Mizuho Economic Outlook & Analysis

Regional characteristics of Japanese agriculture as revealed by the data
Agricultural policies responsive to local conditions will be crucial

< Summary >

◆ A scatter plot distribution of the 47 prefectures in terms of their 2015 agricultural income produced per hectare and per agricultural management entity can help us identify a number of trends, for example, that districts where rice production accounts for a large proportion of total agricultural output tend to have low profitability.

◆ The prefectures with low income per agricultural management entity generally fared poorly on such indicators as farmland consolidation rate, abandoned farmland rate, proportion of young farmers, and net profitability of rice production.

◆ To improve the competitiveness of the Japanese agricultural sector, the government is advised to assist municipalities in implementing policies responsive to local conditions by strengthening non-product-specific support programs, identifying focus regions for each program, and giving funding priority to those regions.

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1. Introduction

Farm operations in Japan vary widely based on such factors as commodities produced (e.g., rice, vegetables, or livestock), geographical location (e.g., level ground or hilly and mountainous area), and business model (e.g., full- or part-time operations). There are region-specific characteristics as well. For example, in the village of Ogata in Akita Prefecture, where large-scale land reclamation was carried out in the decades following the end of the Second World War, the prominent agricultural activity is rice production practiced by full-time farmers on paddies built on level areas. Considering these factors, this report will classify the nation's prefectures into groups and analyze the competitiveness of each group using an indicator of agricultural profitability, namely agricultural income produced. It will also discuss solutions to support agricultural operations aligned with local needs and priorities.

## 2. Classifying prefectures based on profitability

Agricultural output is the most commonly used data to compare agriculture of different prefectures. Output is obtained by multiplying crop yield by crop price, and is akin to sales in corporate accounting. Agricultural income produced, on the other hand, is equal to agricultural output minus physical expenditures, plus management subsidies, and is similar to profit in corporate accounting. This report uses agricultural income produced ("income") for its analyses, rather than agricultural output, for the purpose of comparing profitability. We calculated an index of income per cultivated land area ("income per area") and income per agricultural management entity ("income per entity") for all prefectures using 2015 data and plotted both to study the distribution (**Chart 1** on Page 2).

As shown in **Chart 1**, the scatter chart divides the prefectures into four groups (A to D) by lines that represent the average of income per area and income per entity. Group A features districts with above-average income per area and income per entity. There are 11 prefectures in this group, ranging from prefectures belonging to a metropolitan area with a large number of consumers and a thriving farming sector (e.g., Chiba and Aichi) to those in the Kyushu region where the raising of beef cattle, sold at high unit prices, is a major enterprise (e.g., Miyazaki and Kagoshima). Some prefectures in the Tohoku region belong here as well (e.g., Aomori and Yamagata) as the region produces a lot of fruits, which have slightly higher unit prices than vegetables or rice. It is also the second most suitable region in the country for large-scale farming after Hokkaido. Group A's advantages in terms of geographical location and commodities produced translate into

greater profitability relative to the other groups.

Group B consists of districts whose income per area is lower than the national average but whose income per entity is higher. The only prefecture to fall in this category is Hokkaido, the country's top agricultural producer with an agricultural output 2.6 times larger than second-ranked Ibaraki Prefecture. Taking advantage of Hokkaido's vast acreage, farms engage in large-scale production of raw materials not widely grown in other parts of Japan (e.g., wheat, soy bean, and milk). Although Hokkaido's crop income per area is low, its income per entity is five times greater than the national average because its cultivated land per entity is 14.6 times larger than the rest of the country.

Chart 1: Distribution of the prefectural index of agricultural income produced (National average = 100, 2015)
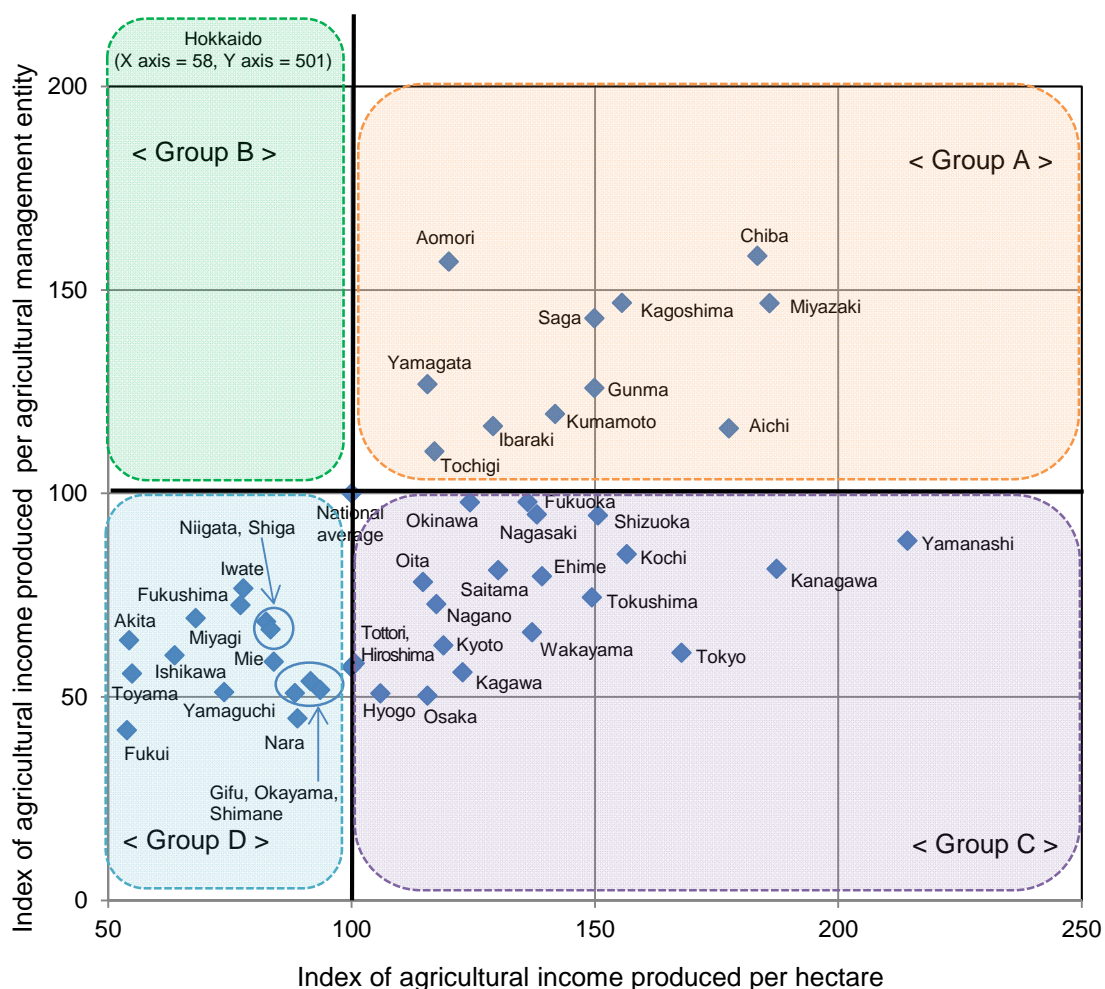
Source: Made by MHRI based on the Ministry of Agriculture, Forestry and Fisheries, *Statistics on Agricultural Income Produced.*

The prefectures in Group C have above-average income per area and below-average income per entity. This group mainly consists of two categories: (a) prefectures belonging to a metropolitan area, such as Tokyo and Osaka; and (b) prefectures where farming is a leading industry but are geographically distant from major markets. The latter category includes such areas as the four prefectures in the Shikoku region (i.e., Tokushima, Kagawa, Ehime, and Kochi). In the category (a) prefectures, the growth of housing development brought on by agricultural land conversion presents a challenge for farms to expand their operations. On the other hand, in the category (b) prefectures, farmers tend to endure high transportation costs for shipping crops to markets. These disadvantages—namely the difficulty in expanding farmland due to their urban location or the high freight costs required for transporting products to distant markets—are experienced by some of the Group A prefectures as well; however, income per entity is held at lower levels for Group C prefectures, presumably because their location magnifies the impact of these problems.

The prefectures in Group D have income per area and income per entity that are both below the national average. This group takes in 15 prefectures, including areas known as major rice-producing districts (e.g., Niigata and Akita) and prefectures that have the lowest agricultural output, following Tokyo and Osaka (e.g., Nara and Fukui). Rice makes up a large proportion of agricultural output, not just in the major rice-producing districts but also in many of the other Group D prefectures. In the major rice-producing districts, income is augmented considerably by rice management subsidies, which are more generous than the subsidies for other crops. The fact that their income per area and income per entity are below the national average in spite of these subsidies suggests that farm operations centering on rice are facing severe business environment after nearly five decades of the rice production adjustment program (commonly known as *gentan*, meaning acreage reduction policy) amid the persistent weakening of the domestic demand for rice.

3. Analyzing the indicators of agricultural competitiveness

Based on the four-group classification of the prefectures explained above, let us now perform a quantitative analysis of agricultural competitiveness. From the data published by the Ministry of Agriculture, Forestry and Fisheries, we selected four indicators that we consider to be important for analyzing agricultural competitiveness: farmland consolidation rate, abandoned farmland rate, proportion of young people engaged in farming, and net profitability of rice production. **Chart 2** summarizes the average value of each of the four indicators for Groups A to D as well as the national average.

Chart 2: Average index value of the four indicators for Groups A to D (2015)

(Unit: %)

Group (Note 1) Indicator	A		B		C		D		National average	Indicator characteristics (Note 2)
Farmland consolidation rate	(2)	42.9	(1)	88.5	(4)	26.5	(3)	41.8	52.3	↑
Abandoned farmland rate	(2)	10.0	(1)	1.6	(4)	12.9	(3)	10.1	8.6	↓
Proportion of young farmers	(2)	8.4	(1)	21.8	(3)	6.7	(4)	4.0	7.3	↑
Net profitability of rice production (Note 3)	(2)	12.4	(1)	32.2	(4)	-4.1	(3)	4.6	13.5	↑

Notes: 1. The group average index values are simple averages of the index values of the prefectures belonging to the group.
2. The upward arrow in the indicator characteristics column indicates that larger values are more favorable, and the downward arrow indicates that lower values are more favorable. The numbers (1) to (4) indicate the order of favorability, with (1) being the most favorable and (4) being the least favorable.
3. Group C does not include Tokyo, Kanagawa, and Okinawa for which data are not published.
Source: Made by MHRI based on the Ministry of Agriculture, Forestry and Fisheries data and publications.

The farmland consolidation rate is obtained by dividing the farmland area being used by *ninaite* (meaning key role players) by the total cultivated land area. *Ninaite* mainly consists of certified farmers whose plans to conduct efficient and stable farming have been certified by their municipal government. The larger the farmland area cultivated by *ninaite*—in other words, the more land that is consolidated—the higher the income per entity is likely to become. The farmland consolidation rate is overwhelmingly high in Group B (Hokkaido) at 88.5%, and low in Group C at 26.5%. Hokkaido's high consolidation rate is attributed to the region's large size of cultivated land per entity, as mentioned earlier, with the majority of the entities being *ninaite*. The low rate in Group C is explained by the fact that there are many small-scale, non-commercial farmers in the region who are reluctant to hand over their land to *ninaite*.

The formula for the abandoned farmland rate is abandoned cultivated land area divided by the sum of the total cultivated land area and abandoned cultivated land area. Abandoned cultivated land is defined as land which has not been cultivated for more than one year and will not be cultivated again over the next several years. The rate is the highest in Group C at 12.9%, and the lowest in Group B (Hokkaido) at 1.6%. While both Groups C and D have below-average income per entity, the problem of abandoned farmland caused by the declining number of farmers or by the aging of farmers is more pronounced in Group C, presumably because many of the group's prefectures are producers of high-maintenance commodities like vegetables and fruits. The areas where land is less likely to be abandoned are also areas where land tends to be more consolidated. The ascending order of the abandoned farmland rate and the descending order of the farmland consolidation rate are precisely the same: B→A→D→C.

The proportion of young people engaged in farming is calculated as follows: the number of core persons mainly engaged in farming who are 44 years of age or younger divided by the total number of core persons mainly engaged in farming. Of all people engaged in farming, the term "core persons mainly engaged in farming" refers to those people whose main occupation is farming. Group B (Hokkaido) has the highest proportion of young farmers at 21.8%, and Group D the lowest at 4.0%. These figures can be explained as follows: In Hokkaido, where its extensive farmland is a strong advantage, young people tend to find farming a worthwhile enterprise. In Group D prefectures, in contrast, the farming business is less likely to be passed down to the younger generations as farmers there continue working into old age. This is probably due to the fact that a significant proportion of production is geared towards rice, a relatively less labor-intensive crop.

The net profitability of rice production per paddy hectare is obtained by the following formula: [income minus payments under the income stabilization measure for farmers] divided by [gross revenue minus payments under the income stabilization measure for farmers]. Income refers to revenue including management subsidies, as described in an earlier paragraph, and payments under the income stabilization measure for farmers are the primary government subsidy for rice production. Gross revenue is equal to sales in corporate accounting plus management subsidies. In a nutshell, the net profitability of rice production is a measure of the profitability that leaves main government subsidies out of the equation. The table shows that Group C has the lowest net profitability rate at -4.1%. Note, however, that Group C's proportion of rice production in total agricultural output is below the national average (16.9%) in 13 of the 20 prefectures. Focusing production on crops that are more profitable than rice, such as fruits and vegetables, appears to be the reason for Group C's higher income per area compared with Group D.

Overall, Groups C and D, whose income per entity is below the national average, fared poorly in the four indicators. Future government efforts to strengthen the competitiveness of Japan's agricultural sector will have to include policies and programs that respond to the local needs of these groups. For example, an effective strategy to reduce abandoned farmland and increase income per area in Group C prefectures would be to expand the supply of farm labor indispensable for fruits and vegetable farming. This could be achieved by designating the municipalities as national strategy special zones and allowing foreign workers to participate in farming. In the major rice-producing districts in Group D, the government is advised to strongly encourage the municipalities to enhance their policies and programs designed to transfer farming business to the younger generations and to create large-scale farm corporations through entity consolidation, with the aim of increasing the proportion of young farmers and raising

income per entity.

4. Agricultural policies aligned with local conditions

In this report we classified Japan's prefectures into four groups based on their income per area and income per entity; we also assessed the agricultural competitiveness of each group using the four indicators. In reality, the situation and context of agricultural operations vary at the prefectural, municipality, and community levels. The national and local governments can facilitate the development and implementation of solutions that respond more directly to local concerns and circumstances by conducting detailed analyses of agricultural data not yet collected or made public (e.g., cross-tabulating the following items by region and commodity: income, management subsidies, number of agricultural management entities, and cultivated land area) on various levels mentioned above. We are hopeful that such government actions will help drive improvements in Japan's agricultural competitiveness.

Finally, a note on how the government might assist the municipalities in carrying out agricultural strategies responsive to local situations as well as on the funding sources for such projects. In line with the plans to review the rice production adjustment program, the government has announced scrapping of the direct payment subsidy for rice farmers in FY2018. We propose that some of the money allocated for this subsidy, which amounts to 71.4 billion yen in FY2017, be used to expand the existing agricultural support programs that are non-product-specific, such as the financial incentives for young farmers and farmland consolidation promotion schemes. It would also be wise to identify in each program the specific focus regions to which priority would be given in distributing the funds shifted away from the rice subsidy. Rice farmers continue to insist that the government maintain its support for rice production, but with the share of rice falling as low as 16.9% of total agricultural output, and given the diversity of Japan's agriculture, investing resources to expand programs that cover many different products would surely have a greater impact on enhancing the competitiveness of the farming sector.