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Structural Changes in Agriculture, Farm Household Economy and Policy Implications

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- “KREI Agricultural Policy Focus” relates to analysis and description of the trend of and policy for agriculture and rural areas.
- This is also provided at the KREI website (www.krei.re.kr).

◇ Abstract ◇

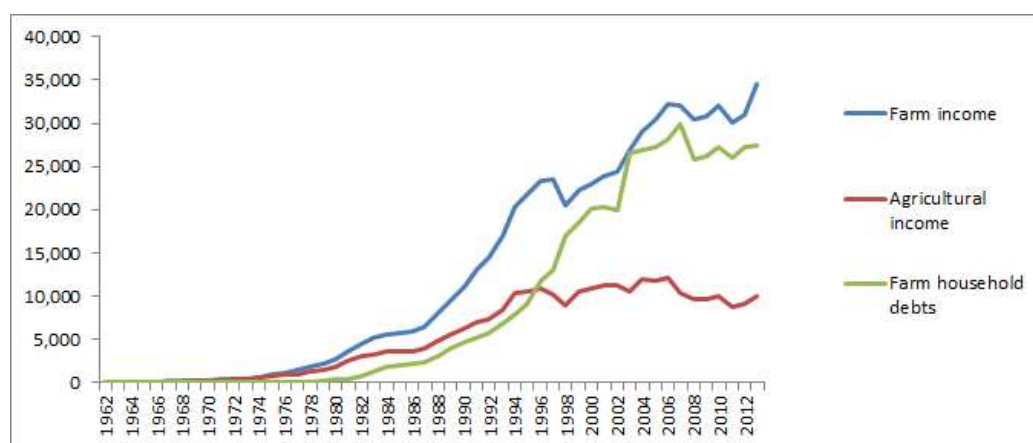
- In 2013, the agricultural authorities announced that the average farm income reached 34.52 million won, 11.3 percent up from the previous year. This figure was considered a signal of the rebound of income that had long been stagnant, and formed expectations of the industry.
 - Given that the 2013 Farm Household Economy Survey is the statistics of the first year of the new samples that are renewed every five years, the increase in farm income can be deemed a rebound that reflects structural changes in agriculture.
- Since the 2000s, the social structure has changed with the increase in the numbers of both small and large farms, the aging of farmers and the increase in the number of single households. At the same time, the agricultural structure has also shifted in various ways, including the switch from rice farming to livestock breeding or fruit/vegetable/special crop cultivating. In this regard, it is necessary to interpret farm households' economic status in 2013 in the long-term perspective.
- A comparative analysis of changes in the agricultural structure and farm household economy within the past ten years, based on data from the Agricultural Census (2000, 2010) and the Results of Farm Household Economy Survey (2003, 2013) shows several findings and policy implications as follows.
 - The farming scale of professional farmers has expanded thanks to the scale expansion policy, but the income of the large farmers group with over 7 hectares of farmland has been sluggish, implying the need for boosting rice farming and reinforcing risk management policies.
 - An increasing proportion of Class 2 part-time farmers have redeemed the decreased proportion of professional farmers, which has significantly contributed to the income growth.
 - Since the number of low-income farmers has been on the rise due to the trend of aging in the agricultural industry and the increased risk factors in farming management, it is necessary to reinforce social welfare policies.
 - When excluding those who are classified as low-income farmers due to a temporary failure of farming management, the number of farmers in their 40s and 50s in absolute poverty has dropped, which implies that the employment policies for rural areas have worked.
 - However, the number of farmers in their 40s and 50s in absolute poverty due to a temporary failure of farming management has increased compared to a decade ago, which indicates that the risk management and supportive policies for the revival of farming management are needed.
 - The necessary scale of farming management and the required proportion of non-farm income are increasing in raising farm income to the level above that of urban working households. In this context, it is crucial to strengthen the policy of developing non-farm income sources along with the scale expansion policy.

1. Issues in Question

□ Rebound of farm income and expectations

- The authorities released that the average farm income of 2013 increased to 34.52 million won, 11.3 percent up from the previous year. This figure created expectations about the end of the long-stagnant period of farm income.
 - In 2013, the average income increased by 3.5 million won from 2012 and 7.4 million won from 2003.
 - * 26.78 million won (2003) → 31.03 million won (2012) → 34.52 million won (2013)
- After exceeding 30 million won in 2005, the average farm income has formed a box pattern below 31 million won until 2012, raising concerns about a prolonged stagnation.
 - After hitting 10 million won in 1995, the average agricultural income has been on the steady rise to reach 12 million won in 2006, but dropped to 9.12 million won in 2012.

Figure 1. Long-term Progress of Farm Income, Agricultural Income and Farm Household Debts



Source: Statistics Korea, *Farm Household Economy Survey*, <www.kosis.kr>.

□ Changes in the socioeconomic structure of agriculture and rural areas, and the farm household economy

- Changes in the socioeconomic structure of agriculture and rural areas, as well as industrial factors including decreased profitability of agriculture due to market opening and other changes in the conditions of competition, have worked as a major variable that has contributed to the prolonged stagnation of farm income.
 - Agricultural income stopped growing because the price of farm inputs rapidly increased compared to that of agricultural products due to the increased amount of imports after market opening, resulting in the decrease in the profitability of agriculture.
- In the 2000s, the aging of farm households and the trend of an increasing number of small farms have continued along with the scale expansion, specialization and part-time farming in the agricultural industry in response to government policies and changes in conditions of the industry.
 - The proportion of large farm households with over 5 hectares of farmland multiplied from 1.7 percent in 2000 to 3.4 percent in 2010, and the proportion of Class 2 part-time farmers has been on the rise, whereas that of professional farmers has been on the decline. In the meantime, those aged over 70 have become the mode of farm owners, and the proportion of small farms with less than 0.5 hectares of farmland has risen from 31.8 percent to 40.1 percent.
- The stagnation of income and structural changes in agriculture, which have continued in various ways, indicate that it is not sufficient to design policies by understanding the current status of agriculture only based on average statistics of farm households.
 - The scale expansion and part-time farming in the agricultural industry contribute to income growth, while the aging of farmers and

the continuous increase in the proportion of small farms contribute to the decline in income.

□ **Large gaps revealed in the statistics of the farm household economy and structural changes in agriculture**

- In the results of Farm Household Economy Surveys, large gaps are found every five years when samples are renewed, and there have been mixed opinions about this phenomenon.
 - In order to reflect the structure of agriculture, the Farm Household Economy Survey is conducted with renewed samples every five years (2,600 farms in 2013, 3,200 farms in 2003) with the population based on the result of the recent Agricultural Census.
 - The samples of the results of the 2013 and 2003 Farm Household Economy Surveys were selected based on the 2010 and 2000 Agricultural Censuses, respectively.
- Large gaps found in the time series analysis of the results of Farm Household Economy Surveys reflect structural changes of five years in the agricultural sector.
 - The inconsistency of the statistics may be attributed to technical errors in surveys. However, given that changes in the farming scale based on renewed samples and in the distribution of samples by zone are key factors that cause changes in statistics, it can be interpreted that the inconsistency of the statistics resulted from new samples that reflect structural changes.
 - Samples with less than 0.5 ha: 14.8% (2003) → 23.9% (2013);
Samples from suburban areas: 3.6% → 4.3%
 - The statistics of five years with the same samples reflect changes in the economic status of the same farm households, while the statistics with renewed samples reflect structural changes of the agricultural sector.

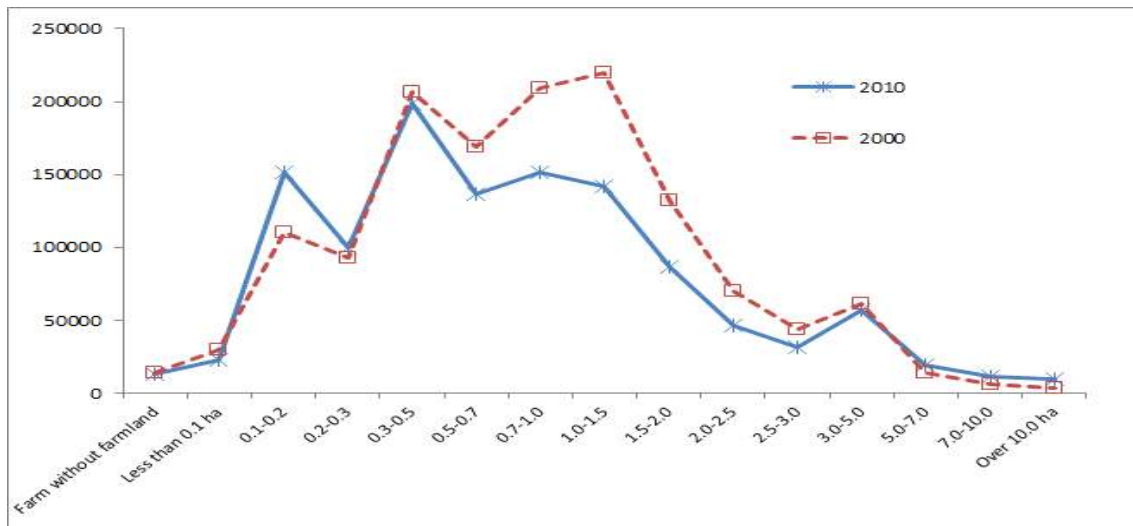
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- **This report is aimed to seek for policy implications by analyzing changes in the structure of agriculture and the farm household economy in the 2000s.**
 - This report intends to draw policy implications by analyzing changes in the socioeconomic structure of agriculture and rural areas based on the 2000 and 2010 Agricultural Censuses and the direction and pattern of changes reflected in the 2003 and 2013 Farm Household Economy Surveys.
 - In terms of structural changes, the report analyzes the level of the scale expansion, specialization, part-time farming and the aging of farming population. Based on the analysis, the report will measure the stability of the farm household economy focusing on farm income and debts.

2. Progress of the Scale Expansion and Farm Income

☐ Polarization between large and small farms

- The scale expansion has made a huge progress thanks to policies of strengthening the competitiveness of agriculture and improving the structure. However, the proportion of small farms with less than 0.5 hectares increased at the same time.
- While the proportions of large and small farms increased, that of medium-sized farms (0.5-5 hectares of farmland) significantly decreased.
 - The proportion of large farms with over 5 hectares of farmland increased from 1.7 percent in 2000 to 3.4 percent in 2010, and that of small farms with less than 0.5 hectares of farmland also increased from 31.8 percent to 40.1 percent during the same period.
- The proportion of farms with over 30 million won or less than 5 million won of sales of agricultural products increased, whereas that of the rest mostly declined.
 - The proportion of farms with over 30 million won of sales income increased from 6.5 percent in 2000 to 12.9 percent in 2010, and that of farms with less than 5 million won of sales income increased from 48.2 percent to 53.1 percent during the same period.

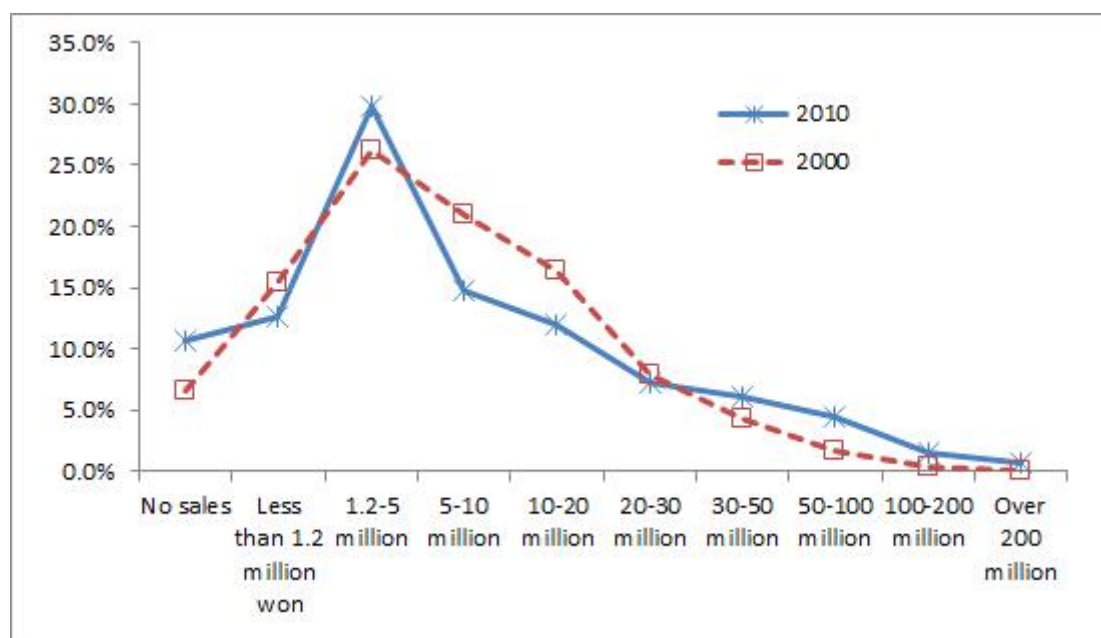
Figure 2. Changes in the Distribution of Farmland Size



Source: Statistics Korea, *Agricultural Census*, <www.kosis.kr>.

- It is assumed that the increase in large farms is attributed to the scale expansion policy aimed to strengthen the competitiveness of agriculture, whereas the increase in small farms resulted from social changes, including the aging population in rural areas and an increasing number of people who consider farming as a type of hobby or a sideline job.
- The increased proportion of small farms with less than 0.5 hectares of farmland is attributed to the aging of farming population and a growing number of people who return to rural areas and become farmers for hobby or for their post-retirement lives.

Figure 3. Distribution of Sales Income of Agricultural and Livestock Products (Proportion)



Source: Statistics Korea, *Agricultural Census*, <www.kosis.kr>.

□ The income growth effect of the scale expansion was largest for farms with around 7 hectares of farmland.

- In the past decade (2003-2013), farm income has been on the rise in general regardless of the size of farmland, but how fast it has grown depends on the size of farmland.
- The groups of farms with 3-5 hectares of farmland and those with 5-7 hectares of farmland, which are relatively broad, have enjoyed a remarkable gross income growth, but the largest farms with over 7 hectares of farmland have not seen that big a change in their income.
 - The average income of the farm group with 5-7 hectares of farmland soared from 34.7 million won in 2003 to 56.6 million won in 2013, while that of the farm group with 7-10 hectares of farmland decreased from 50.9 million won to 45 million won.

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- With the exception of agricultural income, non-recurring income, transfer income and non-farm income have not shown big changes in the pace of growth of cultivated acreage. This implies that agricultural income is a key factor of changes in farm income.
 - In particular, the agricultural income of farms with 5-7 hectares of farmland increased by 40.1 percent, while that of farms with 7-10 hectares of farmland fell by 38.1 percent, forming a striking contrast.
 - This gap indicates that professional farms relying more on agricultural income have bigger potential risks in their management.
 - According to the analysis conducted by the Oaxaca decomposition method, which was adopted to remove the influence of changes in the sample design for analyzing the average farm income variation depending on changes of farming scale, such changes are estimated to have contributed to 650,000 won of income growth out of 7.4 million won of nominal income growth from 2003 to 2013.

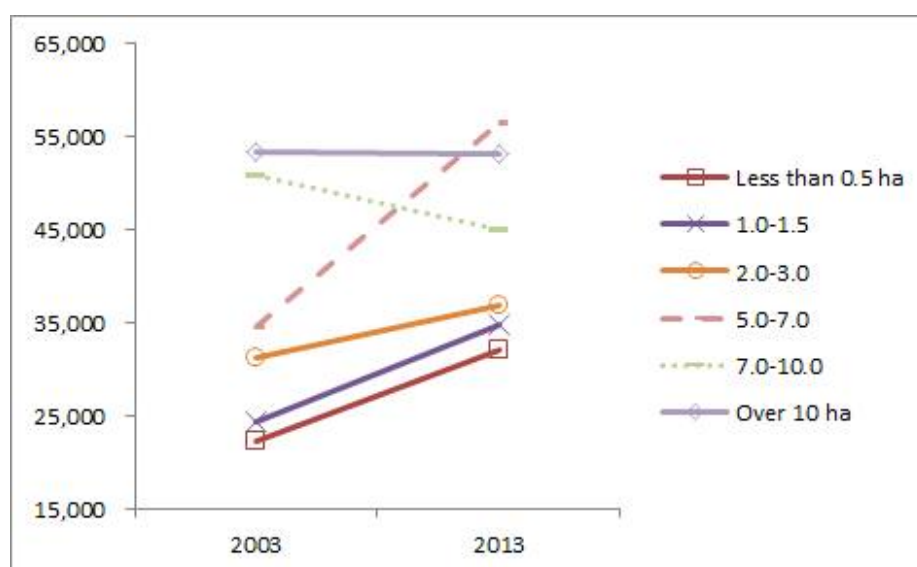
Oaxaca decomposition:

It is a method that decomposes mean differences between dependent variables of two groups divided from the entire samples, based on the outcome estimated by using the identical linear regression model for the two groups. According to Oaxaca, mean differences between dependent variables of the two groups can be decomposed into two factors. First, the values of independent variables of the two groups can be different from each other; second, even if the values of independent variables of the two groups are equal, each independent variable may have different effect on dependent variables. For instance, when two companies, which produce the same type of commodity, employ different methods of production, or production technologies (i.e. production function), while they put different amount of production factors (labor force, capital, etc.), the effect of differences can be

divided. In this case, under the principle of Oaxaca decomposition, the cause of differences in their outcome can be decomposed into the difference in production technologies and that in the invested amount of production factors (Choi Pil-sun and Min In-sik, 2010).

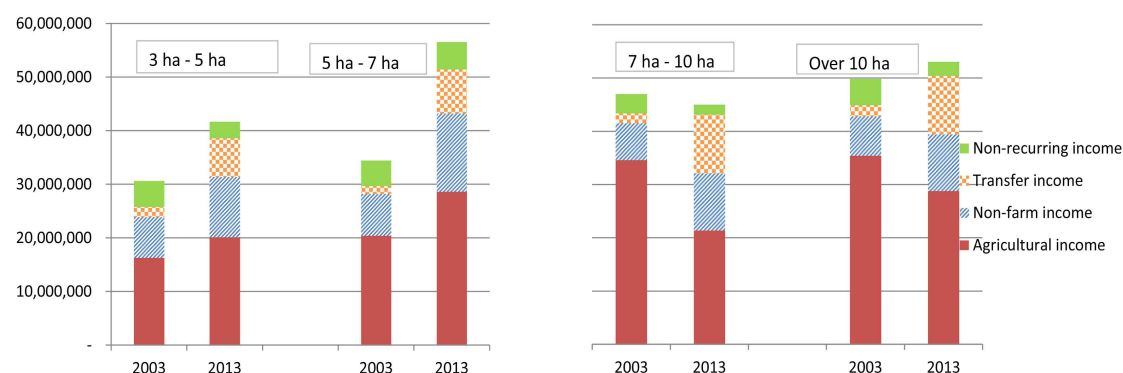
Figure 4. Changes in Farm Income by Farmland Size (in the Past Decade)

(Unit: KRW 1,000)



Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

Figure 5. Income Structure of Farms with Different Farm Size That Experienced Income Variations



Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

□ There was a noticeable stagnation of income of professional farmers cultivating rice on a large scale.

- Most large farms with over 7 hectares of farmland cultivate rice in paddy fields. The stagnation of their income implies the need for policies to enhance the income of rice farming.
- The gap between income changes of farms with 7-10 hectares of farmland and those with over 10 hectares of farmland seems to be related to the proportion of rice-cultivating farms in the samples.
 - Among farms with 7-10 hectares of farmland, whose income fell in the past decade, the proportion of rice-cultivating farms decreased by only 2 percent points from 42 percent in 2003 to 40 percent in 2013. However, among farms with over 10 hectares of farmland with slightly increased income, the proportion of rice-cultivating farms dwindled by 25 percent points from 54 percent to 29 percent.
- In case of farms with 5-7 hectares of farmland, which enjoyed the biggest growth of income, the proportion of rice-cultivating farms decreased, whereas that of livestock-breeding or vegetable-cultivating farms increased.
 - The proportion of rice-cultivating farms dropped from 45 percent in 2003 to 30 percent in 2013, while that of livestock farms with relatively high income increased from 7 percent to 20 percent, and that of vegetable-cultivating farms also slightly increased from 17 percent to 18 percent.

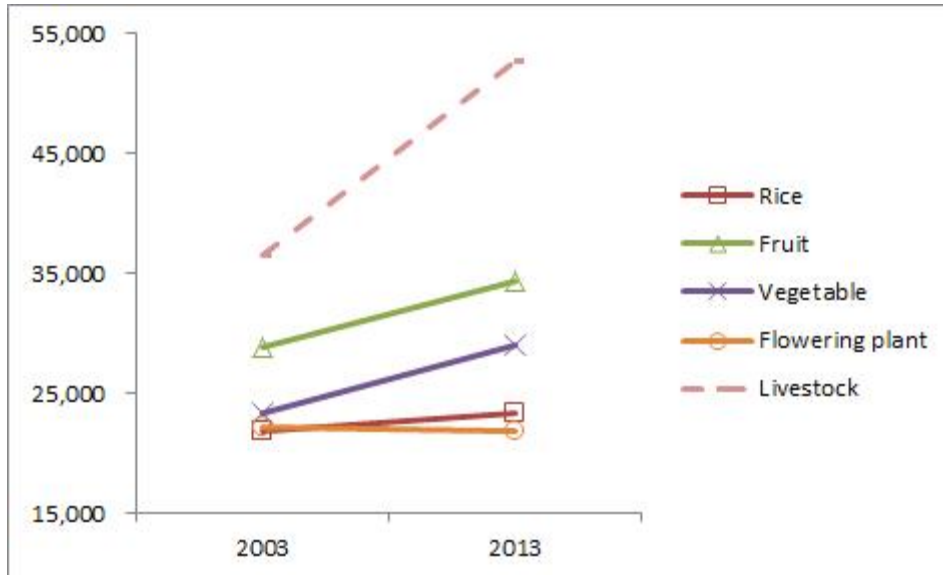
3. Specialization, Part-time Farming and Farm Income

☐ **Changes in the distribution of farms of each farming type and the income gap depending on profitability**

- From 2000 to 2010, the variation of the number of farms of each farming type showed clear differences, implying that farms vigorously switched the type of crops they cultivate considering profitability.
 - The numbers of farms cultivating rice, special crops and vegetables decreased by 33.6 percent, 25.5 percent and 6.1 percent, respectively, while those of farms cultivating flowering plants and fruit and breeding livestock increased by 130.3 percent, 18.7 percent and 12.4 percent, respectively.
- Compared to 2003, the gap between incomes of farms of each farming type expanded in 2013.
 - Livestock farms enjoyed the income growth by 44 percent from 36.6 million won to 52.7 million won, while farms cultivating flowering plants saw the income decline by 1.4 percent from 22.2 million won to 21.9 million won.
- A key factor of farm income changes of each farming type in the past decade is attributed to the increase or decrease in agricultural income.

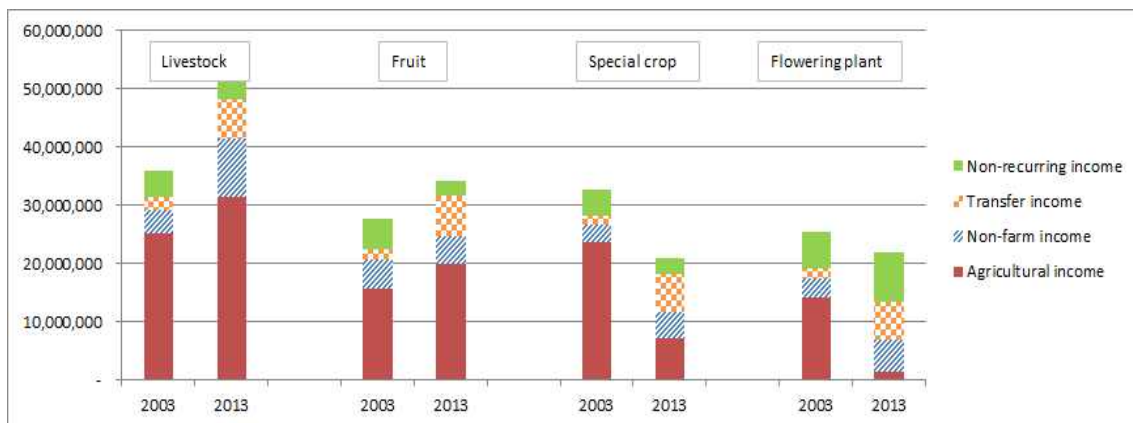
Figure 6. Changes in Farm Income by Farming Type (in the Past Decade)

(Unit: KRW 1,000)



Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

Figure 7. Income Structure of Farms of Each Farming Type That Experienced Income Variations

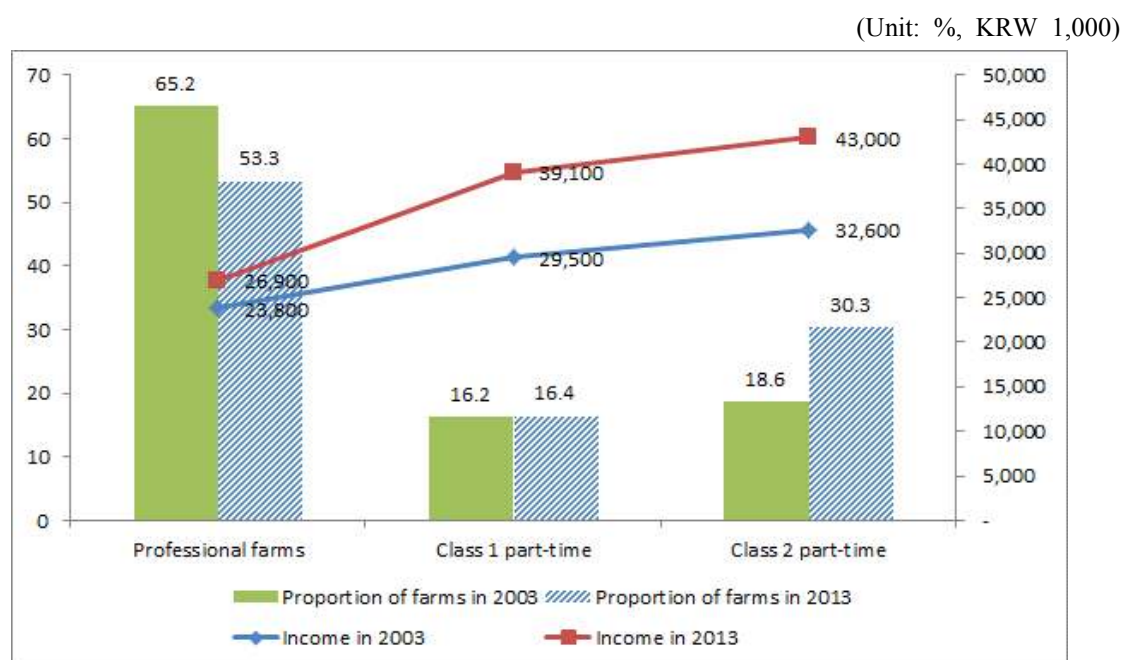


Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

- ☐ The trend of part-time farming, in which the proportion of professional farms decreases while that of Class 2 part-time farmers increases, has led to the increase in the average income.

- The proportion of professional farms relying mostly on agricultural income decreased by 11.9 percent points from 65.2 percent in 2000 to 53.3 percent in 2010. In contrast, the proportion of Class 2 part-time farmers, which tend to earn more non-farm income than agricultural income, increased by 11.7 percent points from 18.6 percent to 30.3 percent.
- The amount of income increases in the order of professional farmers (the lowest income), Class 1 part-time farmers and Class 2 part-time farmers (the highest income). But the income growth rate of the past decade increases in the different order: the income growth rate of professional farmers is 13 percent; Class 1 part-time farmers 32.5 percent; and Class 2 part-time farmers 31.9 percent. This shows the trend of part-time farming contributed to the increase in the average farm income.

Figure 8. Changes in the Number of Farms and Farm Income of Professional and Part-time Farmers



Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

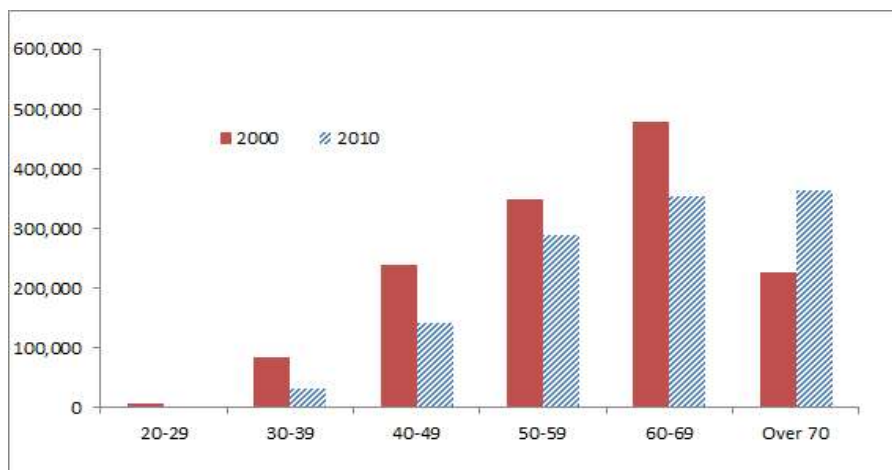
4. Aging Population and Aggravation of Income Gap

□ **As farmers aged over 70 have become the mode of farm owners, the pace of income growth has been slowing down.**

○ Farmers in their 60s were the mode of farm owners in the 2000 Agricultural Census, but it changed to those over 70 in the 2010 Census.

- The number of farms run by those aged over 70 increased from 220,000 in 2000 to 360,000 in 2010, and thus the proportion of such farms remarkably grew from 16.3 percent to 30.9 percent.

Figure 9. Changes in Distribution of Ages of Farm Owners



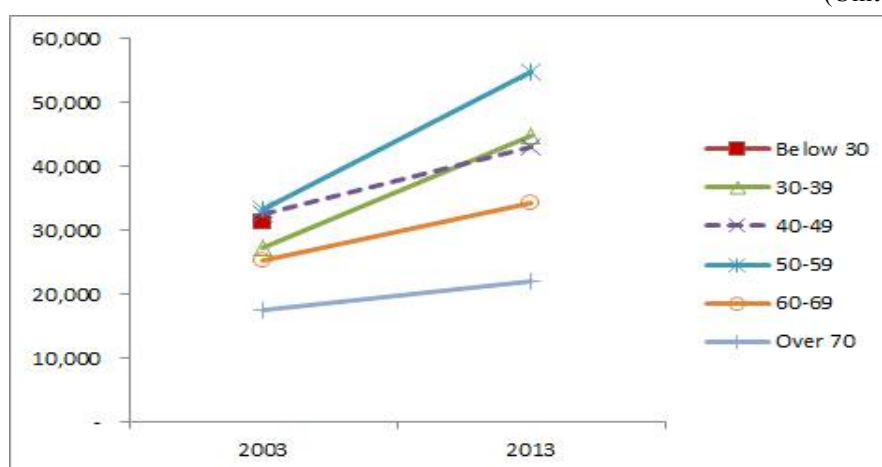
Source: Statistics Korea, *Agricultural Census*, <www.kosis.kr>.

○ The income of farms run by those in their 50s has grown the most rapidly among farmers of all ages, and the gap between the lowest and highest incomes has widened.

- The average income of farm owners of all ages was between 17 million won and 33 million won in 2003, but its range expanded to be between 22 million won and 54 million won in 2013.
- The income of farmers aged over 70, whose proportion is the largest in the total number of farmers, increased only by 26 percent in the past decade. Their income is low, and the pace of income growth has also been slow.
 - Income growth: 30s (66%), 40s (47%), 50s (55%), 60s (39%)
- As the proportion of aged farmers with relatively low income increased, the average income of all farms declined.

Figure 10. Changes in Farm Income by Ages of Owners (in the Past Decade)

(Unit: KRW 1,000)



Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

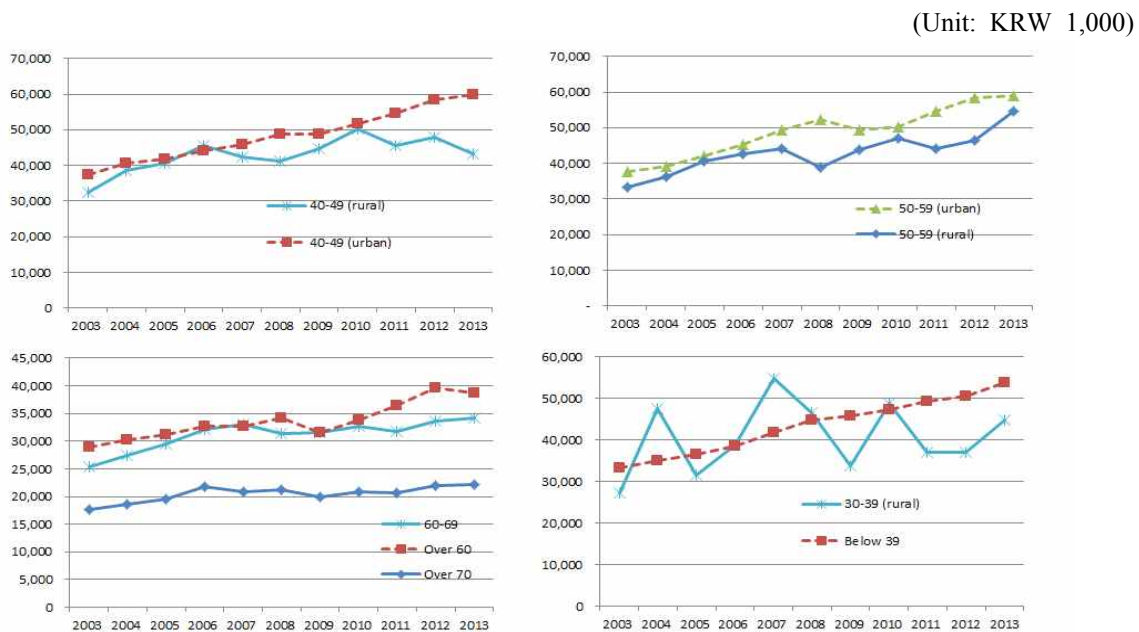
- ☐ **The income of farms operated by owners in their 50s increased in a similar pace to that of urban working households' income.**
- Overall, the average income of farming households is lower than that of urban working households. However, in case of farms run by those

in their 50s, the pace of income growth was similar to that of their urban counterparts in the past decade.

- The decrease in the income of farms run by relatively young owners in their 40s seems to be attributed to a slump in the livestock industry in 2010 due to the outbreak of foot-and-mouth disease and the cohort effect in which agricultural successors in their 30s ten years ago are now classified into the group in their 40s.

- Overall, the average income of farmers in each age group is lower and more unstable than that of urban working households, implying that it is necessary to develop stable income sources for farming households.

Figure 11. Comparison of Incomes of Farm Households and Urban Working Households by Age



Source: Statistics Korea, *Farm Household Economy Survey*, *Household Survey*, <www.kosis.kr>.

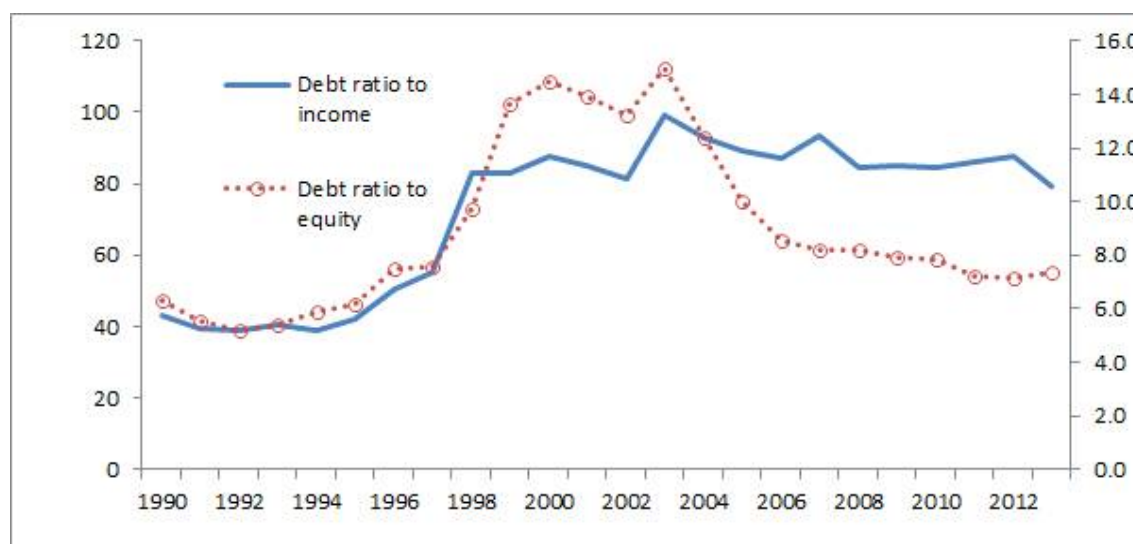
5. Stability of Farm Household Economy

□ **The trend of growing farm household debts has been reversed, and thus the stability of the farm household economy improved.**

- Farm household debts, which used to threaten the stability of farm household economy, began falling in 2007, and the proportion of debt to income has also been on the decline since 2003.
- The proportion of farms with the debt ratio to equity exceeding 70 percent decreased from 9.6 percent in 2003 to 3.9 percent in 2013, and that of farms with the debt ratio to equity exceeding 40 percent also decreased from 16.4 percent to 7.6 percent.
- Consequently, the financial stability of farm households appears to have improved even in the recent years in which farm income growth was stagnant.

Figure 12. Progress of the Debt Ratio to Farm Income

(Unit: %)



Source: Statistics Korea, *Farm Household Economy Survey*, <www.kosis.kr>.

Table 1. Distribution of Farms by the Debt Ratio to Equity of Farm Households

(Unit: %)

	Debt ratio > 0.2	Debt ratio > 0.4	Debt ratio > 0.7
2003	28.9	16.4	9.6
2013	15.0	7.6	3.9

Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

□ The increased proportion of farms in absolute poverty implies the need for reinforcing social policies.

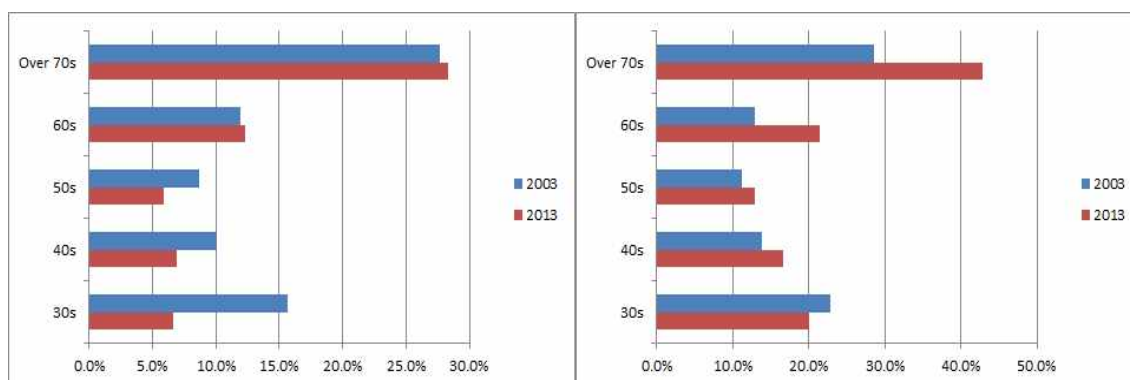
- The proportion of three-person farm households in absolute poverty with income lower than the minimum cost of living¹⁾ significantly grew from 5.9 percent in 2003 to 27.6 percent in 2013.
 - Even with the exception of farms with farming scale that is hard to be classified into farms in absolute poverty,²⁾ the proportion of farms in absolute poverty still increased from 14 percent to 17 percent.
- In the aspect of ages of farm owners, when including those who failed in farming management, the proportion of farms in absolute poverty increased in all age groups except for those in their 30s. On the contrary, when excluding those who failed in farming management, the proportion of farms in absolute poverty decreased among farmers aged between 30 to 59.

1) Standard of absolute poverty: Minimum cost of living (810,000 won per month in 2003; 1,260,000 won per month in 2013)

2) Those who earn low income but have over 1 hectare of standard farming scale (which is calculated by adding the farmland size and the land price converted from agricultural capital) and are classified as low-income farmers due to a temporary failure of farming management

- The proportion of farmers aged over 70 in absolute poverty was around 28 percent both in 2003 and 2013, meaning that about one-third of them are beneficiaries of the welfare policy.
 - When excluding those who are classified as low-income farmers due to the failure in farming management, those of 70 and over take up the biggest part of farms in absolute poverty.
- The proportion of farms in absolute poverty decreased in the group of young farmers who can earn high non-farm income, and this implies the significance of policies for job creation in rural areas.

Figure 13. Proportion of Farms in Absolute Poverty by Age Group: Excluding Those Failing in Farming Management (Left); Including Those Failing in Farming Management (Right)



Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

- On the other hand, in case of farmers in their 40s and 50s, the proportion of farms in absolute poverty decreased when excluding those who failed in farming management, but the proportion increased when including such farms. This indicates that the possibility of failure in farming management increased, and thus it is necessary to reinforce policies to manage risk factors and support the revival of farming management.

□ The proportion of farms that earn more than the average income of urban working households slightly fell.

- When farms earn more than the average income of the entire society, the farm household economy can be considered stable in a positive sense.
 - In contrast, when deciding the stability of the farm household economy based on financial standard (debt ratio, etc.), it means that the farm household economy can be considered stable in case of no debt even if farms earn low income, which is a passive judgment.
- When excluding small farms with less than 0.5 hectares and those run by farmers over 70,³⁾ the proportion of farms with income higher than the average income of urban working households decreased from 15 percent in 2003 to 13.1 percent in 2013.
- The standardized size of farming of farms that earn more than the average income of urban working households increased from 1.56 hectares in 2003 to 3.8 hectares in 2013, and the average income of such farms remarkably grew from 59.2 million won to 94.7 million won.
 - Until the mid-2000s, the average income of farms run by those in their 40s and 60s was similar to that of urban working households, but has stagnated or dropped since then.
 - The proportion of farmers in their 40s among such farms decreased from 29 percent in 2003 to 10 percent in 2013 because the inflow of relatively young agricultural successors into the industry has reduced.

3) Farms with less than 0.5 hectares of the standardized size of farming and those run by farmers over 70 are excluded from the perspective that it is not appropriate to compare aged or small farms with urban workers.

- Despite the small standardized size of farming, part of farms can earn more than the average income of urban working households thanks to non-farm income.
 - Among such farms, the proportion of Class 2 part-time farms increased from 20 percent in 2003 to 30 percent in 2013. The proportion of non-farm income in the entire farm income also grew from 26 percent to 31 percent.

Table 2. Income and Farming Scale of Sustainable Farms

(Unit: %, KRW 1,000, ha)

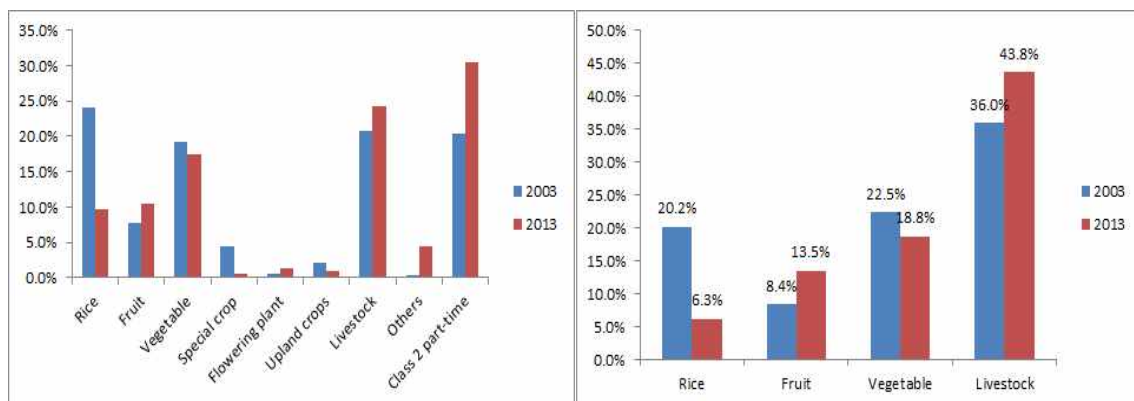
	Proportion	Average farm income	Average non-farm income	Average standardized size of farming
2003	15.0	59,200	15,500	1.56
2013	13.1	94,700	30,300	3.8

Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

- In the aspect of sustainability of farming management, the proportion of farms earning agricultural income higher than the average income of urban working households decreased from 5.8 percent in 2003 to 3.9 percent in 2013.
- The proportion of rice-cultivating farms earning agricultural income higher than the average income of urban working households significantly fell from 20.2 percent in 2003 to 6.3 percent in 2013.
- It is analyzed that farms need to cultivate over 5.8 hectares of farmland in average in order to secure agricultural income as much as the average income of urban working households in 2013.
 - The average agricultural income of farms earning more than the average income of urban working households nearly doubled to 116 million won from a decade ago, which seems to reflect the trend of expansion of high-income large farms.

- Given that the proportion of farms with over 5 hectares of farmland was only 3.3 percent in 2010 and that the income gap between urban and rural areas has widened, it is hard for farms to keep up with urban working households only with agricultural income.

Figure 14. Farming Type of Sustainable Farms: Based on Farm Income (Left); Based on Agricultural Income (Right)



Source: Statistics Korea, MicroData Service System, <mdss.kostat.go.kr>.

6. Policy Implications

☐ **The average farming scale has increased thanks to the scale expansion policy, but the income of large farms is stagnant.**

- The effect of economy of scale worked only for farms with less than 7 hectares of farmland, due to the stagnant agricultural income.
 - The government policies related to non-farm income had a positive effect on most sizes of farming, while the policies related to agricultural income did not work for large farms with over 7 hectares of farmland.

☐ **Although the proportion of professional farmers decreased, that of Class 2 part-time farmers increased, contributing to income growth.**

- In the past decade, the proportion of professional farms declined by 11.9 percent points, whereas that of Class 2 part-time farms grew by 11.7 percent points.
 - The income of professional farms increased by 13 percent, and that of Class 2 part-time farms increased by a whopping 31.9 percent.

☐ **It is necessary to reinforce welfare policies given the increased number of low-income farm households.**

- Part of farms operated by those in their 60s and 70s is in absolute poverty, and the number of such low-income farms will continuously grow as the aging of rural population is aggravated.

☐ **The proportion of low-income farmers in their 40s and 50s decreased, implying that job creation policies for rural areas worked well.**

- The proportion of farmers in their 40s and 50s among small farms in absolute poverty (with less than 1 hectare of farmland) decreased, and this indicates that job creation policies for rural areas had a positive effect.

☐ **It is crucial to reinforce the risk management policy for farms.**

- The proportion of farms, which are not small but in absolute poverty due to a temporary failure in farming management, increased compared to a decade ago. This implies that part of farms failed to adapt themselves to new circumstances of the industry, including market opening.

☐ **It is important to strengthen policies to develop new income sources for the stable growth of farms.**

- Although the proportion of stable farms with the similar income level to that of urban working households has been on the decline in general, farmers breeding livestock or those in their 50s appear to keep up with urban households.
- Given that the necessary farming scale to earn income more than the average income of urban working households tends to increase, it is crucial to reinforce policies of expanding the farming scale and developing new non-farm income sources.

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