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研究論文

Transformation of Korean Rural Society under Globalization: A Study Based on Agricultural Census 2015

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This paper clarifies the changes in Korean rural society under globalization based on the 2015 Agricultural Census. In Korea, large-scale farmers were supported with the aim of improving agricultural competitiveness under the market opening in the 1990s, but many small-scale farmers did not receive support, polarizing the farmer class into large and small farmers. According to popular wisdom, polarization increases inequality and thereby creates tension in rural societies. However, we found that such tension does not exist in rural Korea because outsourcing operations make large- and small-scale farmers interdependent. More specifically, we found that elderly small-scale farmers outsource heavy farming work to large-scale farmers who own machines. Large-scale farmers can depreciate large machines by undertaking heavy farming work. On the other hand, small-scale farmers can save machine ownership costs. Of late, contract fees have been falling due to competition among large-scale farmers, which creates a favourable conditions for small-scale farmers. While rural polarization usually brings tension and instability to rural societies, we found that this mechanism of outsourcing work between large and small farmers has brought equilibrium and stability to rural Korea.

1. Introduction

In a previous paper, the author analysed rural Korean society based on the 2010 Agricultural Census[1]. This paper sheds light on recent changes in rural society, as evidenced by the 2015 agricultural census.[2]

In recent years, the Korean domestic agricultural product market has been opened to foreign markets and domestic agriculture production is now increasingly exposed to global competition. Economic conditions for domestic farmers have become more challenging and rural society is changing rapidly. To respond to these conditions, in the 1990s, Korean agricultural policies promoted the scaling up of farms to improve productivity and competitiveness through agricultural mechanisation. However, elderly farmers were excluded from this policy since they were not able to invest in mechanisation. It is challenging for elderly farmers to scale-up their farms—as a result, the number of elderly farmers as a proportion of

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1) Fukagawa, Hiroshi. 2018. 'Transition of Agricultural and Rural Policies in Korea: Polarization and Reorganization of Rural Society since the 2000s.' *The Journal of Korean Economic Studies* 15: 23-47. (in Japanese)

2) This paper is an extended and translated version of Fukagawa, Hiroshi. 2019. 'Changes in Korean Rural Society Seen on Agricaltural Census 2015' *The Anual Report, Research Center for Korean Studies* 19: 29-42. (in Japanese)

small-scale farmers showed an increase. Most farmers operate on a small scale and have no successors; as they age, they struggle to continue farming on their own.

Many elderly small farmers outsource their farming to large-scale farmers with heavy machinery. Large-scale farmers require full operation and depreciation of large machinery, increasing the amount of contract work. Contract fees for large-scale farmers have been falling as a result of competition among them. Naturally, elderly small-scale farmers prefer outsourcing farming for as low a fee as possible. With the expansion of this outsourcing relationship, elderly small-scale farmers have became more dependent on large-scale farmers and, as a result, the polarisation of farmers' classes in rural areas is increasing. This is driving a re-organisation and integration of the rural strata, centred on large farmers. Eventually, the elderly small-scale farmers quit farming, and their resources, such as farmland, are integrated into those of large-scale farmers.

This trend is accelerated by the international competition for rice production. To improve the international competitiveness of rice production, it is necessary to reduce the price of domestic rice to bring it in line with international prices. Rice prices are usually determined by the high production costs of marginal farmers, many of whom are elderly small-scale farmers. As long as marginal farmers are in operation, rice prices will not fall. However, if the domestic agricultural product market opens to foreign markets, foreign agricultural products will be imported into Korea. As a result, the supply of agricultural products will exceed demand, and the domestic rice prices might fall to international levels. In such a case, there is a possibility that the elderly small-scale farmers will move out of cultivation and quit farming, and their farming resources, such as farm land, will get integrated with those of large-scale farmers.

This paper examines past agricultural policies from the above perspectives and analyses changes in rural Korean society based on the 2015 Agricultural Census.

2. Background to the polarisation of rural society

2.1 Characteristics of agricultural policies in each period

Kim, Jong Ho. et al. (2011) summarised the characteristics of agricultural policy during different periods in Korea (Table 1)[3].

During the first period (1948-1967), the Korean government attempted, but failed, to enact a farmland law that banned the lease of farmland allocated to farmers through farmland reform. Food self-sufficiency was not achieved and imports of foreign agricultural products caused grain prices to fall. In the second period (1968-1977), the Korean government achieved food self-sufficiency and implemented a high price policy for rice and the 'Saemaeul Movement' to develop rural areas. However, in the process of industrialisation, the number of people who left farms increased and there was a decline in agricultural population. In the third period (1978-1985), the number of people leaving farms continued to increase and, under this increasing labour shortage, mechanisation began. The agricultural population thus continued to decline. In the 1980s, with relatively favourable economic growth, Korea grew out of the developing country stage and was classified as a middle-income country. However, since this growth was

3) Kim, Jong Ho. et al. 2011. 'Study on Evaluation of Agricultural Structural Policy and Establishment of Direction II: Focusing on Rice Agriculture,' Korean Rural Economic Institute: 24.

Table 1 Development process of Korean agricultural policy

1st period 1948-1967	Agricultural land reform implemented (1949)
Development of institutional base	Enactment of the Agricultural Basic Act (1967)
	Import of surplus agricultural products (Based on Public Law 480)
2nd period 1968-1977 Agricultural policy for increase of food production	Pursuit of parallel development of agriculture and industry
	Challenges of increasing agricultural income
	Promotion of the Saemaeul Movement (1970s)
	Green Revolution and High Rice Price Policy
	Achieved the goal of food grain self-sufficiency (1977)
3rd period 1978-1985 Agricultural policies for increase of income	Cumulative deficit in food purchase budget and debate over food policy change
	Imports of food grains and the start of a low grain price policy following the cold damage of 1980
	Beef price crash and farmers' debt problem (1984 and 1985)
	Increasing debate over comparative advantage and non-farm income claims
4th period 1986-1997 Agricultural policy for structural reform	Market opening claims emerging. Agriculture and fishing village comprehensive measures (1986)
	Graduation from GATT BOP (Restricted Import Countries for Balance of Payments) (1989)
	Special Act for Rural Development (1990)
	Agriculture and Fisheries Restructuring Plan (1992)
	Uruguay Round (UR) negotiations concluded (1993), WTO launched (1995)
	Special Agricultural and Fishing Villages Tax (1994)
5th period 1998-present Market-opening agricultural policy	Currency crisis, IMF controls (1998)
	Agriculture and Rural Basic Law enacted (1998)
	Postponement of rice import liberalisation (from 2005 to 2014)
	Conclusion of FTA (Chile, ASEAN, US, EU, etc.)
	Special Act on the Improvement of the Quality of Life of Farmers and Fishermen and the Promotion of Rural Development (2005)
	Agricultural, Rural, and Food Industry Basic Law enacted (2008)

Source: Kim, Jong Ho. et al. 2011. Study on Evaluation of Agricultural Structural Policy and Establishment of Direction II: Focusing on Rice Agriculture, Korean Rural Economic Institute: 24.

achieved mainly by exports, it became increasingly necessary to open the domestic markets to foreign countries and imports increased. In the fourth period (1986-1997), demands for opening agricultural markets began to rise. In the 1990s, the Uruguay Round (UR) negotiations were concluded and agricultural markets were opened except for rice. To prepare for this opening of markets, the agricultural structural policies were put in place[4].

UR negotiations began in 1986 during the fourth period. In 1989, Korea announced a plan to liberalise imports of agricultural, forestry, and fishery products since the balance of payments in the period 1986-1988 was positive. In 1990, Korea enacted the Special Act for Rural Development to promote further structural reforms in the agricultural sector. In addition, Korea established the Rural Development Corporation and promoted farmland mobilisation through the Farmland Management Fund.

To promote these plans, in 1992, Korea budgeted for a KRW 42 trillion (approximately USD 42 billion) the Agriculture and Fisheries Restructuring Plan (1992- 1998). In 1994, a KRW 15 trillion (approximately USD 15 billion) agricultural special tax budget (1994-2004) was added[5].

2.2 Polarisation of rural society since the 1990s

The policy to promote the scaling-up of farmland in the 1990s caused the polarization of rural societ-

4) Ibid.
5) Kim, Jong Ho. et al., op.cit. p. 26.

ies. The Restructuring Plan in the 1990s achieved its intended goal of promoting large, competitive farmers, but the ratio of older small-scale farmers increased. This put a strain on rural society.

As a result of the WTO negotiations on rice, the liberalisation of the rice trade was postponed in 2004 and the government's system for rice purchase was abolished, as a result of which rice prices began to decline. Such a scenario impacted smaller farmers first since falling prices adversely effected their profitability. Kim, Jong Ho. with reference to the structural policies in the 1990s, stated that problems had been identified early but adjustments and counter-measures were delayed. 'Agricultural productivity has greatly improved due to technological advances such as agricultural mechanisation and automation, but since the mid-1990s, the real price of agricultural products had fallen, making it impossible to increase agricultural income.' [6] The decline in agricultural prices continued after the 2000s, forcing the Korean government to respond differently from the 1990s.

During the fifth period (after 1998), the Korean government responded to the opening of the markets. During this period, the government shifted from its traditional policy of promoting large farmers to that of fostering small and medium farmers by encouraging eco-friendly agriculture and by improving quality competitiveness. In addition, a direct payment system for farmers of all sizes was enforced.

The government rice purchase system supported rice farmers' income; however, this system was abolished in 2004 because of incompatibility with the WTO Agricultural Agreement (WTO Agreement). An alternative system was required to support rice farmers. A direct rice payment system was subsequently enforced which was compatible with the WTO Agreement.

Direct payments are divided into a variable part and a fixed part. For the variable component, the government compensates for 80% of the difference between the falling market price and the target price. The fixed component supports rice farmers on the basis of the environmental conservation of the flooding of paddy fields. This is based on the idea that flooding paddy fields contribute to the conservation of biodiversity. This fixed component is paid out on the basis of the area of the flooded paddy field irrespective of the change in rice prices [7].

In this case, the variable part is partly in violation of the WTO Agreement, but the fixed part of environmental protection is consistent with the WTO Agreement. The direct rice payment system was intended to compensate domestic rice farmers when the market opened while maintaining compatibility with the WTO Agreement. Fixed compensation was extended to all farmers with flooded paddy fields.

According to Kim, Jong Ho. et al. (2011), 'The direction of agricultural administration has shifted from the policy of expanding farming in the 1990s to a policy of small and medium-sized farming and stable management in the 2000s. In particular, it is necessary to develop successors, reflecting the aging of farmers. In order to increase income, direct payments have been enforced instead of past productivity improvement measures.'[8]

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6) In this regard, please refer to the following papers.
Fukagawa, Hiroshi. 2012. 'On Direct Payment in Korea-Response to Market Opening.' *Agriculture and Economy: Special Feature: What to Protect? Direct Payment System Self-Sufficiency, Leaders, Resources, Environment*. 78 (3): 78-85.
Fukagawa. 2011. 'Changes in Korean Agriculture and the Background of the US-Korea FTA.' *Agriculture and Economy, Special Issue: What Happens to Japanese Agriculture with Rapidly Growing TPPs*: 92-97.
Fukagawa, Hiroshi. 2002. *Korean Agriculture under Market Opening. Kuyshu Daigaku Shuttuppankai*:1-427.
7) Kim, Jong Ho. et al., op.cit. p. 44.
8) Ibid.

Table 2 Number of farm households and farm population

Unit: household, person

Survey year	Number of farms	Farm population	Number of families menbers per farmhouse
1960	2,329,128	14,242,489	6.11
1970	2,487,370	14,421,730	5.80
1980	2,157,555	10,826,748	5.02
1990	1,768,501	6,661,322	3.77
1995	1,502,171	4,851,080	3.23
2000	1,383,468	4,031,065	2.91
2005	1,272,908	3,433,573	2.70
2010	1,177,318	3,062,956	2.60
2015	1,088,518	2,569,387	2.36

Source: Agricultural census yearly version

However, even in the 2000s, policies to support large-scale farming continued, and the proportion of large-scale farmers increased. The ratio of small-scale elderly farmers has also increased. As this polarisation grew in rural areas, the survival of small farmers became more difficult. With the aging of farmers, the succession of small-scale farmers and the survival of rural communities have also become problems.

In such a scenario, what is the current state of the polarisation of the rural society and the aging of the farmers? This study explored the situation in the rural areas based on an analysis of the 2015 Agricultural Census.

3. Analysis of the 2015 Agricultural Census

3.1 Decrease in the number of farm households and the farm population

The current aging of farmers has been caused by the decline in the number of farm households and farm population since the 1970s. Table 2 shows that the number of farm households has decreased by about 330,000 in the 1970s, by 389,000 in the 1980s, and by approximately 385,000 in the 1990s. The number of households, which stood at about 2,487,000 in 1970, decreased to approximately 1,089,000 in 2015. The farm population decreased by about 3.59 million, 4.17 million, 2.63 million in the 1970s, 1980s, 1990s, respectively.

The farmer population, which was about 14.42 million in 1970, shrank to about 2.57 million in 2015. During the 45 years from 1970 to 2015, the farm population declined at a faster rate than the decline in the number of farm households, and the number of family members per farm household dropped from 5.81 to 2.36.

In response to this decline in the number of farm households and that of the farm population, the Korean government promoted agricultural structural policies in the 1990s—these included the buying and selling of farmlands, subsidisation of agricultural machinery, and farmland leasing [9]. As a result, the ratio of farm households by management size changed significantly.

Table 3 shows that the proportion of middle-scale farmlands (between 0.5 ha or more and less than 1.5 ha) has decreased, and the proportion of small-scale farms (smaller than 0.5 ha) and large-scale farms

9) Ibid.

Table 3　Changes in the number of farm households by size of farmland management

Unit: farm household, %

Year	<0.5ha	0.5-1.0ha	1.0-1.5ha	1.5-2.0ha	2.0-2.5ha	2.5-3.0ha	>=3.0ha	Non-cultivated agriculture	Total
1995	433,384	432,293	265,295	152,837	79,565	43,872	70,839	24,086	1,502,171
2000	440,605	378,655	219,479	132,055	70,234	43,556	84,714	14,170	1,383,468
2005	457,815	330,651	173,939	106,746	55,930	37,365	93,445	17,017	1,272,908
2010	472,657	287,695	141,501	87,039	46,612	31,628	96,630	13,556	1,177,318
2015	486,234	255,365	113,819	71,292	36,387	26,248	88,695	10,478	1,088,518
1995	28.9	28.8	17.7	10.2	5.3	2.9	4.7	1.6	100.0
2000	31.8	27.4	15.9	9.5	5.1	3.1	6.1	1.0	100.0
2005	36.0	26.0	13.7	8.4	4.4	2.9	7.3	1.3	100.0
2010	40.1	24.4	12.0	7.4	4.0	2.7	8.2	1.2	100.0
2015	44.7	23.5	10.5	6.5	3.3	2.4	8.1	1.0	100.0

Source: Agricultural Census Yearly Version.

(3.0 ha or more) has increased. Between 1995 and 2015, the percentage of farm households under 0.5 ha increased from 28.9% to 44.7%, and those over 3.0 ha increased from 4.7% to 8.1%. On the other hand, farms between 0.5- 1.0 ha, 1.0-1.5 ha, and 1.5-2.0 ha all shrank. In particular, the 1.0-1.5 ha category dropped significantly from 17.7% in 1995 to 10.5% in 2015.

The total number of farms has dropped significantly from about 1,520,000 to about 1,088,000. The number of middle-scale farm households (0.5-2.0 ha) has decreased, as has the total number of households. On the other hand, the number of farm households less than 0.5 ha increased from about 433,000 in 1995 to about 486,000 in 2015. The number of farm households with more than 3.0 ha also increased from about 71,000 to about 89,000 during this period. The decrease in the middle-scale class farms and the increase in the small- and large- scale farms is an indicator of polarisation in the farming sector.

The background to the increase in small-scale farmers is (a) the increase in part-time farmers, and (b) the aging of farmers. In the former, the extension of urbanisation has spread to rural areas, and the number of part-time jobs has increased. If side-income income can be obtained, small-scale farmers can stabilise their income. In the latter, the farmers are aging and have lent their farmland to reduce the scale of the farms.

Data on part-time farmers is examined in Table 4. The ratio of part-time farmers in Korea is low—at about 40%—compared to Japan, where the comparative figure is 80%. Looking at changes every five

Table 4　Number of full and part time farm households

Unit: Farm household, %

Year	Full timefarm households	Part time farm households	Type 1 part-time farm households	Part time by owner	Part time by household member	Part time by owner and household member	Type 2 part-time farm households	Part time by owner	Part time by household member	Part time by owner and household member	Number of Farm households
1995	849,053	651,692	277,214	69,165	140,644	67,405	374,478	86,661	139,308	148,509	1,500,745
2000	902,149	481,319	224,642	42,227	132,471	49,944	256,677	61,935	91,413	103,329	1,383,468
2005	796,220	476,688	164,976	37,061	78,788	49,127	311,712	86,111	106,150	119,451	1,272,908
2010	627,460	549,858	193,438	50,753	74,184	68,501	356,420	93,101	116,523	146,796	1,177,318
2015	598,466	490,052	172,450	48,650	47,992	75,808	317,602	94,141	76,398	147,063	1,088,518
1995	56.6	43.4	18.5	4.6	9.4	4.5	25.0	5.8	9.3	9.9	100.0
2000	65.2	34.8	16.2	3.1	9.6	3.6	18.6	4.5	6.6	7.5	100.0
2005	62.6	37.4	13.0	2.9	6.2	3.9	24.5	6.8	8.3	9.4	100.0
2010	53.3	46.7	16.4	4.3	6.3	5.8	30.3	7.9	9.9	12.5	100.0
2015	55.0	45.0	15.8	4.5	4.4	7.0	29.2	8.6	7.0	13.5	100.0

Source: Same as Table 3

years, since the 1995 census, the ratio of part-time farmers declined from 43.4% in 1995 to 34.8% in 2000 to 37.4% in 2005. Subsequently, it increased to 46.7% in 2010. A reason for the dip in between is that, around the year 2000, the number of part-time jobs decreased due to the recession caused by the Asian economic crisis, and as a result, the ratio of part-time farmers fell. However, since then, the figures for part-time farmers have recovered, as evidenced by the 2010 and 2015 censuses.

In addition, the ratio of Type 2 part-time farmers is much higher in the 2010s as compared to 1995. A Type 2 farmer is one who earns more part-time income than agricultural income. A Type 1 farmer, on the other hand, earns more agricultural income than part-time income. The ratio of Type 2 part-time farmers in 1995 was 25.0%, but increased to 39.3% in 2010, and was 29.2% in 2015. This is thought to be due to an increase in the number of farmers with part-time family members.

The ratio of Type 2 part-time farmers with multiple family members has also increased slightly, from 9.9% in 1995 to 12.5% in 2010 and 13.5% in 2015, respectively. This may be due to the stagnation of agricultural economic conditions. Another reason is thought to be the development of transportation infrastructure, which led to the increased possibilities of part-time commuting.

However, the ratio of part-time farmers peaked in 2015. A reason for this could be the increase in the number of elderly farmers who have few side jobs. The aging of farmers is progressing and the ratio of elderly people who have difficulty working part-time is increasing.

3.2 Aging of farm family members

Table 5 analyses trends in the number of generations in farm households (an indicator of fragmentation of farmland). The data shows that, over the period in question, the percentage of two-generation and three-generation households decreased and the proportion of one-generation and single-person households increased. From 2005 to 2015, the ratio of single-generation households increased from 39.9% to 46.8%. The percentage of single-person households also increased from 14.8% to 18.5%. Many of these households are aging. On the other hand, the number of two-generation households consisting of parents and children has decreased from 34.0% to 28.1%. Three-generation households, consisting of parents, children, and grandchildren, have shrunk from 11.0% to 6.5%. The total of single-generation households and single-person households is equivalent to approximately 70% of the total.

Table 6 shows the number of farm households by owner age and number of families. Of the one-person households, 15.2% are 80 or older, 56.5% are 70 or older, and 82.2% are 60 or older. For two-person households, 78.7% are 60 or older. It is estimated that about 80% of two-person households consist of elderly couples. By age group, 32.3% of those 80 or older are single-person households, and 55.0%

Table 5 Changes in family composition by generation Unit: Farm household, %

Year	One generation household	Two generation household	Three generation household	Four and over generation household	One-person household	Unrelated household	Total
2005	508,195	432,866	139,518	3,844	188,091	394	1,272,908
2010	481,157	390,194	115,528	2,900	183,502	4,037	1,177,318
2015	509,258	305,412	71,014	1,298	201,240	296	1,088,518
2005	39.9	34.0	11.0	0.3	14.8	0.0	100.0
2010	40.9	33.1	9.8	0.2	15.6	0.3	100.0
2015	46.8	28.1	6.5	0.1	18.5	0.0	100.0

Source: Same as Table 3

Table 6　Number of farms by number of families and by owner age　Unit: Farm household, %

Age group	1person	2person	3person	4person	5person	>=6person	Total
20～29years	221	208	197	114	41	11	792
30～39years	1,546	3,078	2,437	4,182	2,135	196	13,574
40～49years	7,500	16,361	15,314	25,655	13,855	5,340	84,025
50～59years	26,496	99,980	54,314	39,980	15,556	10,498	246,824
60～69years	51,783	197,893	54,314	16,329	6,509	5,330	332,158
70～79years	83,069	190,530	26,004	7,443	4,859	5,471	317,376
>=80years	30,625	51,567	6,340	2,326	1,474	1,437	93,769
Total	**201,240**	**558,915**	**163,779**	**96,019**	**44,429**	**24,136**	**1,088,518**
20～29years	0.1	0.0	0.1	0.1	0.1	0.0	0.1
30～39years	0.8	0.6	1.5	4.4	4.8	0.8	1.2
40～49years	3.7	2.9	9.4	26.7	31.2	22.1	7.7
50～59years	13.2	17.9	33.2	41.6	35.0	43.5	22.7
60～69years	25.7	35.4	33.2	17.0	14.7	22.1	30.5
70～79years	41.3	34.1	15.9	7.8	10.9	22.7	29.2
>=80years	15.2	9.2	3.9	2.4	3.3	6.0	8.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
20～29years	27.9	26.3	24.9	14.4	5.2	1.4	100.0
30～39years	11.4	22.7	18.0	30.8	15.7	1.4	100.0
40～49years	8.9	19.5	18.2	30.5	16.5	6.4	100.0
50～59years	10.7	40.5	22.0	16.2	6.3	4.3	100.0
60～69years	15.6	59.6	16.4	4.9	2.0	1.6	100.0
70～79years	26.2	60.0	8.2	2.3	1.5	1.7	100.0
>=80years	32.7	55.0	6.8	2.5	1.6	1.5	100.0
Total	**18.5**	**51.3**	**15.0**	**8.8**	**4.1**	**2.2**	**100.0**

Source: Agricultural Census 2015

Table 7　Changes in Farm Population by Age　Unit: Person,%

	Number of farmers for each year					Number of farmers for each year (Ratio)				
	1995	2000	2005	2010	2015	1995	2000	2005	2010	2015
0～9years	319,156	258,405	182,058	142,023	83,089	6.6	6.4	5.3	4.6	3.2
10～19years	784,168	462,396	310,819	261,454	156,298	16.2	11.5	9.1	8.5	6.1
20～29years	574,247	417,183	292,335	212,579	148,055	11.8	10.3	8.5	6.9	5.8
30～39years	464,728	352,122	247,850	217,221	134,731	9.6	8.7	7.2	7.1	5.2
40～49years	586,890	531,597	448,595	363,689	237,315	12.1	13.2	13.1	11.9	9.2
50～59years	867,002	676,367	600,863	586,871	516,990	17.9	16.8	17.5	19.2	20.1
60～69years	790,480	845,945	760,268	621,620	598,932	16.3	21.0	22.1	20.3	23.3
70～79years	348,658	374,551	468,221	520,582	512,162	7.2	9.3	13.6	17.0	19.9
>=80years	115,751	112,499	122,564	136,917	181,815	2.4	2.8	3.6	4.5	7.1
Total	4,851,080	4,031,065	3,433,573	3,062,956	2,569,387	100.0	100.0	100.0	100.0	100.0

Source: Same as Table 3

Table 8　Changes in the number of agricultural workers by age group　Unit: Person, %

Year	<50years	50-60	60-70	>=70 years	Total
1995	1,331,647	852,234	769,782	340,873	3,294,536
2000	925,901	662,549	827,107	379,851	2,795,408
2005	623,267	577,002	741,002	486,773	2,428,044
2010	447,051	561,051	607,491	573,906	2,189,499
2015	280,661	486,304	584,253	632,967	1,984,185
1995	40.4	25.9	23.4	10.3	100.0
2000	33.1	23.7	29.6	13.6	100.0
2005	25.7	23.8	30.5	20.0	100.0
2010	20.4	25.6	27.7	26.2	100.0
2015	14.1	24.5	29.4	31.9	100.0

Source: Same as Table 3

are two-person households. Among households 70 and older, 26.2% are single-person households and 60.0% are two-person households. These facts indicate that farm household members are aging.

Table 7 shows changes, between 1995 and 2015, in the farming population by age. In 1995, the largest percentage of farmers was in the age group 50-59 years (17.9%). Year 2000 onwards, the largest percentage of farmers was in the age-group 60-69 years old with 21.0% in 2000, 22.1% in 2005, 20.3% in 2010, and 23.3% in 2015. Between 1995 and 2015, the percentage of population in the 60s age-bracket increased from 16.3% to 23.3%. The corresponding change for those in their 70s was from 7.2% to 19.9%, and from 2.4% to 7.1% for those in the age-group 80s and above. From this data, it can be inferred that the population is aging.

A significant number of the elderly make a living by engaging in agriculture. Table 8 shows the number of farmers by age group. In 1995, 40.4% of farmers were under the age of 50, and 10.3% were 70 or older. However, by 2015, these percentages changed to 14.1% under the age of 50, and 31.9% for those above the age of 70. The percentage of farmers in the age-group 60 and above almost doubled from 33.7% in 1995 to 61.3% in 2015. On the other hand, the percentage of farmers under the age of 50 decreased from 40.4% to 14.1% during the same period. The proportion of farmers under the age of 60 also dropped significantly from 66.3% to 38.6%.

4. Agricultural management of elderly small-scale farmers

4.1 Cultivated crops of elderly small-scale farmers

Many of the elderly households are small-scale farmers. Table 9 shows farming by farmer's age-group and farmland size scale. Of the small-scale farmers, namely those with landholdings under 0.5 ha, 41.1% are 70 years or older, and 69.2% are 60 years or older. These figures are 42.7% and 72.5%, respectively, for the 0.5-1.0 ha farm sizes, and 39.8% and 72.1% for the 1.0–1.5 ha farm scale. From these trends, we can infer that the mid-scale farmers are also aging.

The ratio of the age group by farm scale is as follows—among farmers with farms smaller than 1.5 ha, the percentage of farmers in the age group of 70 years or older is the highest. Among the farmers with farms of 1.5 ha up to 10.0 ha, the percentage of farmers in their 60s is the highest. Among the farmers whose farms are 10.0 ha or larger, the proportion of farmers in their 50s is the highest. This indicates that

Table 9 Number of Farm Households by Owner Age and Farmland Management Size Unit: Household, %

	<0.5ha	0.5-1.0ha	1.0-1.5ha	1.5-2.0ha	2.0-2.5ha	2.5-3.0ha	3.0-10.0ha	>=10.0	Non-cultivated agriculture	Total
<50years	47,979	18,109	8,403	5,942	2,943	2,364	9,400	1,806	2,445	98,391
50-60	102,616	51,564	23,382	16,869	9,187	7,345	27,240	4,752	3,869	246,824
60-70	137,553	75,624	36,782	24,750	13,398	9,813	28,446	2,855	2,937	332,158
>=70years	201,086	108,068	45,252	23,731	10,859	6,726	13,358	838	1,227	411,145
Number of farm households	489,234	253,365	113,819	71,292	36,387	26,248	78,444	10,251	10,478	1,088,518
<50years	9.8	7.1	7.4	8.3	8.1	9.0	12.0	17.6	23.3	9.0
50-60	21.0	20.4	20.5	23.7	25.2	28.0	34.7	46.4	36.9	22.7
60-70	28.1	29.8	32.3	34.7	36.8	37.4	36.3	27.9	28.0	30.5
>=70years	41.1	42.7	39.8	33.3	29.8	25.6	17.0	8.2	11.7	37.8
Number of farm households	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Same as Table 6

Table 10　Compositions of farm households by age, crop, and full-/part-time in 2015　Unit: Person, %

	<50 years	50-60	60-70	>=70 years	Total
Rice cultivation	103,224	174,367	237,808	306,276	821,675
Food crops	32,232	59,854	68,439	81,312	241,837
Vegetables	51,511	91,996	109,485	109,481	362,473
Special crops / mushrooms	8,805	16,618	19,247	23,179	67,849
Fruits	51,503	86,426	100,915	84,631	323,475
Medicinal crops	3,348	6,120	5,295	3,968	18,731
Flower	5,248	8,499	7,221	4,438	25,406
Other crops	3,306	5,156	5,029	4,570	18,061
Livestock farming	21,484	37,268	30,814	15,112	104,678
Total	280,661	486,304	584,253	632,967	1,984,185
Full-time farmers	83,807	176,986	331,507	463,860	1,056,160
Part-time farmers	196,854	309,318	252,746	169,107	928,025
Type 1 part-time farmers	56,482	96,817	101,775	82,122	337,196
Type 2 part-time farmers	140,372	212,501	150,971	86,985	590,829
Total	280,661	486,304	584,253	632,967	1,984,185
Rice cultivation	36.8	35.9	40.7	48.4	41.4
Food crops	11.5	12.3	11.7	12.8	12.2
Vegetables	18.4	18.9	18.7	17.3	18.3
Special crops / mushrooms	3.1	3.4	3.3	3.7	3.4
Fruits	18.4	17.8	17.3	13.4	16.3
Medicinal crops	1.2	1.3	0.9	0.6	0.9
Flower	1.9	1.7	1.2	0.7	1.3
Other crops	1.2	1.1	0.9	0.7	0.9
Livestock farming	7.7	7.7	5.3	2.4	5.3
Total	100.0	100.0	100.0	100.0	100.0
Full-time farmers	29.9	36.4	56.7	73.3	53.2
Part-time farmers	70.1	63.6	43.3	26.7	46.8
Type 1 part-time farmers	20.1	19.9	17.4	13.0	17.0
Type 2 part-time farmers	50.0	43.7	25.8	13.7	29.8
Total	100.0	100.0	100.0	100.0	100.0

Source: Same as Table 6

the smaller the scale of the farm, the higher the farmer's age.

We now analyse the type of crops grown by farmers in different age groups. Many elderly farmers are engaged in rice cultivation and food crops (Table 10). In the group aged 70 years or older, rice cultivation is the most prevalent at 48.4%, while vegetables and wild vegetables account for 17.8% and 13.4% grow fruits. Rice cultivation accounts for 40.7% of the crops grown by farmers in the group aged 60 to 70 years old. Rice cultivation requires only about 50 days a year when two elderly people in a family engage in production. Further, if the heavy work such as rice planting and harvesting is outsourced, the elderly are able to carry out the lighter work. On the other hand, flowers and livestock farming have far more working days per year, and the work is also difficult to outsource. Consequently, only 0.7% of farmers 70 years or older grow flowers, and the corresponding percentage for livestock farming is 2.4%.

An analysis of full-time vis-à-vis part-time farmers, by age group, is as follows: 29.9% of farmers under the age of 50 are engaged in part-time farming, 36.4% for farmers in their 50s, 56.7% for those in their 60s, and 73.3% of farmers above 70 years are engaged in part-time farming. Conversely, the ratio of part-time farmers increases for younger farmers—of the farmers over 70 years, 26.7% are part-time farmers. This percentage is 43.3% for farmers in their 60s, 63.6% for farmers in their 50s, and 70.1% for farmers under 50. We observe that, of the total farmers, the percentage of full-time farmers increases as the age of the farmers increases. The older they are, the fewer opportunities for part-time jobs there are

Table 11 Farmers' ownership of agricultural machinery by size of farmland under management

Unit: Number of machines, %

	<0.5ha	0.5-1.0ha	1.0-2.0ha	2.0-3.0ha	3.0-5.0ha	5.0-10.0ha	>=10.0ha	Total
Tractor	42,505	45,357	47,014	19,946	21,972	15,845	5,428	198,067
Rice transplanter	34,898	36,560	39,382	16,445	20,148	15,135	5,316	167,884
Combine	8,908	11,182	15,281	8,507	12,531	11,790	4,740	72,939
Rice farm households Total	311,755	156,101	91,037	27,386	26,170	17,195	5,720	635,364

	<0.5ha	0.5-1.0ha	1.0-2.0ha	2.0-3.0ha	3.0-5.0ha	5.0-10.0ha	>=10.0ha	Total
Tractor	13.6	29.1	51.6	72.8	84.0	92.1	94.9	31.2
Rice transplanter	11.2	23.4	43.3	60.0	77.0	88.0	92.9	26.4
Combine	2.9	7.2	16.8	31.1	47.9	68.6	82.9	11.5
Rice farm households Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Same as Table 6

Table 12 Contract farming ratio of rice farmers by work contents / harvest scale / age group

Unit: Farm household, %

	Seedling work		Tilling work		Planting work		Pesticide spraying work		Harvesting/threshing work		Rice farm households Total
Scale of harvesting	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	
<0.5ha	126,529	184,445	76,797	234,958	62,755	247,736	134,016	144,973	32,931	278,824	311,755
0.5-1.0ha	84,695	70,098	56,507	99,594	45,774	109,797	79,923	61,764	21,806	134,295	156,101
1.0-1.5ha	35,827	18,222	26,995	27,398	21,696	32,511	32,099	17,816	11,113	43,280	54,393
1.5-2.0ha	26,636	9,754	22,744	13,900	18,297	18,217	23,861	10,013	10,510	26,134	36,644
2.0-3.0ha	21,877	5,323	20,132	7,254	16,655	10,623	19,775	6,757	10,415	16,971	27,386
3.0-10.0ha	34,732	5,436	5,381	5,549	34,099	9,110	35,064	5,887	26,775	16,590	43,365
>=10.0ha	5,233	469	5,381	339	5,156	546	4,934	592	4,828	892	5,720
Age Group											
<50years	27,093	21,487	24,943	24,662	20,849	28,131	29,011	15,931	13,830	35,458	49,288
50-59	76,424	54,502	69,705	62,693	57,777	74,049	79,997	40,873	37,098	95,300	132,398
60-69	111,091	82,119	86,207	108,390	70,522	123,758	110,514	67,506	39,950	154,964	194,914
>=70years	120,921	135,639	65,517	193,247	55,284	202,602	110,150	122,900	27,500	231,264	258,764
Farm households Total	335,529	293,747	246,372	388,992	204,432	428,540	329,672	247,210	118,378	516,986	635,364

	Seedling work		Tilling work		Planting work		Pesticide spraying work		Harvesting/threshing work		Rice farm households Total
Scale of harvesting	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	Self-employed farming	Farming outsourcing	
<0.5ha	40.6	59.2	24.6	75.4	20.1	79.5	43.0	46.5	10.6	89.4	100.0
0.5-1.0ha	54.3	44.9	36.2	63.8	29.3	70.3	51.2	39.6	14.0	86.0	100.0
1.0-1.5ha	65.9	33.5	49.6	50.4	39.9	59.8	59.0	32.8	20.4	79.6	100.0
1.5-2.0ha	72.7	26.6	62.1	37.9	49.9	49.7	65.1	27.3	28.7	71.3	100.0
2.0-3.0ha	79.9	19.4	73.5	26.5	60.8	38.8	72.2	24.7	38.0	62.0	100.0
3.0-10.0ha	80.1	12.5	12.4	12.8	78.6	21.0	80.9	13.6	61.7	38.3	100.0
>=10.0ha	91.5	8.2	94.1	5.9	90.1	9.5	86.3	10.3	84.4	15.6	100.0
Age Group											
<50years	55.0	43.6	50.6	50.0	42.3	57.1	58.9	32.3	28.1	71.9	100.0
50-59	57.7	41.2	52.6	47.4	43.6	55.9	60.4	30.9	28.0	72.0	100.0
60-69	57.0	42.1	44.2	55.6	36.2	63.5	56.7	34.6	20.5	79.5	100.0
>=70years	46.7	52.4	25.3	74.7	21.4	78.3	42.6	47.5	10.6	89.4	100.0
Farm households Total	52.8	46.2	38.8	61.2	32.2	67.4	51.9	38.9	18.6	81.4	100.0

Source: Same as Table 6

Note: "Farming outsourcing" includes "all outsourcing" and "partially outsourcing".

"Farmers who do not work" are not included in the total number of farmers. So self-employed farming + farming consignment ≠ 100%.

and the less physical strength they have.

An inference that can be drawn from these facts is that many small-scale elderly farmers are full-time farmers engaged in rice cultivation.

4.2 Actual conditions of rice cultivation for small-scale elderly farmers

In Table 11, we analyse the status of ownership of major machinery by farm scale. Small farmers

have fewer machines. For farmers with less than 0.5 ha of land, the ownership ratio of tractors is 13.6%, rice planters is 11.2%, and combine harvesters is only 2.9%. Even when the scale of the farms is small, planting and harvesting rice by hand is heavy work for the elderly. For small-scale farms run by the elderly, it is difficult to invest in machinery and consequently, they normally do not have plans to scale up. Many small-scale farmers, in fact, outsource this heavy work.

Table 12 shows the status of farming outsourcing by operation. As a whole, the proportion of heavy labour work that is outsourced is high in rice planting and harvesting. Notably, 67.4% of rice planting operations in farms are outsourced, and the corresponding figure is 81.4% for harvesting, 46.2% for seedlings work, and 38.9% for pesticide spraying. In addition, the smaller the farm scale, the higher the proportion of rice planting and harvesting work that is outsourced.

Furthermore, by age group, the elderly, who are 70 years or older, have a high rate of outsourcing of rice planting and harvesting work, while those younger than 70 years carry out more seedling raising and pesticide spraying on their own. These facts indicate that small-scale elderly rice farmers are more likely to outsource rice planting and harvesting, which is a significant labour-saving effect of mechanisation. This also indicates that farmers under the age of 70 are engaged in light work such as seedling raising and pesticide spraying.

As the age of the farmer increases, the outsourcing rate for each category of work increases and the percentage of self-employed farming declines. In the age-bracket of 50s and 60s, the percentage of self-employed light-working farmers is higher than in the 70s and older category. Self-employed farmers who are into light work save on outsourcing fees and add to their agricultural income, which is an economic rationale for small-scale rice farming.

Typically, the work is outsourced to large farmers who have relatively large machines. For large-scale farmers to further expand their scale, it is necessary to increase the capacity utilisation and reduce the cost of owning the machines. Large-scale farmers try to expand farming contracts to amortise machines early. Increasing work contracts lowers contract fees due to competition among large-scale farmers.

Large-scale farmers have been competing in farming contracts due to the need for the maximum possible capacity utilisation of large machinery. This competition has led to lower contract fees which helps small-scale elderly farmers who have become more dependent on low-cost farming outsourcing.

In other words, a certain equilibrium between elderly small-scale and large-scale farming has been created through outsourcing. The polarisation of farmers into large and small classes usually leads to social instability. However, in the situation mentioned above, a stable equilibrium has been created in the rural villages through this interdependence. The equilibrium between small and large-scale farmers has enabled them to survive the challenging conditions brought on by the opening of the market.

While this has enabled small-scale elderly farmers to continue with farming, it has also hindered the integration of agricultural resources, such as farmland, into larger scale farmers. For large-scale farmers, the scale of contract work expanded; however, contract work is unstable because there is no guarantee of renewal. This mix of a small number of unstable large-scale farmers and a large number of small-scale elderly farmers in rural Korea led to a stable equilibrium and simultaneous instability.

5. Concluding Remarks

Korea's agricultural structural policy since the 1990s has shown some success in terms of promoting large-scale farming, but it has also led to a polarisation of the population in rural areas. It also led to stagnancy of small-scale elderly farmers in rural areas. Analysis of the 2015 Agricultural Census revealed that the farmer population had aged since the previous census in 2010. In addition, the number of small-scale farmers and part-time farmers has been increasing and many of them are engaged in rice cultivation. Small-scale farming is divided into part-time farming and elderly farming. In particular, the number of small-scale elderly rice farmers has shown an upward trend.

This phenomenon of aging is explained by the increase in outsourcing of farm work. Rice cultivation involves heavy labour, such as planting and harvesting, and small-scale elderly farmers have few machines. Consequently, many small-scale farmers outsource this heavy work and continue doing the light work—this is the economic rationale of small-scale rice farming.

This work is outsourced to large farmers who have relatively large machines. Further, these large-scale farmers compete with each other in farming contracts since they need to maximise the capacity utilisation of their large machinery. This competition leads to lower contract fees and provides relatively low-cost farm contract fees to small-scale elderly farmers. Small-scale elderly farmers have become more dependent on low-cost farming outsourcing and are able to continue their work.

In other words, a certain balance has been created between elderly small-scale farmers and large-scale farmers through outsourcing. The polarisation of farmers into large and small classes usually leads to social instability. However, in this case, a stable equilibrium has been created in the rural villages through their interdependence. Further, this equilibrium between small and large-scale farmers has enabled them to survive in challenging conditions created by the opening of markets.

This also enabled small-scale elderly farmers to continue farming, which hindered the integration of agricultural resources, such as farmland, into larger enterprises. For large-scale farms, the scale of contract work expands; however, this contract work is unstable due to the uncertainty around annual contract renewals year on year. In that respect, large-scale farmers with more contracted work depend on an unstable management base. A small number of unstable large-scale farmers and a large number of small-scale elderly farmers make up the current rural village in Korea. A stable equilibrium and instability co-exist simultaneously in the Korean village.

The novelty of this study is that it presents a hypothesis that differs from the conventional wisdom about the polarization of rural areas. The common sense is that in rural areas under globalization, inequality will widen due to polarization. Inequality worsens uneven distributions of wealth and poverty. The main cause of poverty in rural areas is the reduction of the scale of agriculture under management. In particular, elderly farmers reduce their working hours and production scale as they age, and their agricultural income accordingly decreases.

Our analysis found that such poverty does not exist in rural areas because large- and small-scale farmers enjoy interdependence by engaging in outsourcing that allows small scale farmers to continue farming. In particular, elderly small-scale farmers outsource heavy farming work to large-scale farmers with machines and large scale farmers are able to depreciate large machinery by undertaking heavy farm-

ing work. Moreover, competition among large farmers is putting downward pressure on contracted farming, which helps small farmers.

Although rural polarization usually creates tension and destabilizes rural societies, the mechanism of outsourcing work between large and small farmers in Korea has brought equilibrium and stability to rural areas. This was not pointed out in previous studies; this study revealed it for the first time with its analysis of the 2015 Agricultural Census.

Future scholars would do well to examine how the equilibrium of this rural society has evolved since the 2015 census. This could be facilitated by an analysis of the 2020 Agricultural Census (scheduled for publication in 2021). Such an analysis is likely to clarify the mechanisms of balance and stability unique to Korean rural society.

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