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# Focal Issues Concerning Farmland Liquidity and Utilization Through Farmland Intermediary Management Institutions in the Sanin Region

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**Abstract** This study examined the regional differences and focal issues regarding farmland liquidity and utilization through farmland intermediary management institutions (FIMIs) considering farmland accumulation at the prefectural and municipal levels. The following findings were obtained using the interview data from the FIMIs and prefecture data from the Sanin region. First, facility-based horticulture farmers prefer renting higher-quality farmland. Moreover, their farm management areas do not always necessitate required areal clustering within their residential region. Second, FIMIs and local government initiatives generate regional differences in farmland accumulation. Third, coordination costs can become exceedingly high as the conditions of each farmland plot differ in hilly and mountainous areas. These findings imply that conducting social activities based on farmer diversity and rural communities is necessary.

**Keywords:** Farmland intermediary management institution, Farmland liquidity, Farmland use, Sanin region

## Introduction

Rural areas, especially in hilly and mountainous areas, have faced a farmland conservation problem due to a declining population. Farmers are aging, and the number of abandoned farmlands is increasing. Each agricultural community must liquidate farmlands and increase farmland use by newcomers such as I-turners and U-turners to conserve farmlands. In this context, expectations for farmland intermediary management institutions (FIMIs) have risen in recent years. FIMIs were established in each prefecture in 2014 to promote farmland borrowing and lending. The prefectural governors designated prefectural agricultural public corporations as the entity to carry out this project. Therefore, this project's position and residents' responses in regard to the FIMI differ across local governments.

Studies on farmlands include research on the use of abandoned farmland and farmland accumulation, such as those by Koike (2013) and Saitoh et al. (2012), respectively. However, only a few studies focus on the role of the FIMI. Furthermore, although a majority of studies, such as those by Ando (2021) and Taniguchi et al. (2013), analyze actual conditions and policy discussions regarding FIMI, limited studies investigate the differences between local governments.

Therefore, this study examines differences in prefectures and municipalities using FIMI in terms of farmland concentration performance. For this purpose, we focus on the Shimane and Tottori prefectures in the Sanin region as target areas, as they generally represent Japan's hilly and mountainous regions.

## Materials and Methods

### Hypotheses

This study investigates the following hypotheses.

H1: Differences in liquidity and utilization of farmlands are caused by farming conditions, such as differences in main crops and the existence of hilly and mountainous areas.

H2: The FIMI's promotion status varies by region, with the acceptance of new farmers and regions where they are a specific concentration of farmers.

H3: The relationship between FIMI and municipality in policy influences the efficient farmlands use.

### Method for investigation

To test hypotheses qualitatively, we collected data from FIMI interviews and prefectural data regarding the relationship between the degree of accumulation and regional agriculture. The interview survey was conducted from October to

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November 2020. Prefecture and municipality data were obtained from the FIMI and Census of Agriculture and Forestry surveyed by the Ministry of Agriculture, Forestry and Fisheries. Using the data, we examined the characteristics of farmland accumulation through the FIMI and its relationship with local governments' policies.

**Target area**

The Sanin region was the target area. The region has many mountainous areas, and farmlands are often abandoned due to the disadvantageous cultivation conditions compared to that of flat farming areas. Farmland accumulation among farmers in the target area is challenging. In this context, FIMIs in the Sanin region aid in accelerating the rate of farmland accumulation relative to other prefectures.

**Characteristics of the target area**

Prior to the implementation of the FIMI system, the percentage of paddy fields in the Shimane prefecture was 80.2 % in the 2013 fiscal year. Conversely, the percentage of arable land in Shimane was 5.7 %, which is lower than that of other prefectures in the Chugoku region. The Tottori prefecture had the lowest ratio of paddy fields (at 67.9 % in the 2013 fiscal year). Moreover, the percentage of arable land was 10.0 % higher than in the other Chugoku prefectures. According to the Annual Report on Agriculture, Forestry, and Fisheries Statistics, farmland use has been characterized primarily by the growth of vegetables and fruits on the plains.

## Results

**Characteristics of the FIMI contribution**

Tables 1 and 2 demonstrate the FIMI's contribution in accumulating farmlands at the prefectural level. Table 1 shows that the percentage of concentration among "bearers of regional agriculture," who are the core of farmland conservation, including certified farmers, community-based farming organizations, and certified new farmers, is not high on a national level. However, the differences from 2014 to 2020 (i.e., indicator ((d) - (c)) / (a) in Table 1) are relatively more significant than those at the national level. Table 2 shows that the proportion of the FIMI's rented farmland area (for 2019) to the amount of arable land (a) is high. The contribution of FIMI is high because the accumulated areas formed a new contract between regional agriculture bearers and landowners through FIMI against the annual accumulation target (indicators (g) and (k) in Table 2). These indicators show that both prefectures significantly contribute to the liquidation of farmlands in regional agriculture through the FIMI.

**Table 1 Status of farmland accumulation to regional agriculture bearers in the Sanin region**

| | Area of arable land in 2013 | Area of arable land in 2019 | Percentage of change from 2013 to 2019 | Farmland area cultivated by bearers in March 2014 | Farmland area cultivated by bearers in March 2020 | Percentage of contribution to farmland accumulation from 2014 to 2020 | Percentage of farmland cultivated by bearers in March 2014 | Percentage of farmland cultivated by bearers in March 2020 | Difference between percentages from 2014 to 2020 |
|---|---|---|---|---|---|---|---|---|---|
| | (a) | (b) | (b)/(a)-1 | (c) | (d) | ((d)-(c)) /(a) | (e)=(c)/(a) | (f)=(d)/(a) | (g)=(f)-(e) |
| | ha | ha | % | ha | ha | % | % | % | % |
| Japan | 4,537,000 | 4,397,000 | -3.1 | 2,208,258 | 2,508,560 | 6.6 | 48.7 | 57.1 | 8.4 |
| Tottori | 34,900 | 34,300 | -1.7 | 7,255 | 10,613 | 9.6 | 20.8 | 30.9 | 10.2 |
| Shimane | 37,900 | 36,600 | -3.4 | 9,851 | 12,509 | 7.0 | 26.0 | 34.2 | 8.2 |
| Okayama | 67,300 | 64,500 | -4.2 | 12,532 | 16,258 | 5.5 | 18.6 | 25.2 | 6.6 |
| Hiroshima | 56,900 | 54,100 | -4.9 | 10,586 | 13,152 | 4.5 | 18.6 | 24.3 | 5.7 |
| Yamaguchi | 49,200 | 46,400 | -5.7 | 11,655 | 14,053 | 4.9 | 23.7 | 30.3 | 6.6 |

Source: Ministry of Agriculture, Forestry, and Fisheries. Materials related to the accomplishments of the Farmland Intermediary Management Institution in 2019.

Note：The area of arable land is based on the area surveyed by the Ministry of Agriculture, Forestry, and Fisheries.

**Table 2 Status of farmland flow by the FIMIs in the Sanin region**

| | Area of arable land in 2019 | Annual target of farmland accumulation | Rented farmland area by the FIMI | Percentage of rented farmland by the FIMI to arable land in 2019 | Farmland areas subleased by the FIMI | Farmlands including accumulated areas via the new contract through the FIMI |
|---|---|---|---|---|---|---|
| | (a) | (b) | (c) | (c)/(a) | (d) | (e) |
| | ha | ha | ha | % | ha | ha |
| Japan | 4,397,000 | 149,210 | 35,437 | 0.81 | 39,937 | 15,480 |
| Tottori | 34,300 | 1,090 | 732 | 2.13 | 986 | 344 |
| Shimane | 36,600 | 1,560 | 947 | 2.59 | 809 | 407 |
| Okayama | 64,500 | 1,910 | 393 | 0.61 | 441 | 188 |
| Hiroshima | 54,100 | 1,620 | 367 | 0.68 | 390 | 167 |
| Yamaguchi | 46,400 | 2,280 | 595 | 1.28 | 581 | 218 |

Source and Note: Same as Table 1.

**Table 2 Status of farmland flow by the FIMIs in the Sanin region (Continued)**

| | Cumulative Status from April 2014 to March 2020 | | | | | |
|---|---|---|---|---|---|---|
| | Percentage of newly made contracts through FIMI to subleased area | Accumulated area of newly made contracts through FIMI to annual target of accumulation | Farmland areas subleased by FIMI | Farmlands including accumulated areas with a new contract through FIMI | Percentage of newly made contracts through FIMI to subleased area | Accumulated area of newly made contracts through FIMI to annual target of accumulation |
| | (f)=(e)/(d) | (g)=(e)/(b) | (h) | (i) | (j)=(i)/(h) | (k)=(i)/((b)×6) |
| | % | % | ha | ha | % | % |
| Japan | 38.8 | 10.4 | 253,872 | 102,520 | 40.4 | 11.5 |
| Tottori | 34.9 | 31.6 | 3,540 | 1,907 | 53.9 | 29.2 |
| Shimane | 50.3 | 26.1 | 4,350 | 2,027 | 46.6 | 21.7 |
| Okayama | 42.6 | 9.8 | 2,201 | 1,190 | 54.1 | 10.4 |
| Hiroshima | 42.8 | 10.3 | 4,322 | 1,533 | 35.5 | 15.8 |
| Yamaguchi | 37.5 | 9.6 | 5,542 | 1,718 | 31.0 | 12.6 |

Source and Note: Same as Table 1.

**Policy for land utilization through FIMIs**

An interview survey of FIMIs in the Shimane and Tottori prefectures clarified the following farmland use and liquidity characteristics. First, in the Tottori prefecture, farmland accumulation was promoted in agricultural management entities with flat non-paddy fields (i.e., cultivated flat farming areas for vegetables and fruits). Local stakeholders have been collaborating in the towns of Iwami and Yazu. The municipal Agricultural Public Corporation has been conducting harmonization projects for farmland use in these areas, along with efforts for efficient farmland use under the One-Community, One-Farm system. As a result, the percentage of farmland accumulation to the bearers of regional agriculture has been higher than that of other municipalities. Farmland borrowing and lending, according to FIMI, is a matter of autonomy for each municipality. Municipal officers promote activities on farmland use through working-level consultations and official meetings with individuals in charge of operations related to the community-based master plan on farmland utilization and regional agricultural development (*hito nochi plan*).

For the past 10 years, the FIMI in the Tottori prefecture has also provided training for new farmers through a collaboration with presently skilled farmers called the Agri-Start Training Program. This program has administered the integrated management of bearers and farmlands. The FIMI has encouraged those who wish to begin farming to do so through the Agri-Start Training Program that involves managing open field vegetables, ultimately requiring less capital investment. The FIMI prioritize securing farmlands for newcomers. The primary focus has been on improving farmlands conditions whenever possible. In several cases, weeds have impeded new farmers who have leased abandoned or unused farmlands; therefore, large-scale management entities first focus on re-cultivating farmlands for several years and then partially surrender their farmlands to new farmers. The FIMI considers that beginning farming in the hilly and mountainous areas will be a challenge for new farmers. Hence, the FIMI encourages large-scale management entities to lease farmlands in the hilly and mountainous areas for farmland utilization. Generally, farm management entities of facility-based horticulture lease farmlands with better conditions even outside the municipal region. Expanding their operation scales within the residential region would be unnecessary for them. Therefore, each farmer rents farmlands through face-to-face communication rather than through the FIMI. Nonetheless, the FIMI's role is increasingly critical for non-paddy field management entities seeking to improve their farmland efficiency.

Each municipality faces unique challenges. No municipality has achieved the levelling of farmland policy because farm management is based on local governance. Since the person managing the municipal office is replaced every few years, their attitudes toward measures vary. Additionally, the number of management entities with the maximum acceptance of farmland has increased. As large-scale management entities reduced the size of their operations and stopped farming after retirement, the FIMI and municipal committee face a new challenge as finding farmers who would rent and take over such farmlands is time-consuming and costly. Therefore, responding to changes in management entities and cultivating new core farmers becomes a challenge.

Another issue is that the administrative workload associated with renting farmlands has increased, and the administrative burden has become too much for the FIMI staff.

We can see the different characteristics of farmland use and transfer through the FIMI of the Shimane prefecture. According to an FIMI summary, the accumulation percentage in flat farming areas, which comprises the Matsue and Izumo Cities, is 44 percent, while that in hilly and mountainous areas,

which includes all other municipalities, is 27.3 percent.

The current farming situation in the flat farming area of the Hikawa district (old municipality range) in Izumo City is the result of coordinating farmland use among community-based farm organizations and the effort of the Agricultural Public Corporation, which provided a place for farmers to consult on farmland use. The remote island town of Okinoshima also has a history with the Agricultural Public Corporation implementing its first farmland management measures to utilize abandoned farmlands and supporting small farmers. This background makes promoting farmland accumulation through the intermediate management of the FIMI project easier. Even in hilly and mountainous areas, farmland liquidation has been progressing in areas where community-based farm organizations are primarily managed in the towns of Iinan and Tsuwano.

Paddy field horticulture has been promoted by municipalities and prefectures in hilly and mountainous areas, increasing greenhouse plantings of paprika, strawberries, and other vegetables. However, greenhouse operations in paddy fields necessitate significant capital investment. Therefore, it is critical to assist new farmers by converting farmland to more profitable ones by implementing water allocation measures and improving the conditions of small fields through the farmland infrastructure project. Furthermore, rather than waiting for potential renters, the project narrows the number of regional agriculture bearers to be trained and provides intensive support for expanding their farm management.

The FIMI has proposed that the institution prepare and distribute the "Newsletter of the Institution of Farmland Intermediary Management" to introduce its projects and regional examples, and to assign counselors to 11 districts in the Shimane prefecture to share information with local farmers. Additionally, farmland exchange and accumulation projects ranging from 10 hectares to 20 hectares are planned in seven districts of the Shimane prefecture.

For aging farmers who leased farmlands from the FIMI, a major concern is returning said farmlands. Making a living solely from farm income alone in hilly and mountainous areas is a challenge. Moreover, increasing number of animals (especially wild boar) has added to the difficulties of managing farmers who have rented farmlands. Measures that do not involve wired barriers and animal hunting are required to address these issues. Finally, due to aging and other factors, there is an expected increase in the number of farmers who want to return their farmland.

**Farmland utilization in non-paddy cultivated fields**

The Yumigahama (Kyuhin) Peninsula is an example of farmland utilization and farmland liquidity. As of 2020, welsh onions and other crops are primarily produced in the sandy fields on the Peninsula. Moreover, the production area has expanded from the plains to hilly and mountainous areas as paddy field conversion crops. Shipments are made throughout the entire year. Corporate agricultural entities contribute to efficient farmland use.

Company A, one of the agricultural entities, produces vegetables such as welsh onions on idle farmland leased through the FIMI as well as its own farmland. The company borrows farmland from elderly landowners who face difficulty in cultivating the surrounding area and expanding its operations while using previously cultivated land composed of fertile *Kokuboku* soil (andosols), and reclaimed land. Recently, discussions were held with farmland owners in collaboration with the FIMI to resolve the issue of idle farmlands inside and outside of reclaimed lands. The farmlands have thus been concentrated to local leaders who are trusted by landowners. In the Yumigahama (Kyuhin) Peninsula, young farmers in their 30s and 40s have established a group of welsh onion farmers who hold study sessions and exchange information on farming technique and marketing.

A function of training new farmers can also be confirmed. Tottori prefecture's training program accepts registered farmers as trainees. New farmers generally begin farming after receiving training from experienced farmers and gradually expand their scale of operation. However, as existing farmlands are being used, small pieces of farmland are borrowed in scattered forms. Thus, it has become a trend to borrow farmland on reclaimed land through the FIMIs for crops that require efficient production.

**Relationship between farmland use and new entry farmers**

Newcomers often have difficulty using better-quality paddy fields or converting rented paddy fields into non-paddy fields because of the resistance of farmers who have lived in the area for a long time. Finding a way to encourage I-turners, who are new to farming, has become a challenge, while community-based farming conserves farmlands.

In the city of Matsue, cabbage cultivation gradually increased after completing Iya drained land under the Nakaumi reclaimed land project, and the city became a designated vegetable production area in the early 1990s. Subsequently, by 2007, production areas decreased due to aging farmers. Existing farmers accepted and trained new farmers to maintain and improve the brand name and value of the production area. Specifically, since 2009, related organizations and farmers have collaborated to launch a farming training program to train new farmers who will facilitate production. The training program has led to an increase in the number of farmers in the city as well as a certification of new farmers in the drained land, which is flat and has irrigation facilities and works efficiently. Additionally, cultivated areas and the amount of cabbage shipped by the farmers has recovered. Farmers who have leased farmlands from neighboring farmers and expanding the scale of operations have taken the lead in training. The ability to maintain the brand of the production area while building new mentoring relationships has become increasingly vital for farmland use and conservation. Approximately half of the new farmers have utilized the FIMI for farmland use, implying that borrowing through FIMI has become more important for farmers attempting to scale up their operations.

## Discussion

Based on the results of the actual farming conditions, we proposed the following three issues on farming liquidity.

The first is the issue of continuity and stability of the scale of agricultural management. As farmlands are typically leased to trusted farmers in the rural community, they are likely to have a larger number of idle farmlands to lease out. Within a rural district, large-scale farm management entities have been created. However, the sudden retirement of large-scale farmers who borrowed a large number of farmlands and the instability of their farm management are also unsettling factors in a depopulating and aging society. Therefore, areas with a high concentration of farmlands will bear the burden of adjusting for reallocation as farm operations shrinks in scale. This point is consistent with Tanigch's (2013) study. In line with this, the FIMI of the Shimane prefecture settled a case in the city of Oda, where a large-scale farmer who borrowed from landowners unexpectedly retired. The agricultural committee members, optimization promotion committee members, other related organizations, and farmers in the district collaborated to develop policies and secure farmers in cultivating farmlands. They also considered a method for borrowed farmers to cultivate farmlands as a unit by coordinating these farmers and others in the district to conserve farmlands. Local stakeholders must work collaboratively thus and support farmland cultivation.

The second issue is the integration of newcomers into rural communities. The settlements of new farmers in the rural community, as well as the inflow from outside the community, are crucial for the community's sustainable development. However, new farmers who are I-turners must begin by borrowing farmland from landowners. The cost of coordinating with landowners rises as new farmers need to borrow farmland from multiple landowners. Coordination cost are particularly high in hilly and mountainous areas due to the differences in the conditions of each plot of farmland. One of the survey results from the Sustainable Community Research Institute in Masuda City and the Research Institute for Sustainable Community (2020) demonstrates the level of awareness among landowners who lend their farmlands. The results show that existing farmers overwhelmingly supported the idea of lending farmland to new farmers. Before lending out better-quality farmlands, rural residents will consider whether or not they will settle down in the community.

In hilly and mountainous areas, I-turners have been accepted through the institution of Local Vitalization Cooperator and the New Farming Training. In particular, in communities with small populations, younger individuals are more readily accepted through the institution and willing use vacant houses because of regional resource management. However, there were several cases of individuals who did not fit in with the local community. Existing residents aim to confirm the new residents' willingness to settle into the community, and they offer better-quality farmland and vacant houses when they can confirm that there exists a great desire to settle in the community after several years. In hilly and mountainous areas, some newcomers gradually integrate into the rural community while simultaneously working part-time for a community-based farming organization and establishing their businesses. We can also confirm a recent trend of allocating better-quality farmlands to new farmers.

In the paddy fields, relationships among farmers involved in water management are essential, and farmers have historically valued close communication. Based on this, I-turn

farmers require a longer time to build trust by stating their intention to settle down (e.g., purchasing a house and farmland) and their vision for farm management in the rural community.

Third, due to unfavorable conditions, farmland accumulation in paddy field agriculture in hilly and mountainous areas incurs high costs. The issues to be addressed are ridge (*Keihan*) and water management on rented farmlands, as well as mitigating damage caused by wild boar and other animals. Toyoda et al. (2020) highlighted that it is difficult to promote a community-based master plan on farmland utilization in hilly and mountainous areas, with a focus on farmland accumulation. They also emphasize that the plan's content is extremely limited. These points are consistent with this study's results. The future of local communities is not limited to farmland accumulation. It is crucial to develop new farm management entities in hilly and mountainous areas by establishing measures to protect farmland and coordinating farmland utilization. This measure should be conducted with the common goal of vitalizing rural communities.

## Conclusion

This study explored the relationship between the FIMI's promotion of farmland uses and regional farmers' behaviors using interview data from the Sanin region. The results suggest that the FIMI and local government initiatives generate a regional difference in farmland acquisition and farmland renting.

Establishing a system to take cross-sectoral measures for stabilizing farm management of farmers who have leased farmlands from FIMI, fostering new bearers of regional agriculture and harmonizing with rural communities, and preserving the environment around farmland, including measures to prevent damage to wild boar and other animals in hilly and mountainous areas, will be critical. Additionally, it is essential to discuss how the administrative burden placed on the relevant organizations can be alleviated.

Obtaining various actors involved in farmland conservation will result in the preservation of regional agriculture and rural communities. Thus, efforts should be focused on preserving farmer diversity.

Finally, statistical testing of these findings is critical. A main challenge is to quantitatively investigate differences between municipalities, districts, and rural communities. These issues will need to be addressed in future studies.

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