

Study on the Maintenance and Management System of Tanada in Mountainous Area -Case Study on Okuno Settlement in Yamaguchi Prefecture-

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Abstract:

The aim of this study is to make clear spatial composition and farming system on the small-scale mountain settlement still maintaining Tanada (Terraced Paddy Field) in Yamaguchi prefecture. In Japan Tanada has had many problems such as difficulty of finding successors of paddies, introducing agricultural machines and so on. Therefore many traditional mountain settlements are facing a crisis of disappearing. On the other hand, recently revaluation of Tanada is on the rise again, because of growing social awareness about the environment preservation and protection of cultural scenery. Therefore, some prompt measures for maintaining and utilizing Tanada as a regional resource are required. In this study, we attempted to make clear the system to maintain and manage Tanada only through a few farmers by a case study on the small-scale mountain settlement “Okuno” in Yamaguchi prefecture. At first, we summarized current situation of the farmland use and preservation. Next we grasped the constituent elements and farming system of “Okuno” settlement. Then, we analyzed numerical data of farmlands. As a result we revealed the system of maintenance of Tanada gave been closely related to fine geographical conditions and irrigation system.

Keywords: up to five words; *Tanada (Terraced Paddy Field), Irrigation System, Mountain Settlement, Spatial Composition, Farming System*

1. Introduction

The Japanese topography varies considerably. Therefore a large number of terraced paddy fields called “Tanada” were developed in mountainous areas for the purpose of increasing yield to the maximum, in order to contribute to secure efficient agricultural production. In recent years, these traditional farmlands have been appreciated as primal beautiful Japanese scenes.

On the other hand, in rural areas, populations are aging and decreasing, so no generation change in farming occurs, farmers grow older and at last they give up farming. In addition, Tanada has so small a cultivated area that it is difficult to introduce large agricultural machines. Therefore, it is very difficult to maintain the social symbiosis of residents, not only the maintenance and management of Tanada in mountainous areas.

“Okuno” settlement located in Shimonoseki City, Yamaguchi Prefecture is small-scale mountain settlement where aging and depopulation. However, the extensive Tanada has been



Fig.1. Tanada of Okuno in Shimonoseki City, Yamaguchi Prefecture

maintained by few farmers in Okuno even today, and perceived as the landscape resources. As a result, Tanada of Okuno received the scenery prize of Shimonoseki City in 2013(Figure 1).

In this study, we attempted to make clear the system to maintain and manage Tanada only through a few farmers by a case study on the small-scale mountain settlement “Okuno”.

As for the previous study about the landscape conservation of rural area, Nishiyama and Mimura (1995) pointed the necessity of farmlands conservation not only architectures. In

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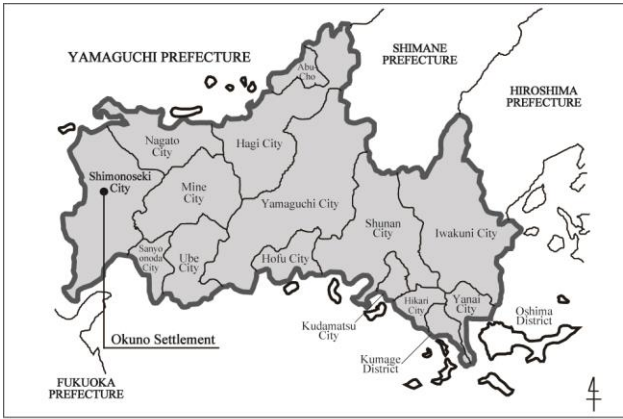


Fig.2. Location of Okuno Settlement in Yamaguchi Prefecture

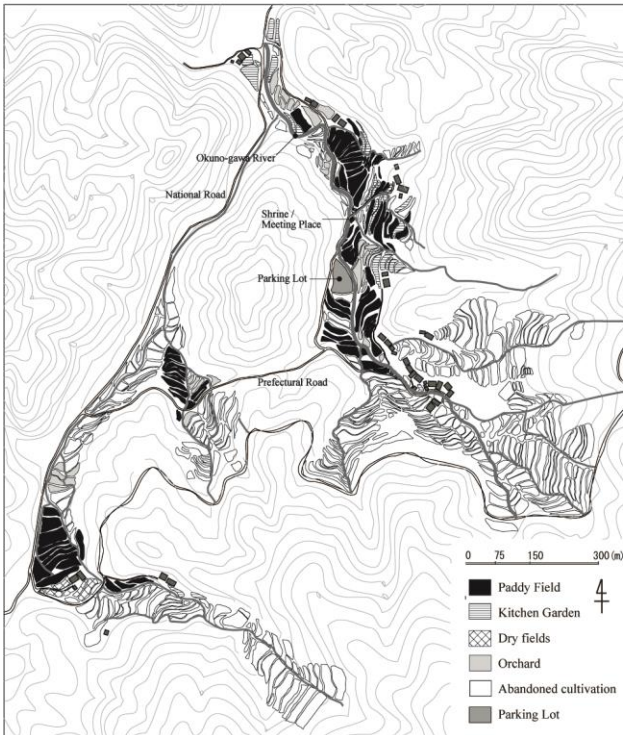


Fig.3. Okuno Settlement

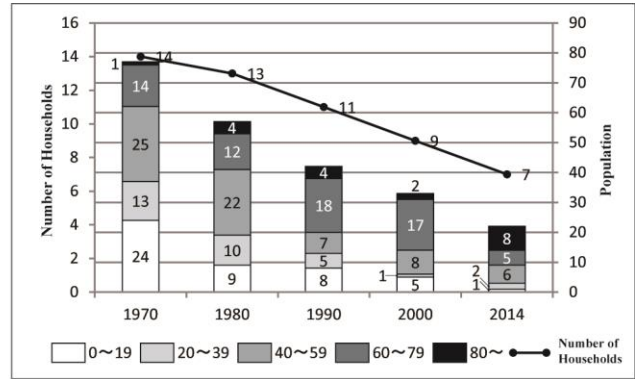


Fig.4. Transition of Population

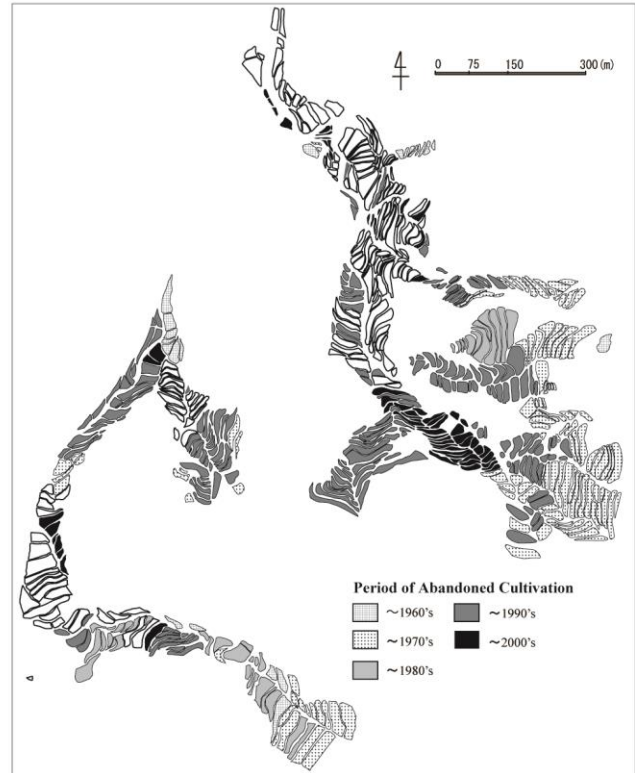


Fig.5. Transition of Farmland Use

addition, about the landscape, Yamasaki (2010) regard the irrigation waterway as the scenery constituent elements. Also, Temma (2012, 2013) treated the irrigation system in a mountain village, and examined the effect on the landscape. However, little is known about the detailed relation between the farmlands as the scenery constituent elements and the actual situation of farming environment.

2. Method of Study

In this paper, we made Okuno settlement positioned beside of Okuno-gawa River in Shimonoseki City, Yamaguchi Prefecture as the target (Figure 2, 3). At first, we conducted a questionnaire survey with residents to grasp current situation of the farmland use and preservation. Next we conducted a field survey to grasp the constituent elements and farming system of Okuno settlement. Then, we analyzed numerical data of farmlands (area, distance of a straight line from residence, altitude difference from residence, connecting road width and

water intake source) from 1960 to 2014. From the above, we attempted to make clear the system to maintain and manage Tanada only through a few farmers.

3. Outline of Okuno Settlement

In this chapter, we marshaled about outline of Okuno settlement. In the 1970s and later, the total population of Okuno settlement has decreased from 77 to 22. In addition, the ratio of elderly persons has increased from 19.5% to 59.1%. In particular, the proportion of elderly people aged 80, or over, has increased significantly (Figure 4).

Figure 5 indicates the transition of farmland use in chronological order since the 1960s. In the 1960s, more than 95% of the farmlands were cultivated as paddy fields. Since the 1970s, the abandoned farmlands started to increase from upstream side of the many mountain streams, because the acreage-reduction policy of paddy began to be fully promoted. And in the 1990s, the large part of Tanada located on the

upstream side of mountain streams had already been abandoned.

In addition, since the 2000s, the abandoned farmlands occurred on the midstream of Okuno River. As of 2014, the total farmlands of Okuno consist of the abandoned farmlands (74.1%), the cultivated farmlands as paddy fields (14.3%), and the dry fields (11.7%).

4. Farming Environment

Chapter 4 gauges the present situation of farmland use by use of 4 index, 1) the area of a paddy field (figure 5), 2) the distance of a straight line from owner's residence (figure 6), 3) altitude difference from owner's residence (figure 7) and 4) connecting road width (figure 8).

First of all, figure 6 indicates the distribution of the farmland areas. The area of major part of farmlands ranges from 100 to 300 square meters. And the area of farmlands cultivated as paddy fields today are on a same trend.

In the second place, figure 6 indicates the distribution of the distance of a straight line from owner's residence. Major part of farmlands are located in the range below 350 meters. In addition, many farmlands cultivated as paddy fields today are located in the range below 100 meters.

In the third place, figure 7 indicates the altitude difference from owner's residence. More than 90% of the farmlands having the altitude difference over 10 meters have already been abandoned. And the farmlands located lower than owner's residence are cultivated as paddy fields today more than higher farmlands.

In the fourth place, figure 8 indicates the connecting road width. The connecting road width of many farmlands ranges from 0.5 meter to 1.5 meter. However, the connecting road width of the many farmlands cultivated as paddy fields today are more than 1.5 meter.

5. Agricultural Management Conditions

5.1 Relationship Between Family Structure and Farmland

Next, we analyze the relationship between the family structure and the number of farmlands. At present, in Okuno settlement, the types of family structure can be classified into four types, 1) single elderly household, 2) elderly couple household, 3) two-generation household and 4) three-generation household.

Figure 9 indicates the number of farmlands by each types of family structure. In detail, 3 of them are the three-generation households, 2 are the single elderly households, and 1 is elderly couple household and two-generation household. And the three-generation household is most numerous type and cultivates most number of paddy fields today. The number of paddy fields cultivated by the elderly couple is second largest after the three-generation household. On the other hand, all of all farmlands of the single elderly household are not cultivated as paddy fields.

5.2 Water Intake Method

For paddy growing to secure a dedicated source of water supply. Therefore, in this chapter we take up the water intake method. In Okuno, agricultural water is supplied from Okuno-gawa River or some mountain streams. The methods of

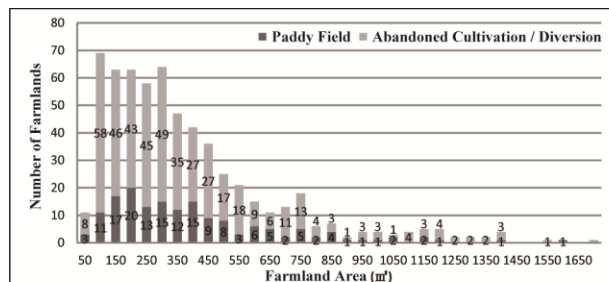


Fig.5. Area of a Paddy Field

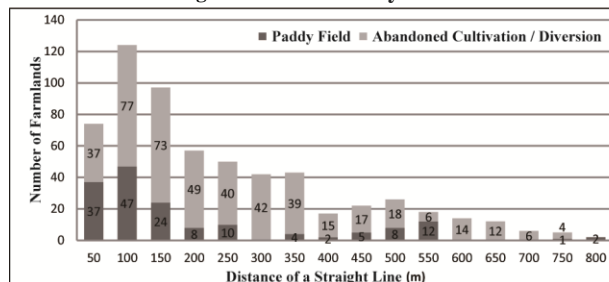


Fig.6. Distance of a Straight Line from Residence

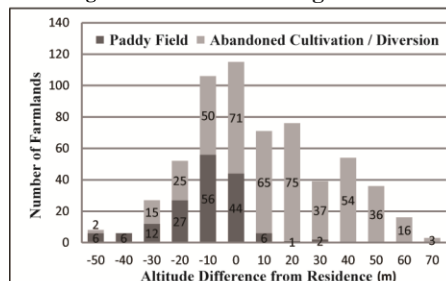


Fig.7. Altitude Difference from Residence

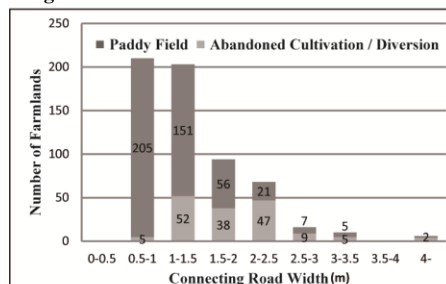


Fig.8. Connecting Road Width

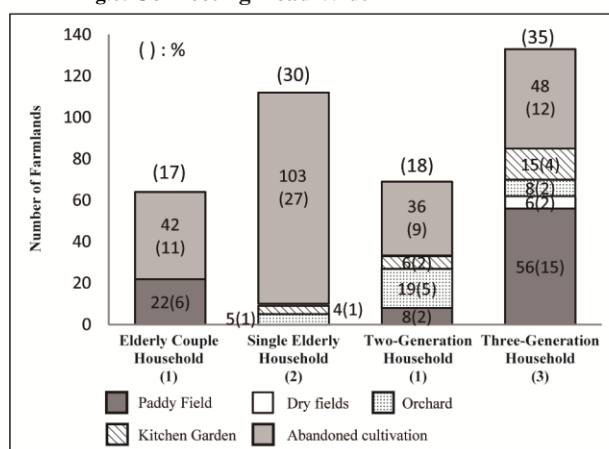


Fig.9. Number of Farmlands by Types of Family Structure

water intake to each paddy fields can be categorized in the following three groups, 1) drawing water directly from Okuno-gawa River or mountain stream, 2) drawing water from agricultural irrigation channel and 3) drawing water from the upper field over a ridge. These methods are selected on the basis of the paddy field position and the altitude difference.

Figure 10 indicates the distribution of paddy fields by the methods of water intake in 2014. In the old days, approximately half of the paddy fields were drawing water from the upper field over a ridge. However, at the present, 70% of the paddy fields are drawing water from agricultural irrigation channels, and these fields are distributed in the lower Okuno-gawa River or mountain streams. Most of the paddy fields drawing water from the upper field located on the upstream side of Okuno-gawa River. Thereby, the chain-like progression of the abandonment of paddy fields had occurred.

5.3 Relationship Distribution of Paddy Fields, the Family Structure and Water Intake Method

At last, we analyze the relationship the distribution of paddy fields, the family structure and water intake method (Figure 11). In the old days, all households cultivated large paddy fields from around each residences into the upstream side slope. But, at present stage, small groups of paddy fields around each

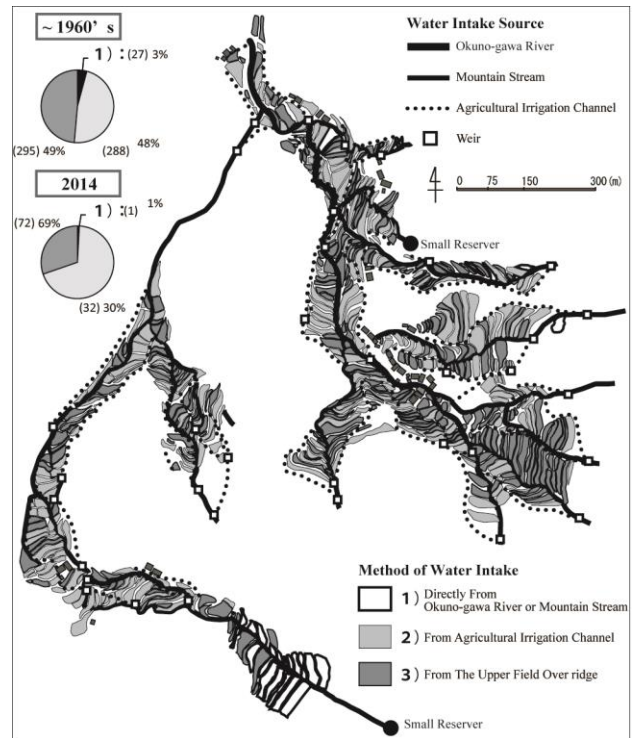


Fig.10. Water Intake Method

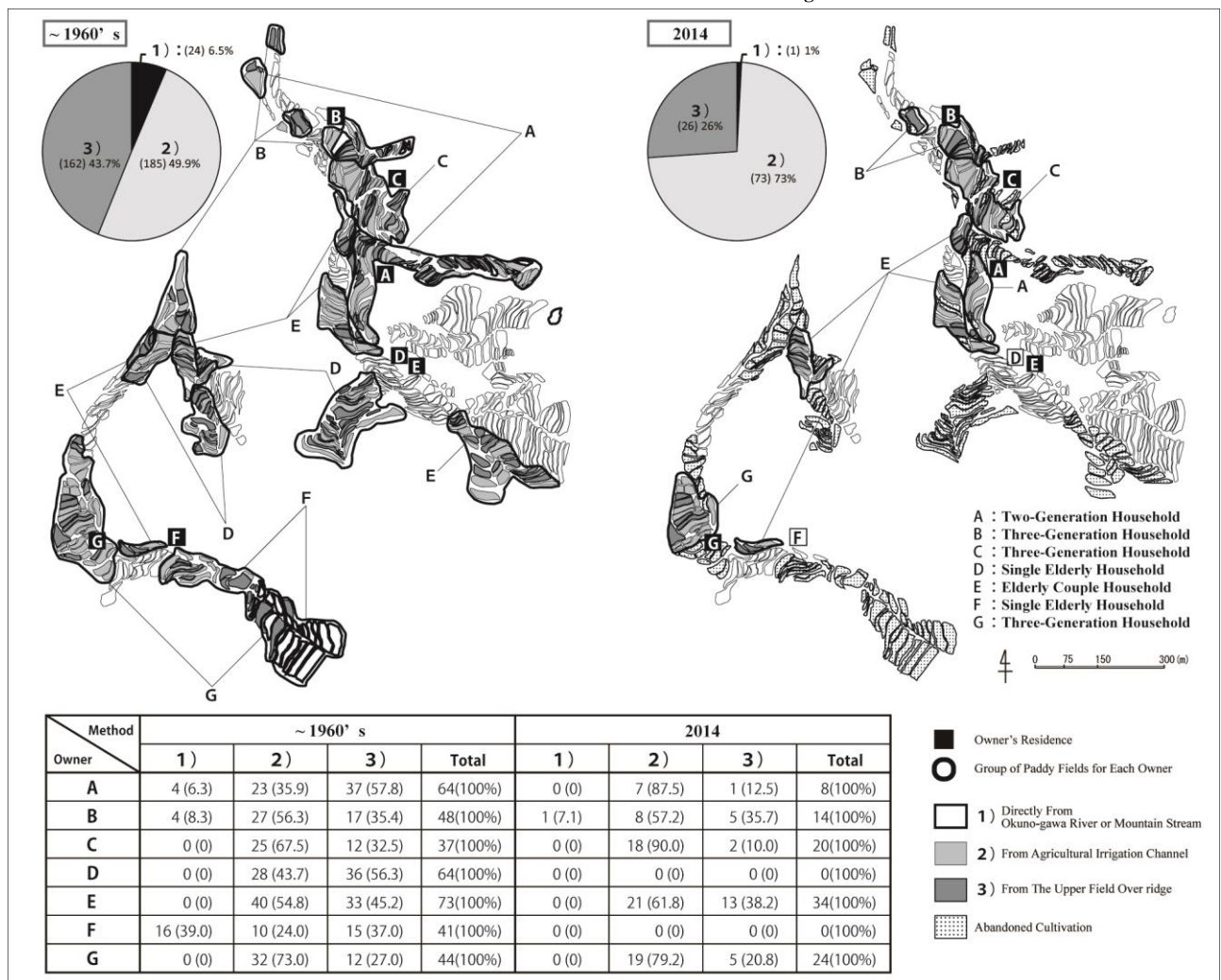


Fig.11. Relationship Distribution of Paddy Fields, the Family Structure and Water Intake Method

residences are cultivated by 5 households excluding 2 single elderly households. Each groups of paddy fields are clustered together in the lower Okuno River or mountain streams for each owner. And, the water intake methods of each groups of paddy fields are constituted by combining different water-sources. Exactly, the group of paddy fields under one ownership is maintained by the family labor forces and the combination of water intake methods.

6. Conclusion

In this study, we analyzed the system to maintain and manage Tanada only though a few farmers by a case study on the small-scale mountain settlement Okuno in Yamaguchi prefecture. The following are its conclusion.

- 1) In Okuno settlement, the abandoned cultivated lands are increased rapidly since the 1970s. In that same period, the government introduced adjustment of production of paddy, and the population of Okuno was on the brink of decline.
- 2) The occurrence of abandoned cultivated lands results from the location conditions of paddy fields. Especially, the paddy fields that were raised above residences and faced the narrow and small roads have been abandoned. Thereby the altitude difference from residence and the connecting road width could be a significant factor for the occurrence of abandoned cultivated lands in Okuno.
- 3) In Okuno, most of the farmlands cultivated as paddy fields are drawing water from agricultural irrigation channels. In addition, the clustered paddy fields are maintained by combining some water-sources and family labor forces.

In Okuno settlement, the major part of the paddy fields had been abandoned from the 1960s. However even now the limited number of paddy fields are forming the fine farm village scenery. We consider the maintenance and management system based on the ownership of the firm and water-use has contributed to the landscape conservation of paddy terrace.

From now on, to preserve the good agricultural environment in an aging society with a falling birthrate we need to grasp and utilize the regionally-district farming systems. The case of Okuno settlement presents good model maintaining Tanada only through a few farmers.

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