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Regional management and biodiversity conservation in GIAHS: text analysis of municipal strategy and tourism management

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ABSTRACT

Purpose of the research: To identify the gaps between the rhetoric and reality of the role of citizen participation and its role in maintenance and monitoring of heritages and resources (including biodiversity monitoring), we analyzed the discourse of Globally Important Agricultural Heritage System (GIAHS) at municipality level.

Methods: As an analytical framework, text mining is applied to interviews of officers at the municipal level of GIAHS in Noto which was amongst the first sites in Japan. The identification of such gap is critical for sustainability and to prevent conflicts from tourism, agriculture or educations.

Results: The results reveal that (1) there is a gap between the official goals of that designation at the international level and local needs, (2) role of citizens is emphasized in the applications and action plans at rhetorical level but remain rather limited in practice and that (3) municipalities composing the GIAHS often have different priorities, even within the very same GIAHS sites, some municipalities even calling themselves “just a transition point to other destination municipalities.”

Conclusions: It is critical for municipal officers to collaborate with various stakeholders, especially citizens. As such, citizen science is a bottom-up approach to promote biodiversity conservation and facilitate GIAHS managements.

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Introduction

The official record explanations for regional certifications or recognitions are frequently bottom-up with rhetoric of local initiatives. However, in reality, it is often spearheaded by a leader or an organization serving as catalyst. This was presumably the case for the Noto peninsula, which was the first registration of the Globally Important Agricultural Heritage Systems (GIAHS) in Japan in June 2011. The official record states that the registration process was initiated by the eight local municipalities, which later became nine as a town was added. The efforts were endorsed and recommended by the local branch of United Nations organizations, as well as universities and prefectures, with support from the national government or the Ministry of Agriculture, Forestry and Fisheries (MAFF). However, a number of interviewees agreed that in the early stages, the application for GIAHS was primarily led by the national government or a regional branch of the national government. Related efforts are then pursued by the prefecture.

The municipalities who lead and take the official documents usually do not lead the GIAHS applications process. In some cases, they remain passive about its value or the achievement of its objectives. Despite this, municipalities are undoubtedly key players in operationalizing and sustaining the GIAHS scheme as a heritage. Hence, it is

important to examine whether the municipalities adopt a more active role in undertaking relevant activities after five years of GIAHS registration. For the Noto peninsula, its GIAHS application highlighted efforts on biodiversity conservation and maintenance of Satoyama cultural landscapes. It mentioned citizen-led monitoring of biodiversity, which is a precondition of the Food and Agriculture Organization (FAO) for GIAHS registration, as part of such efforts. This study examined whether the ideas and practices of the initial GIAHS plan, particularly statements on citizen-led monitoring of biodiversity, are mainstreamed among policymakers at the grassroots level of municipalities, who play a critical role in the sustainability of the system. We interviewed the officers in charge of GIAHS and examined which elements are mainstreamed among the policymakers by analyzing the results quantitatively. This paper is unique in that it applies quantitative methods yet the implications of the findings on municipal strategies are largely qualitative.

Review: globally important agricultural heritage systems

Globally Important Agricultural Heritage Systems are established under the framework of FAO with the aims of evaluating sustainable agricultural systems cultivated on the basis of regional biodiversity, and

promoting community-based agriculture (Koochafkan and Altieri 2011). To facilitate community-based sustainable agriculture and biodiversity conservation, GIAHS designations are currently utilized in different regions of the world, with 37 designated sites in 16 countries. The Asia-Pacific region has a relatively large portion of such designations, with 26 GIAHS sites (Evonne, Akira, and Kazuhiko 2016). Under the current framework, the value of agricultural heritages is being rediscovered in making and implementing comprehensive local strategies in those regions' rural areas (Mitchell and Barrett 2015; Uchiyama et al. 2017a).

Regarding the activities in GIAHS sites, communities focus on research and promotion of the grassroots activities including biodiversity monitoring by citizens. The FAO developed the GIAHS designation (or acknowledged status) with the aim to maintain local agricultural systems and transmit them to future generations. In the official description of the aim of the GIAHS programme, branding or promotion of agricultural products *per se* is not the primary goal. From the existing literature, it is seen that there are certain products of GIAHS sites which are not destined for market supplies (Chen and Qiu 2012) but are shared by local communities and as gifts to families as local resources (Kamiyama et al. 2016).

The GIAHS generally focusses on local and bottom-up activities in that the applications are voluntarily done usually by local umbrella organizations or municipalities. In this respect, municipalities need to support their local activities by providing the platforms for decision-making by stakeholders. For such purposes, the collaboration of stakeholders, including international organizations, local municipalities, private companies, and residents, is an urgent task to facilitate local resource management under international designation systems such as GIAHS (Qiu, Chen, and Takemoto 2014). Local stakeholders have differing understandings of local resources, and preferred information channels differ among them (Kohsaka, Tomiyoshi, and Matuoka 2016). In local resource management with diverse stakeholders, it is crucial towards effective collaboration to visualize and understand the diversity of their understandings and attitudes.

The global change in the conditions of agriculture affects the local landscapes of community-based agriculture. The GIAHS sites are not exceptional, and their landscapes are influenced by global change in this regard (Carmona and Nahuelhual 2012). The influence needs to be identified, not only in specific micro-districts, but also in large-scale perspectives involving several local municipalities (Calvo-Iglesias, Fra-Paleo, and Diaz-Varela 2009). Area management based on benchmarks, including approaches of citizen sciences, is recommended for GIAHS sites (Koochafkan and Altieri 2011). To support indicator-based management, the visualization and evaluation of ecosystem services are conducted

in the GIAHS sites with mapping systems based on a geographic information system (GIS) (Barrena et al. 2014; Nahuelhual et al. 2014). The mapping systems are utilized as a useful tool in participatory approaches of local environmental managements including citizen science approaches (Ramos 2010; Larcher et al. 2013; Yehong et al. 2013; Wachowiak et al. 2017; Brown et al. 2018). These research results can contribute to collaboration among stakeholders and citizens in developing local policies. Relevant information sharing helps to facilitate local environmental management (Nthunya 2002). On the other hand, understanding the expectations and attitudes of local municipalities which facilitate collaboration of stakeholders is required to develop the methods to use the visualized data in local decision-making. For local stakeholders, particularly for citizens, environmental managements have different expectations for resources and future pathways. The analysis of the stakeholders including local communities and citizens is implemented based on qualitative evidence for building basis for consensus (Moran and Rau 2016). Furthermore, the conservation efforts are frequently described as "bottom-up" but there are not many empirical analyses which examined the extent of such efforts amongst policymakers and practices.

Often, the main aims of regional designation systems are not identical with the expectations of local stakeholders. A regional designation system does not necessarily aim primarily to promote local tourism or economy but to conserve biodiversity and the local environment. However, aim and expectation are not necessarily trade-offs and local actors often expect a positive effect in promotion of the products and participations (Uchiyama et al. 2017b; Kajima, Tanaka, and Uchiyama 2017; Kohsaka, Fujihira, and Uchiyama 2016). Local culture that forms the socio-ecological landscape in a place is often related to the economic culture in that place (Huggins and Thompson 2015). In this regard, involving regional economic strategy and citizen participation is crucial to implementing the conservation of the landscape that is the focus in GIAHS. For example, contributions of Geoparks which is a regional designation managed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in socio-economic development in local areas can be expected in terms of sustainable managements of designation areas (Farsani, Coelho, and Costa 2011). In addition to economic development and environmental conservation, maintenance of cultural aspects that underpin the local communities of designation areas need to be considered and to explore appropriate balance with other aspects including economy and environment (Hung et al. 2017).

International institutions, including United Nations organizations, are designating the heritage sites. At the implementation phase, however, collaborations of global, national, and local-level stakeholders, including governments and institutions, are necessary (Dempsey

and Wilbrand 2017). Figuring out what kinds of views or approaches are held by local officers is integral part of the discussion. Furthermore, identifying the status of collaboration between the different spatial scales and among local municipalities needs to be addressed. However, research on the attitudes of local municipalities is limited in number, and methodological frameworks for such research have not been established, neither in a quantitative nor qualitative way. The analysis of interviews of officers at the municipal level is highly relevant to the actual GIAHS operation because municipalities are critical actors, frequently in framing the political agendas and in shaping the landscapes through financial measures such as subsidies. We need to visualize not only the condition of or change in resources but also the attitudes of local municipalities which manage those resources. Local municipalities (and related citizen science approaches mainly in monitoring) play various roles in the management of GIAHS. The roles of local municipalities are paid attention in the bottom-up approach of citizen science in natural resource managements (Little, Hayashi, and Liang 2016; Fraser et al. 2006).

In prior research, analysis of the minutes of local assemblies, where some of the most formal discussions take place, was conducted to understand the attitudes of the municipalities at official discussions in the municipality assembly of individual GIAHS sites (Kohsaka and Matsuoka 2015). This revealed that the attitudes varied, and it can be a cause of conflicts among the municipalities, although it has been implied that there is room for cross-municipality collaboration, based on the study of local resources in the Noto region (Uchiyama and Kohsaka 2016). In the Noto GIAHS site, which is composed of several municipalities, relatively large municipalities discussed GIAHS frequently and regarded it as an important factor in their local strategies. Those research results gave an overview of the differences among attitudes of municipalities in GIAHS sites. However, the detailed differences among municipalities,

and between local needs and the goals of global institutions, are not fully identified particularly in quantitative terms. There is an obvious need for analysis at less formal level.

Materials and methods

In this research, we interviewed persons in departments related to GIAHS management in the nine municipalities (Figure 1) and then analyzed the results using text analysis. Text analysis has been used in prior research to quantify attitudes about environmental conservation (Iwata, Fukamachi, and Morimoto 2011; Iwata, Yumoto, and Morimoto 2014; Kohsaka and Matsuoka 2015). As a first step, the aggregated texts were analyzed to see attitudes about the overall use of the GIAHS and their relationships to keywords such as tourism, agriculture, fishery, and other relevant concepts. As a second step, we applied the corresponding analysis to the results from officers of the individual municipalities and categorized the results into different groups.

Overall, the population of the municipalities is decreasing (Figure 2); the largest municipality, Nanao City, has shrunk by approximately 10,000 people in the last 15 years. The trends in numbers of workers in the individual industries are similar between the municipalities, although the percentages of the individual industries workers differ among the municipalities (Figure 3). The differences in industrial structures can be reflected in the results of the interviews. The percentages of workers in the primary industry have been relatively stable since the year 2000. The percentages for secondary industry workers are decreasing; on the other hand, those for tertiary industry workers are rising.

Semi-structured interviews were implemented in the nine municipalities which compose the Noto GIAHS site. The survey period was from 16 May 2014 to 21 April 2015. Three or four years had passed since the GIAHS designation in 2011, and the municipalities

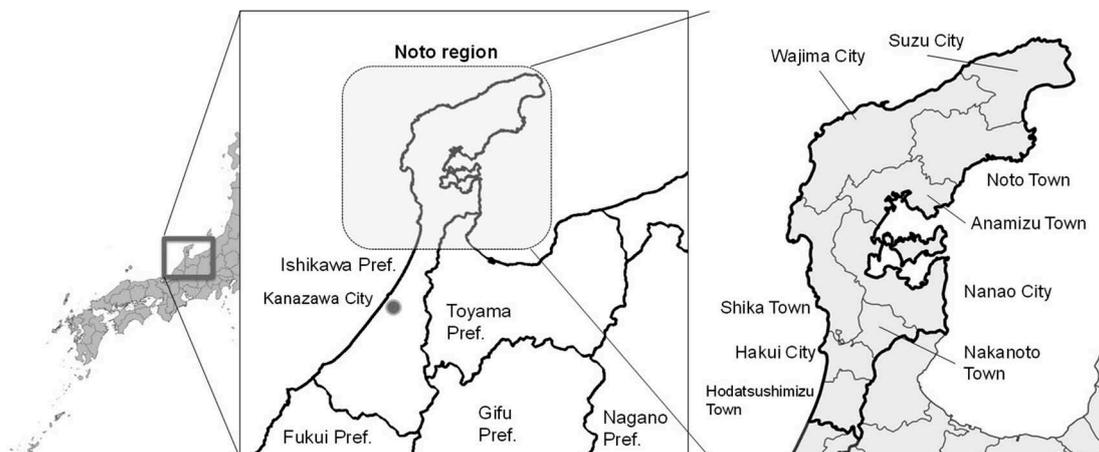


Figure 1. Location of the Noto region and its nine municipalities.

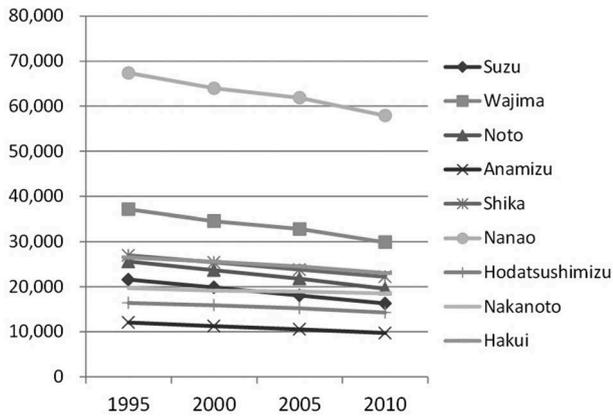


Figure 2. Population trends of the municipalities.

needed to review their policies and plans in that period. They organized their reports relative to the status of the GIAHS site and the activities therein. In this context, the survey could be conducted effectively and efficiently, based on their collected and organized information. We provided the following interview questions:

- (1) Why did you decide to apply for the designation?
- (2) What are the advantages you can receive in utilization of the GIAHS designation?
- (3) What are the disadvantages you can receive in utilization of the GIAHS designation?
- (4) How do you implement decision-making?
- (5) How do you cooperate with other municipalities?
- (6) Do you have any impetus to obtain other regional designations, such as World Heritage, Biosphere Reserve, or Geopark?
- (7) In the process of designation, was there any change in the organizational structure or budget in your municipality?
- (8) Was there any change in the number of tourists or the attitude of local people?
- (9) In the management of the GIAHS site, do any external experts participate in the meetings or activities in your municipality?
- (10) What kinds of requests do the local people make regarding the management of the GIAHS?
- (11) What kinds of requests do tourists make regarding the management of the GIAHS?

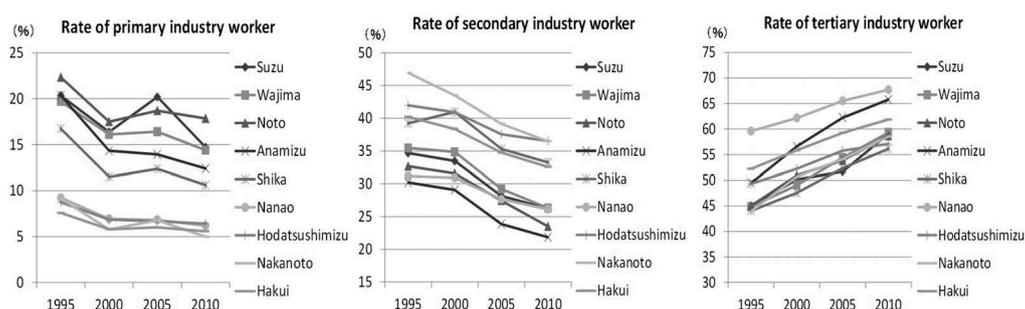


Figure 3. Population change rates of workers in individual industries in the municipalities.

(12) Do you have any strategies for biodiversity conservation, or do you consider biodiversity in other existing strategies?

(13) Did you find any effects on the recognition of your municipality by tourists, or any economic effects in the tourism sector?

We used a text mining software, the KH Coder. We analyzed Japanese nouns in the text of the respondents' remarks and identified frequencies of appearance of the nouns. We conducted co-occurrence analysis to identify the overall trend for the Noto region, and correspondence analysis to clarify the characteristics of individual municipalities.

As a result of the survey, we obtained text data of 21,445 words from the interviews in the municipalities. To understand the relationships between the GIAHS and local strategies in individual municipalities, we analyzed unique words that describe the overall trends of the Noto region and characteristics of each municipality.

Co-occurrence analysis can be used to visualize relationships of words; using it, we could identify words that were frequently used together with "GIAHS." The results of the analysis indicate the policies or activities which are related to GIAHS with high priority, thus reflecting differences in attitudes or expectations of local municipalities.

In the text mining approach, correspondence analysis and hierarchical cluster analysis are used to compare and identify the relationships among sentences with similar themes (Weiss et al. 2010; Minami and Ohura 2015; Hemsley and Palmer 2016). Correspondence analysis is utilized to understand the relationships of two dimensions by degree of frequency of words. On the other hand, the main purpose of hierarchical cluster analysis is categorization, and the cluster analysis is not appropriate to apply to the texts without clear clusters. In this research, we used the correspondence analysis to identify the detailed relationships of the two dimensions (Weiss et al. 2010), which are "municipalities" and "words mentioned in the municipal assemblies." In order to apply the correspondence analysis, we prepared the matrix of the degree of frequency of words. Table 1 is an example of the matrix that shows the degree of frequency of the words including "influence," "symbiosis," and "year" in

of them. In Figure 5, the terms that reflect the characteristics of the individual municipalities are shown near their names. If a municipality name appears near another municipality name, this shows similarity in the results of the interviews with the officers of those municipalities. Regarding the terms related to citizen science and participatory approaches did not appear in Figure 5. This result indicates that biodiversity monitoring by citizens was not active in the Noto region, although the municipalities needed to promote the participatory monitoring activities. The municipalities can be categorized by their locations in the scatter plot of Figure 5, and the understanding of the current situations of the municipalities can be facilitated by the result of categorization. Based on the categorization, three groups are identified. The differences in the interests and priorities of the municipalities are not trivial, and the characteristics of the individual groups are provided in the following paragraphs.

Group 1. Wajima City, Anamizu Town, Nanao City, Noto Town

The terms “*Satoyama* and *Satoumi*,” “fishery,” “action plan,” and “farm” appeared relatively frequently in the interviews and characterized the municipalities of group 1 (Figure 5). The results reflect that the fisheries in Wajima City, Anamizu Town, and Nanao City are relatively active, and that Nanao City has started to make an action plan for the GIAHS. Suzu City is the first municipality to make an action plan for the Noto GIAHS site, and Nanao City is the second. In the result of the co-occurrence network analysis (Figure 4) showing the overall trend for the Noto region, the terms ‘agriculture’ and “*Satoyama* and *Satoumi*” are not directly connected. On the other hand, the municipalities of group 1 are located near agriculture-related terms such as “farm” and “*Satoyama* and *Satoumi*”. This result shows that the municipalities seem to promote their agriculture under the concepts of *Satoyama* and *Satoumi*.

Group 2. Nakanoto Town, Shika Town, Hodatsushimizu Town

In Figure 5, the terms ‘agriculture and forestry’ and ‘promotion’ are located close to the names of the municipalities. This result reflects the fact that agriculture in group 2 is relatively active as compared with group 1. However, fishery is not active in group 2, and the frequency of appearance of the term “*Satoyama* and *Satoumi*” in the group 2 interviews is relatively low. The three municipalities of group 2 have relatively few tourism resources and have difficulty in promoting themselves to visitors. The term ‘promotion’ is located near these municipalities’ names because that is their urgent issue in the utilization of GIAHS.

Group 3. Suzu City

Suzu City has relatively unique policies and activities regarding the Noto GIAHS site. The traditional agricultural event, *Aenokoto*, which is certified as an Intangible Cultural Heritage in Suzu City, is famous among tourists.

The municipality has a relatively large number of cultural resources related to GIAHS and is characterized by terms including ‘village’, “centre”, “one”, and “agricultural policy”. Unlike other municipalities, the terms “centre” and “one” appear for group 3 in Figure 5 because Suzu City is the first municipality which had the secretariat for the Noto GIAHS site. Suzu City is doing promotion and management of GIAHS based on the villages distributed in its administrative area, and thus “village” appears as a characteristic term.

Discussion and conclusion

We conducted the text-analysis as a quantitative approach to the texts of the interviews of the officers of the local municipalities. As a first step, the aggregated texts were analyzed to see the overall use of the GIAHS and the municipalities’ relationships with the keywords ‘tourism,’ “agriculture,” “fishery,” and other relevant concepts. As a second step, we applied the corresponding analysis to the results for officers of the individual municipalities and categorized the results into different groups. We aimed to visualize the overall trends (step 1) and the differences and trends of individual municipalities within the same site of the Noto GIAHS (step 2).

From the results of step 1, the gap between the official goals of the GIAHS designation at the international level and the local needs at the municipality level was identified. The official goals emphasize the heritage aspects, while the local trends are linked strongly with direct benefits to tourism, the economy, and other elements. As a first step to address the issues related to that gap, understanding different value systems of local municipalities and international organizations that manage GIAHS designation is necessary.

Furthermore, it was identified from step 2 that municipalities composing the GIAHS frequently have different interests and priorities, even within the very same GIAHS site. The different interests and priorities are probably related to the cultural and agricultural resources and the municipal industrial structures. For example, municipalities with fewer cultural and agricultural resources had fewer interests in GIAHS activities, calling themselves ‘just a transition point to other destination municipalities’. The agricultural and cultural resources that are components of Noto GIAHS are located in every municipalities in Noto region, and the networks of the resources can attract visitors. However, the location of the resources is not fully shared among municipalities, and communication platform to utilize the networks of the resources is not developed. In this regard, the communication platform and strategic collaboration of municipalities are needed to enhance the potential of heritage systems in the region.

Policymakers at the municipal level are generally interested in harnessing GIAHS recognition in local

management strategies, including strategies to promote tourism in Japan. In managing GIAHS sites, it is critical for municipal officers to collaborate with various stakeholders, especially citizens. As such, citizen science is a potential bottom-up approach to promote biodiversity conservation and develop GIAHS sites as a tourist destination. Citizen-led monitoring of biodiversity, a prerequisite from the FAO for GIAHS registration, was a core thrust of the Noto region during its registration. The participation of citizens, including younger generations, and their role in monitoring was formalized in the Noto GIAHS Action Plan and was re-emphasized when the Action Plan was established for its first period (2011–2015) and when it was revised in 2016.

However, in the present study, elements related to citizen science were scarcely mentioned in the majority of the interviews with municipal officers. The term “monitoring” and “citizen participation” did not appear frequently. This contrasts with what is being emphasized in the initial GIAHS plan and revised action plan of the Noto region. These discrepancies were not prominent in the findings and thus require further evaluation and consideration. The involvement of citizens, which is presently mere rhetoric, should be mainstreamed by policymakers at the municipal level. The quality of biodiversity conservation efforts can be maintained through citizen-led monitoring, and the proper monitoring of biodiversity leads to the maintenance of Satoyama cultural landscapes.

There is a possibility that the staff members of the municipal governments, who are in charge of the GIAHS, are not aware of citizen science programs, although those programs are conducted in the municipalities. As a cause of that situation, it can be frequently seen that the citizen science programs are not directly related to the sections of the municipalities, which are in charge of the GIAHS. The staffs who are in charge of the GIAHS belong to agricultural sections in the municipalities, on the other hand, the citizen science programs are basically under the sections of environmental managements. Information sharing and collaborations between the agricultural sections and the environmental managements sections are challenging tasks in the municipalities, and this situation can be a main cause of the municipal GIAHS staffs’ low awareness of the citizen science programs. Regarding the countermeasures to connect the GIAHS staffs and the citizen science programs, facilitation of collaborations between agricultural sections and environmental managements sections, implementation of educational programs for the GIAHS staffs to learn citizen science, and sharing knowledge related to the GIAHS with the staffs of environmental managements sections can be conducted.

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