, including the contracted area, was 35.2 ha for cultivation, 37.1 ha for rice planting, and 38.7 ha for harvesting. The total management area, including contract work, was approximately 300 ha.

In 2006, they held a meeting to discuss the operations of the group. The discussion focused on how to reduce costs and how to counter the falling price of rice in the face of declining consumption and pressure to open up to imports. Specifically, they discussed the combinations of joint work and marketing to reduce production costs and joint work and *pumashi* (labour exchange) to solve labour shortages.

The following year, the group began to consider ways to reduce costs by operation and divided the Tornyok farmland into two plots for joint ploughing operations. They also divided the land into three plots and carried out seed selection, seedling management, and rice planting. In addition, they discussed the timing of harvesting and joint shipping and explored ways to reduce related costs.

The Hangul Farming Cooperative Corporation was formally established in 2008. Initially, the cooperative had seven members and 250 hectares. The total area under rice cultivation and the average per capita area increased compared to 2004 (Table 2).

In 2009, the corporation was selected as one of the Tornyok Management Entities and received support for a wide-area sprayer. In the same year, the corporation also received support for a joint nursery under the Jeollabuk Province Rice Competitiveness Improvement Project. The data for 2014 reflect a diversification of management and a shift to multiple management (Table 3). While the size of the rice cultivation area has remained unchanged, the areas for wheat, Korean cattle, and strawberry cultivation has increased, bringing

Table 2: Area under rice cultivation, ownership, and use of agricultural machinery among Hangul Farming Cooperative Corporation and its members (May 2008)

Farmer (Initial of name)	Age		Rice cultivation area (ha)	Agricultural machinery (horsepower, number of rows)			Total work area (ha)		
	Parent Brother	Himself		Tractor	Rice planting machine	Combine	Ploughing and tilling	Rice planting	Harvesting
LST	58	34	44.0	125,80,(80) [2)]	8	4,6	56.0	76.0	68.0
KSK	42	37	40.0	110,(65),45,(35)	8,6	4	43.2	51.6	44.0
PHW	−	34	14.0	90,42	6	4,6	18.0	20.0	20.0
BSC	62	32	44.0	110,(65,35)	8	6,4	37.6	46.0	46.0
KJS	68	37	48.0	115,(52),43,(38)	8	5	42.0	42.0	42.0
HDS	63	31	16.0	90,55,(42)	8	4	44.0	50.0	52.0
YJH	68	40	30.0	90,(47),42	8	5	30.0	30.0	30.0
LCS [1)]	76	49	28.0	115,(43)	6	4	36.0	36.0	36.0
Total	−	−	264.0	24 units	9units	11units	306.8	351.6	338.0
Average	62.4	37.0	33.0	−	−	−	38.4	44.0	42.3

Source: Materials obtained during field survey.

Note: 1) LCS withdrew in 2008.

2) Figures in parentheses related to agricultural machinery are data for machinery either purchased used or after the depreciation period.

Table 3: Food crop cultivation area, farm machinery ownership, and utilisation status of the Hangul Farming Cooperative Corporation (October 2014)

Farmer Number (Year of birth)	Area under cultivation by paddy crop type						Agricultural machinery (horsepower, number of rows)			
	Rice cultivation	Barley	Wheat	IR [2)]	Total plantings	Other	Tractors	Rice planting machines	Combines	Drying machines
1(1975)	24(4,20) [1)]	10.0	0.0	0.0	34.0	200 pyeong of mushrooms	105,90,(47,42) [3)]	8	5	(42),54,70
2(1969)	64(32,32)	24.0	24.0	0.0	112.0	−	115,90,(52,43,38)	8,(8)	6	42,50,64 ×4 units
3(1972)	50(8,42)	10.0	0.0	32.0	92.0	230 Korean cattle	135,110,(82,65,45,35)	8	4	(35,44,44),62,62
4(1973)	12(4,8)	0.8	0.0	0.0	12.8	1,800 pyeong of strawberries	90,43,(42)	6	4	75,75
5(1975)	52(14,38)	24.0	0.0	0.0	74.0	Small RPC management	125,90,(80,80,38)	8,(8)	6	70×4units
6(1977)	24(6,18)	12.0	0.0	0.0	36.0	−	110,(110,96,35)	8	6	(42,42,44,62)
7(1979)	32(10,22)	20.0	0.0	0.0	52.0	−	125,(90,55,42)	8	6	(62,62),72,72
Existing subtotal	258.0	100.8	24.0	0.0	414.8	−	31 units	8 units	9 units	28 units

Source: Materials obtained during field survey.

1) Figures in parentheses in the rice cultivation area are own land and rented land.

2) IR is Italian ryegrass.

3) Figures in parentheses related to agricultural machinery are data for machinery either purchased used or after the depreciation period.

the total area under cultivation to 414.8 ha. Although the cultivation of Korean cattle and strawberries is labour-intensive, the shift to multiple management has stabilised its management.

After being selected as the Tornyok Management Entity, paddy double cropping has progressed (Table 4). Wheat crops have stabilised their management and gradually increased the paddy area. In addition, the corporation started producing paddy soybeans in 2017 in response to the rice production reduction policy.

Table 4: Changes in the cultivated area of Hangul Farming Cooperative Corporation's paddy double cropping, by crop (unit: ha, %)

Year	Paddy field area (A)	Wheat crop area					IRG area	Total second gross crop (B)	Double cropping ratio (B/A)	Paddy soybean cultivated area
		Barley	Bare wheat	Subtotal	Wheat	Total				
2012	244.0	–	–	112.8	16.0	128.8	38.0	166.8	68.4	–
2013	258.0	–	–	100.8	24.0	124.8	32.0	156.8	60.8	–
2014	261.2	13.2	50.0	63.2	30.0	93.2	20.0	113.2	43.3	–
2015	261.2	2.0	87.4	89.4	50.8	140.2	22.0	162.2	62.1	–
2016	261.2	18.0	26.0	44.0	56.0	100.0	20.0	120.0	45.9	16.0
2017	270.0	42.0	65.2	107.2	38.0	145.2	32.8	178.0	65.9	64.2
2018	–	–	–	–	–	–	–	–	–	70.0

Source: Materials obtained during field survey.

While some corporations completely shifted from paddy cultivation to soybean management, the Hangul Farming Cooperative Corporation aimed to stabilise its management by staying in paddy cultivation while partially switching to paddy soybean. In addition, it began processing harvested rice. In 2016, the corporation was selected as a rice processing project by the Rural Development Agency, and in 2017, the Hangul Food Farming Cooperative Corporation was established. All of them are oriented toward cost reduction and management stability through cooperative organisations.

The farmers participating in the Hangul Farming Cooperative Cooperation are engaged in diversified farming, including rice farming, livestock farming, and horticulture, and their economic base is stable. The organisation of farming entities has contributed to the improvement of the profitability of diversified farming through the joint use of machinery, seedlings, and fields. The parent generation has entrusted the management of the farms to the succeeding generation, which has enabled them to work together and stabilise the farm income.

The successors of the current owners are eager to manage the farms in the future. Approximately 70% of the farmland managed by the members of the corporation is rented land, and approximately 50% of the owners are absentee landowners. The reason for the success of the corporation is that the plots are located in plain areas, and the conditions for expanding the scale of farming through mechanisation are in place. Approximately 30% of the farmers in the area participate in the corporation, and among the remaining 70%, the larger farmers who do not participate are often those whose landlords are old and reluctant to participate in cooperative activities.

Chiksan Paddy Soybean Farming Cooperative[11)]

The Chiksan Paddy Soybean Farming Cooperative is located in Jiksan-myeon, Geumje-si, Jeollabuk-do,

11) Management entities surveyed: Chiksan Paddy Soybean Farming Cooperative Corporation (Executive Director: Han Eun-seong). Survey location: Chiksan Paddy Soybean Farming Cooperative Corporation, Jiksan-myeon, Geumje, Jeollabuk-do. Survey date: 7 August 2019. Business activities of the corporation: Paddy soybean cultivation (480 ha in 2018), contract work, processing, and refining business. Survey conducted by Fukagawa, Hiroshi, Takayasu Yuichi, Hwang Jae-hyeon, Mizuno Atsuko, and Cho Gaok.

approximately 30 minutes by car from the Hangul Farming Cooperative. It was started in 2011 as the Chiksan Paddy Soybean Farmers' Association with 11 members in its paddy soybean (hereinafter referred to as "soybean") crop group (Table 5). In the same year, the association signed a soybean cultivation contract with Geumje Agricultural Cooperative, followed by a contract with Aikbu Co-op in 2012, and in 2013, the crop group was reorganized into the Chiksan Paddy Soybean Farming Cooperative.

In 2015, the cooperative started to produce sub-fertilizer exclusively for soybeans, and it was selected as a case study of excellence in the 6th industry by the Rural Development Agency. 2016 saw the completion of the construction of the cooperative's warehouse and office (150 pyeong; 800 pyeong of land) and a 30-ton/day selection and sorting line. In the same year, a technical demonstration of soybean harvesting and wheat sowing was conducted. In 2017, 800 pyeong of land was purchased, and 400 pyeong of work space for purchasing and field piling was paved. In 2018, the number of members increased to 70, the cultivation area was 580 hectares, and the yield per unit area was one of the highest in Korea.

As of 2019, the cooperative had 73 members, and its assets include five combine harvesters dedicated to soybeans, as well as one wide-area pest control machine, a cooperative warehouse, a single office building, and a complete selection and sorting line (Table 6). One combine harvester dedicated to soybeans is capable of working 40 hectares per year. Each combine harvester cost about 100 million won (approximately 10 million yen), with a useful life of 6 to 7 years. The cooperative hires operators at a rate of 20,000 yen per day, and the harvest period in the fall is 30-50 days. The total area of paddy soybeans in Geumje City is approximately 3,000 ha, and the cooperative iss responsible for harvesting a portion of it. In addition to the cooperative, there are 15 combine harvesters that are privately owned by the members, and in many cases, the members work individually and ask the cooperative line to perform only the milling and processing. The yield of paddy soybeans per unit area in the cooperative is approximately 370 kg/10a, which is twice as much as the 165 kg/10a yield in other areas. This area is originally a paddy field, and the yield per unit area is large due to the good use of water.

The Chiksan Paddy Soybean Farming Cooperative is managed by raising 4 million won per member. The

Table 5: Progress in the development of the Chiksan Paddy Soybean Farming Cooperative

Year	Number of members	Cultivated area (ha)	Yield (tons)	Yield per unit area (kg)/300 pyeong
2011	11	30	90	300
2012	25	70	230	328
2013	40	170	510	300
2014	57	230	780	340
2015	57	200	700	350
2016	58	230	760	328
2017	63	480	1,560p	333p
2018	70	540	2,240	350

Source: Materials obtained during field survey.

Table 6: Machinery ownership status of the Chiksan Soybean Farming Cooperative and its members

Mechanical operation content	Machinery	Owner
Ploughing and tilling	Tractor and tractor-attached cultivator	Privately owned
Fertilization	Tractor-attached simultaneous fertilizer sowing machine or soybean sowing machine	Privately owned
Seeding	4-row Large sowing machine	Privately owned
Weeding	Power sprayers (early weeding) and manual sprayers (mid-term weeding)	Privately owned
Pest control	Wide-area pest control machine (4-ton one unit)	Agricultural cooperative
	Storage management machine, power sprayer	Privately owned
Harvesting	Combine harvesters for soybean production (Yanmar, Kubota) (5 units)	Agricultural cooperative
	General-purpose combine harvesters - (15 units)	Privately owned
Drying	Grain dryers (5 tons, 4 units, converted to use for soybeans)	Agricultural cooperative
	Grain dryer (5 tons, converted to use for soybeans), grain dryer (2 tons)	Privately owned
Sorting	Sorting line (3 tons per hour)	Agricultural cooperative

Source: Materials obtained during field survey.

income from the operation of the cooperative is from the contracted combine harvester work and the cost of sorting. An annual membership fee of 50,000 won per 1,200 pyeong is collected from members who outsource their work. As for the work of the wide-area pest control machine and the fine sorting machine, the cooperative will pay allowances to the members who participate in the work, and the rest will be the income of the cooperative. Farmers' income is in the range of 5 million won per 1,200 pyeong for each shipment, or 3 million won per 1,200 pyeong in the case of tenant farmers. This is about twice as much income as rice cultivation.

According to Prof. Gaok Cho, the Chiksan Paddy Soybean Farming Cooperative is a successful case of an organisation. A turning point occurred in 2011, when the government adopted a policy to diversify income sources for farmers who depend on paddy income. In response to this policy of reducing rice production and encouraging the shifting of crops from rice to other crops, soybeans were planted in paddy fields, and the development of paddy field soybean technology was promoted. One example is fertiliser. Field cropland drains quickly, causing fertiliser to run off, while paddy field cropland retains water and therefore holds fertiliser better. In addition, fertiliser application techniques have improved, and the improvement in yield per unit area has been made possible by innovations in waterlogging management.

According to Mr. Eun-Sung Han, the key to success was the introduction of agricultural machinery and ingenuity (Table 6). The width of the ridges to be set on the combine harvester was standardised in the region when the combine harvester was used for ploughing and levelling. The attachment to the back of the tractor was modified to make the space between the rows uniform at 140 cm. This was made possible through joint development with a local agricultural machinery company. The tractor itself was expensive, costing up to 20 million yen, but the attachments were relatively inexpensive (approx. 1 million yen). This partnership made

it possible to manualize fertiliser application and eliminated the variation in quality among fields in the region.

There are several other reasons for the corporation's success. First, it aimed to increase farm income by reducing costs. Through mechanisation and organisation, they have improved efficiency and shortened working hours. Sowing, the most labour-intensive part of soybean cultivation, and harvesting were mechanised from the beginning of the introduction of paddy soybean cultivation. The cooperative implemented joint pest control through wide-area pest control equipment, enabling the cooperative to take over the pest control and harvesting tasks that require specialised knowledge. The cooperative purchased agricultural materials, such as herbicides and fertilisers, at a low unit cost. It also formulated sowing and harvesting costs to be about 50-70% of the surrounding prices, leading to lower farming costs in general.

In addition, the cooperative has learned high-yield cultivation techniques. Through visits to developed areas and specialised cultivation education several times a year, it has improved its technical skills to ensure stable and high yields. It produces a standard manual for each year and has conducted training sessions during the busy spring farming season. The group made it possible to carry out drying, selection, and sorting in batches, facilitating the process from harvest to sale. Information on pest and disease outbreaks, sowing, pest control, and other important points were provided to members in written and numerical forms.

In addition, a number of sales outlets were secured. The cooperative joined the Aikup Co-op as a full-time producer member and contracted over 600 tons/year. It entered into a sales agent contract with another local agricultural cooperative and established contract cultivation and delivery contracts with large companies and processing and distribution businesses in the surrounding area. Fixed sales points have been expanded, and the goal is to sell the products for more than the government's purchase price. The price is stable, the soybean planting area has decreased from about 80,000 ha to about 50,000 ha nationwide, and the production volume has decreased by about 100,000 tons, so the price is on the rise due to excess demand. About half of the soybeans are sold to co-ops (4,700 won/kg), and the other half are sold to government buyers (4,200 won/kg) and the general market.

While there are many reasons for the success of this corporation, two of the most important are as follows:

(1) Subsidies from the government's production adjustment (reduction of rice production) led to a continuous shift from paddy rice cultivation to paddy soybean cultivation using paddy rice farmland. In the initial stage, there were many individual farmers, but cooperative corporations developed through joint work and sorting.

(2) Given that paddy soybeans are grown in well-watered paddy fields, the yield of paddy soybeans is double that of soybeans grown in other regions of Japan.

As described above, the Chiksan Paddy Soybean Farming Cooperative Corporation has been successful

as a large-scale corporation by promoting crop conversion in response to the government's production adjustment policy. The corporation owns five combine harvesters, but in addition to those owned by the cooperative, there are fifteen combine harvesters owned by individual members, and in many cases, members work individually and ask the cooperative line to perform only the milling and processing. While some of the work is shared, a significant portion of the work is done by individuals, and in such cases, the corporation only takes care of the processing work entrusted to it by the individuals. As a management body, it can be said that the company is maintained through loose ties while retaining a considerable amount of individual discretion.

4. Conclusion

The Tornyok Management Entities in Korea were conceived around 2010 with the aim of eliminating rural disparities and integrating rural communities. The integration methods at the planning stage were assumed to be the sharing of farmland and collaboration in agricultural work, with special focus on including the elderly. In examining the situation 10 years after the plan was conceived, all plan concepts appear to still be in the process of being realised. The Tornyok Management Entities have shown positive results in reducing management costs and increasing income. They have also shown success in organising the processing and distribution of agricultural products, and they have achieved some success in sharing agricultural production tasks, but they are far from achieving their goal of sharing farmland. The Tornyok Management Entities have not been able to collaborate effectively with older small-scale farmers, and instead they are developing as management structures centred on large-scale farmers who are attracted to high income and can secure successors. While cooperative farming has progressed among members from large-scale farms, there has been no progress in cooperative farming among elderly small-scale farmers or in the joint use of farmland.

In preparation for the future expansion of market opening, Korea is in urgent need of measures to open up its markets, especially for rice farming villages. The Tornyok Management Entities have contributed to increased productivity, reduced production costs, and improved the competitiveness of agriculture, but it is unclear whether they will develop into a viable alternative to family farms. The policy objective of regional unit agricultural Management entities is to halt the polarisation of rural society, but the focus on these organisations may accelerate the polarisation and lead to rural restructuring. The Tornyok Management Entities have moved away from the original goal of social integration, and the original planning concept of rural social integration currently appears to be unachievable.

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