

Classifications and Geographical Characteristics of Activated Forms of Rural Communities in Hilly and Mountainous Areas

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Abstract: This study quantitatively examines the activated forms of rural communities in view of conservation of farmlands and activation of rural communities and the geographical characteristics affecting the activated forms in hilly and mountainous areas. Using the data of rural communities in Chugoku region (Tottori, Shimane, Okayama, Hiroshima, Yamaguchi) obtained from the Census of Agriculture and Forestry, we quantitatively examined the geographical characteristics of qualitative change in conservation of farmlands, economic revitalization and social activation of rural community in hilly and mountainous areas.

We obtained three main findings. First, we extracted two dimensions (axes) respectively based on the corresponding analysis (quantification theory) in view of conservation of farmlands, economic activity for vitalization, and social activities. Conservation of farmlands had the dimensions of maintenance of farmland and farmland utilization. Economic revitalization had the dimensions of farm diversification and Collective activation (Individual or group). With respect to the economic revitalization, we extracted the dimensions of social vitalization and communication. Second, the activated forms were classified into six types from the cluster analysis using the sample scores obtained from corresponding analysis (quantification theory). Third, comparing the geographical factors of each cluster, we clarified that the rural communities in the relatively active clusters were supported in a broad-based agreement or plural agreements.

These findings indicate that it is critical to take measures considering the different types of activation and the way of conservation through the agreement in the rural communities.

Keywords: Hilly and Mountainous Areas, Rural Community, Conservation of Farmlands, Economic Revitalization, Activated form, Geographical Characteristics

JEL Classification: O13, Q13, Q18, R11

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1. Introduction

1.1 Background of this study

There has been great concern about the conservation of farmlands in hilly and mountainous areas since the multi-functionality of agriculture has been noted internationally. In Japan, while many rural communities have entered into agreements for farmland conservation since FY2000, the decreasing number and aging of farmers in recent years have made such agreements difficult. It has thus become necessary to consider the potential of rural social and economic vitalization in these rural communities.

1.2 Previous studies

Prior studies such as Yamaura (2007), Takagishi and Hashizume (2010), Yonezawa and Takeuchi (2006), and Yasunaga (2016) have attempted to capture conservation patterns in terms of the actual conditions and effects of broad-based agreements. However, few studies have captured recent trends in the pattern of community agreements under the direct payment policy in hilly and mountainous areas. In addition, little research has been conducted to examine the vitalization patterns of rural communities and the relationship between the policy of direct payments to hilly and mountainous areas and the sustainability of rural communities. It is nonetheless important to capture the characteristics of rural communities in terms of rural vitalization in order to ensure the maintenance of such community. There has also been research that quantitatively explored the vitalization types of rural communities and the factors affecting such vitalization types under the direct payment policy in hilly and mountainous areas.

1.3 Purpose of this study

This study quantitatively examines the activated forms of rural communities in view of the conservation of farmlands and activation of rural communities and the geographical characteristics that affect the activated forms of such communities in hilly and mountainous areas. In particular, we examined the rural communities in the Chugoku Region (Tottori, Shimane, Okayama, Hiroshima, and Yamaguchi) which contains many hilly and mountainous areas. It should be noted that we focus on rural communities, which are called “shuraku” in Japan. In this study, shuraku refers to a spontaneous and minimum community formed for agricultural land, water use, and forest use on the part of municipalities. We also call such communities agricultural settlements. In Japan, a variety of groups and social relationships are formed at the community level. Even today, social relationships remain in many rural communities.

2. Hypothesis and Research Method

2.1 Research questions

The Research questions in this study are as follows: What are the factors that affect the differences in the form of vitalization in agricultural settlements when they differ in terms of the scale of agriculture or means of cooperating with other communities? How do the conditions of access for a community influence its social vitalization? What types of communities promote the development of rural communities?

2.2 Hypothesis

There are various types of vitalization for rural communities, including vitalization related to farmland conservation,

and economic vitalization (e.g., agri-business), and social vitalization. In addition, the specific type of vitalization is related to the internal and external conditions of agriculture in rural communities. In particular, access factors (e.g., access to an urban market), policy factors (e.g., the form of community agreements under the direct payment policy), and production factors (e.g., the productivity and scale of regional agriculture) influence the above types of vitalization in rural communities.

2.3 Data collection for investigation

2.3.1 Variables on conservation of farmland and rural vitalization

Aspect 1 Situation regarding farmland conservation in the rural community

A1-1 Change in the utilization of farmlands

A1-2 Change in abandoned farmlands

A1-3 Change in arable land area for farm management

A1-4 Situation regarding the qualitative improvement of the rural natural environment

We introduced the above variables to capture the situations regarding farmland conservation in rural communities. Concretely, we considered the change in abandoned farmland or change in arable land as indicators of farmland conservation. We also considered the change in farmland (paddy field and cultivated field) that has not been planted. Furthermore, the change in the situation regarding collective conservation of farmland and forest was considered. We also considered items regarding activity for the vitalization of the rural community. These indicators were obtained from the Ministry of Agriculture, Forestry and Fisheries, which investigated agricultural settlements that were engaged in activities for activation in 2015. For the items regarding such activities, we used rural activities related to “environmental beautification, conservation of the natural environment.”

Aspect 2 Economic vitalization of the rural community

A2-1 Change in rural tourism activities

A2-2 Change in farm diversification

A2-3 Situation regarding efforts to promote rural tourism activities for the vitalization of the community

A2-4 Situation regarding efforts to engage in farm diversification activities for the vitalization of the community

We introduced the above aspects as economic vitalization. Concretely, we considered the number of implementation of agriculture-related business in agricultural management entities and activity items for vitalization of the rural community. These indicators were obtained by Census of Agriculture and Forestry. Food processing, the direct sales of agricultural products, and sales of agricultural products to overseas include in farm diversification. Allotment, tourist farm, farm inn, and farm restaurant were included in rural tourism activities. We also used the situation of the rural activity on “efforts for rural tourism” and “efforts for promotion of primary producers’ diversification into processing and distribution (sixth sector industrialization)” in the activity items mentioned above.

Aspect 3 Social vitalization of rural community

A3-1 Change in number of meetings in the community

A3-2 Situation regarding efforts to preserve traditional culture for the vitalization of the community

A3-3 Situation regarding efforts to promote events for the vitalization of the community

A3-4 Situation regarding efforts to improve the welfare of the community

We introduced the above variables to capture social vitalization. Concretely, we considered the change in the number of meetings at the community level obtained from the Census of Agriculture and Forestry. We also used the situation regarding rural activities for the “preservation of traditional festivals, culture and entertainment,” activities aimed

at “holding some events,” and “welfare activities for the elderly,” as obtained from the activity items mentioned above.

2.3.2 Geographical variables

Geographical variables related to the conservation and vitalization of communities were divided into three conditions.

B1 Access conditions

As the demand condition, we considered the time distance to densely inhabited districts (DIDs), expressway, and road station obtained from the Census of Agriculture and Forestry researched by the Ministry of Agriculture, Forestry and Fisheries.

B2 Production conditions

As the competition condition, we introduced the productivity in food-related businesses obtained from the Economic Census for Business Activity researched by the Ministry of Economy, Trade and Industry. In addition, we considered the proportion of commercial farm households (agricultural management entities) who sell more than five hundred yen of agricultural products and the percentage of farm households with people who are younger than sixty-four years old who are mainly engaged in agriculture. We also considered an index of the area of farm management, labor use, and machine use.

B3 Institutional conditions

As policy conditions, we introduced the formation of community agreements. We also considered interaction terms, such as the relation between the conservation scale of the rural community (i.e., small or large) and the number of agreements in the rural community (i.e., one or more than one).

2.4 Analytical framework

In this study, we use the qualitative variables on farmland conservation and rural vitalization. Therefore, we first extracted factors related to farmland and rural vitalization using corresponding analysis (quantification theory type III). Second, we examined the relationships among these factors and the relationships between these factors and the geographical factors of rural communities by using cluster analysis and by making comparisons among the clusters.

3. Characteristics of conservation of farmland and vitalization of rural communities

3.1 Activated forms of rural community

3.1.1 Conservation of farmlands

From the average of arable land and abandoned farmland in rural communities in five prefecture of Tyugoku region, it appeared that the differences in average of arable land of rural communities in each prefecture. In particular, in Shimane prefecture, each rural community has arable lands of less than 10ha. In five prefectures, arable land area has been reduced in each prefecture year by year. In hilly rural area, number of rural communities that adapted to preserve farmlands increased from 2010 to 2015. Ratio of community that makes abandoned farmland decrease was twenty percent.

3.1.2 Economic and Social vitalization of rural community

We grasped the recent trend of economic and social activities. Number of meeting per year in 2015 has increased in more than thirty percent of the rural communities (agricultural settlements). In particular, the number of meeting on welfare for elderly people in the community increased. With regard to the activity of vitalization, ratio of rural communities that have activities on conservation of traditional culture, welfare activities for elderly, and cleanup operation and conservation of natural environment were high. On the other hand, ratio of rural communities that have activities on rural tourism and promotion of agricultural diversification into processing and distribution were low. In

addition, with regard to the agricultural related business, the number of agricultural management entities that conducted direct sales of agricultural products and food processing increased in the period of 2005 to 2010, and 2010 to 2015.

3.2 Geographical characteristics of rural communities

3.2.1 Access condition (access to urban market)

We also organized the relationship with the geographical factors in the Tsugoku region. With respect to the access conditions, in hilly (semi-mountainous) agricultural areas, rate of rural communities where takes 15 to 30 minutes to get to nearest center of DID (Densely Inhabited District) by the transportation that the residents most usually use (car, bus and train etc) was high. In mountainous agricultural areas, rate of rural communities where takes 30 to 60 minutes to get to nearest DID was high. In particular, in Shimane prefecture, there are many rural communities where takes 60 to 90 minutes to get to nearest DID. In the Sanin region (Shimane and Tottori prefectures), the degree to which the rate of rural communities that it takes time to get to the nearest expressway by car was high. In addition, in Okayama and Hiroshima prefecture, the rate of rural communities in mountainous area that it takes time to get to supermarket, convenience store by car in less than 30 minutes was high. The rate of rural communities where takes over 30 minutes to get to road station by car was relatively high in Okayama and Hiroshima prefecture. These means that access conditions have been removed in the Sanin region, on the other hand, road stations have been established as a rural vitalization sites in Sanin Region. Comparing with five prefectures, in Shimane Prefecture, there are many rural communities that face difficulty on access condition.

3.2.2 Production conditions

Rate of agricultural management entities over five million yen of sales amount was relatively high in hilly agricultural area of Tottori prefecture. In addition, it was relatively low in mountainous areas of Shimane and Okayama prefecture. There was a large difference in estimated agricultural products sales (farm produce revenues) between hilly agricultural areas and mountainous agricultural areas in Tottori and Okayama prefecture. Average of total amount of farm management areas in rural community was relatively high in Tottori prefecture, low in Shimane prefecture. In addition, that of hilly areas was lower than that of mountainous areas in Shimane Prefecture. With respect to the agricultural labor, there remain many farmers in Tottori prefecture than the other prefectures. Employee of agricultural work per agricultural management entity were also many. It is presumed that it is easy to employ workforce for agriculture. With respect to the agricultural machine use, it is presumed that shared use have been progressed in recent years. The degree of the share was different across agricultural regions and prefectures.

3.2.3 Policy conditions

There are many rural communities that have farmland as a direct payment policy target in Hiroshima, Shimane and Tottori. As a whole, there are multiple agreements in the community in mountainous areas. In addition, there is an agreements covered across the communities in mountainous areas compared with hilly agricultural areas. The agreement under direct payment policy mainly covers the area of paddy field. In terms of comparison with total of farm management area, community agreements in Shimane prefecture were covered almost of farmlands.

4. Classification of conservation and vitalization of rural communities

4.1 Extraction of conservation and vitalization factors in hilly and mountainous areas

We extracted the category score using corresponding analysis (quantification theory type III). First, we got the category scores of conservation of farmlands. Dimension 1 indicates the axis on conservation of farmlands. It can be said that the propensity of farmlands conservation is low when the category score indicates a negative value. It can be also

said that the propensity of maintaining the farmland conservation is high when the category score indicates a positive value. Dimension 2 indicates the axis on utilization of farmlands. It can be said that the propensity of expanding farmlands is high when the category score indicates a negative value. It can be also said that the propensity of efficient utilization of farmlands is high when the category score indicates a positive value. Second, we got the category score of economic vitalization of rural communities. Dimension 1 indicates the axis on economic vitalization through farm diversification. It can be said that the propensity of vitalization by agri-business as a entire rural community is high when the category score indicates a positive value. It can be also said that the propensity of agriculture related economic vitalization in the rural community is low when the category score indicates a negative value. Dimension 2 indicates the axis on economic vitalization by individual agricultural management entity and collective economic vitalization in the community unit. It can be said that the propensity of agri-business activity of each agricultural management entity is high when the category score indicates a positive value. It can be also said that the propensity of effort in the rural community unit agriculture is high when the category score indicates a negative value. Third, we got the category score of social vitalization of rural communities. Dimension 1 indicates the axis on social activity. It can be said that the propensity of social activity is high when the category score indicates a positive value. It can be also said that the propensity of social activity in the community unit is low when the category score indicates a negative value. Dimension 2 indicates the axis on communication in the rural community. It can be said that the propensity of social communication is decreasing when the category score indicates a negative value. It can be also said that the communication in the rural community unit is maintaining when the category score indicates a positive value.

4.2 Characteristics of clusters

Next, we applied the cluster analysis (Ward method) using the data of sample scores in each performance obtained from the correspondence analysis (quantification theory type III). The samples of rural communities could be divided into six clusters. We captured the following characteristics of each cluster using the average values of sample scores.

Cluster 1 is the group that efficiently uses farmlands although farmlands in the community was not maintaining. Economic and social vitalization was low. Communication in the community unit was maintained. Cluster 2 is the group that economic and social vitalization was high. Farm diversification was conducted by each agricultural management entity individually, not collectively. Arable land for farm management increased although farmlands in the community were decreasing. Cluster 3 is the group that degree of economic and social vitalization was high. Farm diversification was collectively conducted in the rural community level. The degree of vitalization in the community unit was relatively high. Cluster 4 is the group that degree of social vitalization was high. Communication in the community unit was not maintained. Farm diversification was conducted by each agricultural management entity individually, not collectively. Arable land for farm management increased while the farmlands in the community were decreasing. Cluster 5 is the group that degree of economic and social vitalization was low. Farmlands and Communication in the community unit was not maintained. It can be presumed that efficient use of agricultural land has been advanced. Cluster 6 is the group that degree of social vitalization was low. However, farm diversification though processing and direct sales in the community unit was progressing. The degree of conservation of farmlands was relatively high. Communication in the community unit has been maintained.

4.3 Geographical characteristics of rural communities

We calculated the rate of rural communities contained in the clusters in each prefecture and in each agricultural region. There was no difference in the proportion of rural communities included in each cluster between hilly agricultural areas and mountainous agricultural areas, especially in cluster 2. However, there was difference among prefectures. In

particular, Yamaguchi prefecture relatively has the rural communities that contained in cluster3 and cluster 5. As a similar point, every prefecture has a high proportion of cluster 1 and cluster 2.

We also calculated the rate or average of rural communities related to the geographical factors affecting the classification of rural communities. Cluster 2 has the agricultural conditions such as machine and arable land areas for farm management. With respect to the policy conditions, More than seventy percent of communities in the clusters 1 to 4 have concluded the community agreement. In addition, more than five percent of communities were made up of management beyond community. The agreement area was large when the community entered into the agreement in cluster1 and cluster 2. Especially in cluster 2, the rate of communities that there are multiple agreements in the community was high. It can be presumed that the conservation across the communities and multiple agreements play important roles in vitalization.

5. Conclusion

In this study, we examine the characteristics of farmland conservation and rural vitalization in rural communities using rural community data on the Chugoku region. In addition, we considered the effect of the access, production and policy conditions of agriculture in the rural communities on the types of vitalization for rural communities. We confirm the differences across the agricultural areas and prefectures. In addition, we found that access factors and production factors affect the form of conservation and vitalization in rural communities. In particular, we confirmed the type of rural communities and geographical relationship across prefectures, way of farm management and participation to the direct payment policy. These results indicate that it is important to use measures that capture the actual situation of social vitalization and geographical characteristics, such as multiple communities.

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