

Empirical Study of Local Resource Management of
Auditory Environment in Terms of Soundscape Concept

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Abstract

This paper aims to clarify the characteristics of soundscape as a local resource. “Soundscape” is a concept proposed by Canadian composer Raymond Murray Schafer in the late 1960s that focuses on how people listen to and understand the sounds characteristic of a place. In my research, I adopt two of Schafer’s sound concepts, the “keynote sound” and the “soundmark.” First, the keynote is an important sound that prescribes and supports the way of listening of local people, although it is not necessarily consciously heard. Contrarily, the soundmark is consciously heard, and the way in which it is heard is markedly characterized by the region and society in which it sounds. The way in which a sound is heard and whether it is heard as a keynote sound or soundmark differs depending on the experiences and cultures of the individuals who listen to it.

In this paper, I compare two cases and characterize the soundscape as a local resource. The research areas are Matsukawa village, Nagano prefecture, where the soundscape was managed as a local resource, and Kanazawa city, Ishikawa prefecture, where it was not managed.

In Matsukawa, two local groups organized in different settlements each started to utilize bell cricket chirping. One group collects living bell crickets as a basis for activities, and the other holds hiking events around the bell cricket habitat. The difference between the activities of these two groups was based on their experience of and attitude toward the soundscape. In addition, the utilization of bell cricket chirping as a local resource in Matsukawa was helpful for residents to develop their local identity. It should also be noted that the utilization of the soundscape concept helped them gain a new understanding of their hometown.

On the other hand, Kanazawa city, Ishikawa prefecture, focused on how the local residents listened and characterized the sound of the canals. First, I performed a quantitative analysis by measuring sound pressure levels, and audible spatial range of canal sound. As a result, I identified loud sounds that exceeded the regulations set by the Ministry of the Environment. In addition, it cleared that the extent of the sound transmission depended on the shape of the area such

as streets and structures, and it changed seasonally as the water flow fluctuated. I also conducted a survey with questionnaires and group interviews to clarify the local residents' consciousness and evaluation of keynote sounds in their daily lives. Local residents were not conscious of the water flow sound, but they subliminally evaluated the sound as a context of their daily lives. This suggests that the water flow sound is a keynote sound perceived by local residents.

As reflected in these two cases, the management of the soundscape as a local resource can be summarized as follows. First of all, it is necessary to notice sounds, that is, to hear them as soundmarks rather than keynote sounds, in order to begin to appreciate the soundscape as a local resource. Though changes in the soundscape are promoted by outsiders, it became clear that it is important to preserve the endogenous soundmarks discovered by residents, not the exogenous soundmarks of outsiders. Additionally, the usefulness of the soundscape as a local resource is demonstrated through the process of moving from discovery to utilization. However, since the usefulness of soundscape as a local resource differs from region to region, it is difficult to find commonalities in potential uses. However, the soundscape serves to foster regional identity, as residents participate in the process of discovering and utilizing local sonic resources. Also, regarding the regionality of soundscapes, it can be said that the keynote sound represents personal life and the soundmark is rooted in the viewpoint and consciousness of the group's area shared.

Key words: Soundscape, Local resource, Keynote sound, Soundmark, Bell cricket, Canal

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Chapter I : Introduction

Soundscape is one of the local resources that is expected to be utilized in regional revitalization in recent years. For example, in Takeda City, Oita Prefecture, there is Takeda's sound route around Taki Rentaro Memorial Hall ¹⁾ and, in Ohmihachiman City, Shiga Prefecture, some have suggested that the design of the new city include the sounds of the region (Komatsu 2007).

To begin with, soundscape is a concept proposed by Canadian composer Raymond Murray Schafer in the late 1960s. Schafer submitted soundscape as a neologism combining "sound" and "scape" as an allusion to "landscape." According to Torigoe (1997), the context for the development of the idea was the musical spirit underlying Schafer's desire for liberation from the framework of Western modern music and concerns about noise problems. Schaefer tried to be attentive to the daily sound environment for contemporary people who only listened to the music played in the concert hall (Schaefer 1986, 1992). Schafer then launched the World Soundscape Project in 1972 and developed comprehensive research and design activities on the sound environment. These activities expanded not only to Canada but also to European countries, to clarify the sound environments of various regions and to study the people who hear them. And in 1978, he declared that "Soundscape is defined as the sound environment in which emphasis is placed on how an individual or a particular society perceives and understands (Torigoe 1985). Therefore, the soundscape is defined by relationship between person and sound environment" (Torigoe 1985). With this, it can be said that soundscape not only physically captured sound, but also established a concept of the relationships between sound and the people who hear it.

In Japan the concept of soundscape was introduced in the 1980s. As pioneering research, Nakagawa (1992) considered the soundscape of the Kyoto from the Heian period to the present and Torigoe (1987) investigated the Kanda district of Tokyo. Due to misunderstandings, the concept of soundscape was initially received more with more repulsion than welcome.²⁾ But it was accepted by Japanese society within a relatively short period of time after introduction (Hiramatsu 2008).

Thereafter, in 1993, the Japan Soundscape Association was established, and the research advanced in various fields, ultimately to be taken into community development.

In 1996, the Ministry of the Environment elected "100 selections of soundscape in Japan (hereinafter, 100 soundscape)" by referendum. Thus, the soundscape is widely recognized as a local resource.³⁾

The aim of 100 soundscape is a "sound environment which people cherish as a symbol of the local community and wish to leave them in the future."⁴⁾ As a result, there are 31 sound sources concerning living things, such as a birds and insect voices; 19 cases concerning natural phenomena such as rivers, waterfalls, and the sea; 37 cases concerning life culture such as sounds of festivals and bells; there are 12 compounds of the preceding items; and 1 case of silence. The purpose of 100 soundscapes is also to promote community development.⁵⁾ In 2006, the Ministry of the Environment also tried to promote community development highlighting local resources and the sensory environment as perceived by all five senses, including sound and smell. Those strategies widely promoted and informed the soundscape as a local resource.

Regarding local resources, in recent years soundscape is a term that has come to be noticed in geography and similar fields, and it has been used for experiments in community development. For example, Todokoro (2010) emphasized the necessity that town planning use local resources created from region-specific nature and human environments. Likewise, emphasis is placed on the discovery and utilization of local resources, such as local studies of the endogenous development of community residents (Yoshimoto 2008; Yuki 2009). Similarly, geotourism and ecotourism have attracted attention as types of tourism that emphasize local resources (Fukami 2014).

When defining local resources, Huruuchi et al. (2006) and the symposium "Historical geography of local resources" sponsored by the Association of Historical Geographers in Japan in 2015 identified "usefulness" as a word that incorporates with locality.⁶⁾ In Noma (2016), there are features characterized by regional uniqueness and particularly the town's narrowness and its organic relations between humans and the environment that are not relocatable. Imamura et al. (1995) and

Ministry of Education, Culture, Sports, Science and Technology emphasize non-market characteristics as well as non-transferability and organic linkage.⁷⁾ In addition, Yuzawa (2016a) says resource is a concept in a narrow sense meaning substances (minerals, water, land, etc.) derived from nature that have been incorporated into historical lifestyle and industry. In the thesis, she propose to make local resource a broad concept referring to everything that supports industries and society. In other words, I am trying to capture not only material local resources but also non-material local resources such as history, culture, community, and social capital etc. In Yuzawa (2016b), the identification of " place of living" as one aspect of local resources indicates the breadth of the meaning of the concept.

As background for such discussions on local resources, due to changes in the national and global economic framework, it seems that there is a consciousness of the social problem conscious of the social problems created by the death of locality.⁸⁾ But what should be noted is that local resources are being consciously recognized in regional planning in order to regain the regionality that was lost through the period of high economic growth and that has suddenly reappeared today.⁹⁾ Local resource is also a resource that has been inherited throughout the region since ancient times (Biocchi 2008). Therefore, when discussing local resources it is necessary to do so from a point of view that is conscious of the time and space scale of the region.

Local resources have been discussed in resource theory in a way that has informed our understanding of them. In 1963, Yusuke Ishii who pioneered Japanese resource theory, defined the resource as "a useful possibility latent in nature" (Ishii 2014). Also, Ishimitsu (1973) and Sato (2009) regard the resource as a relation evaluated by humans, not as a substance itself, which is an idea that has since been incorporated into local resource theory. However, the subject of the relationship discussed in these theories is a substance that can be handled, which means that it is not independent of location. In local resource theory, it can be said that there is a new significance in building on our understanding of this object and evaluating it as a region-specific resource.

On the other hand, since local resources are inherent in the region, there are also aspects that

are difficult to identify and utilize. This is because many local resources are hardly recognized as valuable resources for the region. However, it will become clear what kind of problems the area has and what it needs by considering the management resource process for resources recognized as local resources.

If we grasp the decision of local resources as combining "usefulness" with the regionality, the characteristics of the soundscape can also be included in local resources. How has the soundscape as a local resource been used extensively in recent years? Research on soundscape is progressing in several fields, including urban engineering, sociology, and acoustics (Hiramatsu 2006). Among these, research on local resources, for example, Kanomata and Nagahata (2008), investigated residents' evaluation of a newly installed sound-generating facility as a community development in Tanakura, Fukushima prefecture. As a result, it became clear that evaluation of sound becomes positive by imbuing it with the meaning of an area symbol. This indicates that sound is recognized as a new local resource when residents are positively influenced by the significance to the sound. And regarding Gujo-hachiman in Gifu Prefecture, which is well-known for community development utilizing the water environment, Aria (2002) reevaluated the water-sounds of the traditional and historical water system as a local resource. Furthermore, Furukawa and Sasaki (2010) pointed out that residents' evaluation of sound is influenced by the "scale of sound in life." These studies indicated that another important factor is the relationship between the regionality of the soundscape and sound and the people who hear it. In addition, Tsuchida et al. (2007) investigated how residents in Kanazawa City, Ishikawa prefecture hear the bell sound. As a result of the study, it has become valuable as a regional identity. This suggests that "daily sounds" for residents may also be recognized as local resources.

In this way, research on the possibilities of soundscape as a local resource is carried out in multiple fields, but not in geography. Initially, the study of soundscape in geography was dealt with only in some humanistic geography (such as Maida and Gatayama 1991; Potius and Mustin 1992). For example, Gatayama (1997) showed the importance of understanding a sense of "place" through the folk songs of South England. Although the result is very interesting, since then, soundscape

research has not progressed in geography. The reasons pointed out are that geography has historically emphasized visual landscape (Okada 1987a: Nishibe 2007), that there is a lack of objectivity of soundscape research, and that the Japanese translation, "scene of sound," was not accepted (Gatayama 2010). Especially, the discourse on "landscape" and "scene" in geography has not yet reached a settlement, and the uncertainty of terms can be considered a factor that hinders the introduction of the soundscape concept in geography.¹⁰⁾

The tendency of geography to be devoted to visual landscape dates back to the 1920s when the term "landscape" began to be used. It was Taro Tsujimura who first used the term landscape in geography (Watabe 2009). Tsujimura restricted the landscape, a translation of German "Landschaft," to the visible and to shape aspects (Okada 1987a). In the landscape section of "Human Geography Dictionary," so and so explained that "it is used by showing the situation of visually confirmed areas" (Kinda 2013: 102-103). This shows that Tsujimura's usage was widely accepted. On the other hand, however, it is certain that since that time critical opinions have been issued against Tsujimura's usage (Okada 1987b). For example, Senda (2001) criticized the Tsujimura's definition of the landscape as "the characteristic of the seen " and pointed out the word landscape refers to "land space = region" with a certain characteristic grouping. Also, in recent years, the same discussion has been found overseas; the European Landscape Convention defines Landscape as follows:

"Landscape" means an area, as perceived by people, whose character of the interaction of natural and / or human factors.¹¹⁾

It is also worth noting that Gallagher et al. (2017) pointed out the importance of sound in landscape recognition, and the movement to interpret landscape in this broad sense is spreading. In the first place, the meaning of Landschaft is (1) a generic name of visible objects in a certain place, (2) a section of the ground surface which exhibits similar characteristics, (3) the whole of objects in a certain place (regardless of whether it can be visually grasped or not), (4) environmental elements

that are meaningful to living things, including humans (Tezuka 1987). Certainly, limiting geographical subjects to visual landscape worked advantageously in Japanese geography as an academic discipline. However, a comprehensive understanding of the region beyond visual elements is one of the essential tasks in geography. This study is not only a discussion of local resource theory but also a treatment of how to expand the subjects as well as expanding the subjects dealt with in geography. This study is also intended to highlight the significance of introducing the soundscape concept into geography.

Based on the above, this research aims to clarify the characteristics of the soundscape as a local resource. The process of converting a soundscape into local resources also changes in a spatiotemporal manner. That is, the sound which was not recognized as a local resource before, is recognized as a resource at a certain boundary period. Using the theory of resources in geography and the theory of local resources which has extended the resource theory, the relationship between sound, human beings, and regionality can be clarified. Then discussion of the relationship between sound and human beings can be expected to be deepened by the soundscape concept.

Chapter II : Sound concept in soundscape

1. Sounds handled by soundscape

As mentioned earlier, soundscape is not a mere physical property but a concept that pulls sound back into the landscape in which it is heard and rethinks the context of history, culture, nature (Iwamiya 2000; Nakanishi and Muranaka 2005). Therefore, in soundscape research, it is important to elucidate the meaning of a world that people connect with sounds, and research on the semantic environment is required (Hiramatsu 1992).¹²⁾

For example, Torigoe (1996) pointed out that the way each individual listens to the bells of Kanda's Nikolai church differs, and one passerby noted that he did not notice the sound of the bell in an interview that occurred as the bell was ringing. Nagahata (1997) investigated how residents hear the siren in a settlement on a remote island. Kanomata and Nagahata (2008) studied residents' evaluation of a bell sound introduced for community development. Revill (2013) investigated the understanding of the sound environment at station. In these studies, the focus is on how the target sound is understood. They showed that the personal and social factors for understanding the sound environment are complicated.

In this way, the recognition of a certain sound depends on various factors such as the experience and philosophy of an individual as well as the society to which they belong. The sounds of bells and sirens are called signals, and these are consciously heard (Torigoe 1997: 118). Also sounds with characteristics that are distinctive to the region and society are referred to as soundmarks (Torigoe 1997: 120).¹³⁾ The soundmark is important for grasping the character of a certain region from the viewpoint of the sound environment. The aforementioned research on the soundscape is focused on the soundmark of a certain area. However, there are more sounds we hear in our everyday lives, and the sound environment is even composed of sounds that are not consciously heard.

Sounds that are always repeating in everyday life, and hence sounds that are not consciously heard, are called keynote sounds (Torigoe 1997: 117-118). As in the relation between figure and

ground in Gestalt psychology, if the signal is a "figure" in the soundscape, the keynote sound is of the "ground." For example, the keynote sounds include waves and ships for residents in coastal areas, and for residents of the mountains it may be an animal's barking sound or the sound of agricultural work. In urban areas, the sound of automobiles and background music of shops are generally the keynote sounds. Such a keynote sound is the basis of all perceptions and it is not necessary to consciously listen to it. However, it is very important in the sense that it regulates and supports the habit of listening to people in a specific area (Torigoe 1997: 118).

Table 1 summarizes three sound concepts from soundscape research: keynote sounds, signals, and soundmarks. In this research, we will analyze these three sound concepts.

2. Three sound concepts

1) Keynote sound

As research on keynote sounds, for example, Arai (2002) studied the waterway network of Gujo-hachiman, well-known as a water city. Miura and Sasaki (1998) examined the sound environment of an agricultural canal in combination with landscape elements. Yamamoto and Kurita (2011) evaluated the sound environment of rural villages by physical indicators. Arai (2002) grasped the sound quantitatively and tried to value the sound based on historical facts. This contributes to our understanding of imperceptible sounds. However, this research does not consider viewpoints such as how the residents actually listen and make meaning. Likewise, Miura and Sasaki (1998) quantitatively grasped the sound environment of agricultural canals in Yamagata city and pointed out the change in the sound environment due to urbanization, but residents' consciousness of these changes was not discussed.

As mentioned above, studies on keynote sounds evaluate the sound at the sound pressure level, ¹⁴⁾ and human consciousness of the actual process of hearing has not been taken into consideration.

Table1 Types and features of sounds in concept of soundscape

	Keynote Sound	Signal	Soundmark
Feature	Ground	Figure	
Hear / Listen	Hear	Listen	
Attitude of Cognition to Sound	Non Active	Non Active / Active	Active

2) Signal and soundmark

Both the signal and the soundmark are consciously heard sounds, but the sound that has become meaningful, especially to a specific group or society, is called a soundmark. In soundscape research, the soundmark is often treated as the object. The reason is that consciously heard signals have already become meaningful signs to residents in the area.

Studies on soundmarks include Torigoe (1996), Tsuchida et al. (2007), Kanomata and Nagahata (2008), which investigated the sound of sirens, Nagahata (1997) which investigated the sound of a bell, and Revill (2013) which investigated the sound of a station. This research reveals that even if it is a signal for an outsider, specific groups hear meaning in the sound as a soundmark. The evaluation of the soundmark depends on the person's relationship with the sound.

In addition, Gatayama (1997; 2003) studied English folk songs, Fujii (1997) studied soundscapes of human sounds for festival sounds. Music of folk songs and festivals have been shown to merge with the local culture and stimulate the people's sensitivity to certain places. Likewise, Smith (1994; 1997) and Kong (1996) pointed out the relationship between music and local culture, establishing music as a kind of soundmark.

3. Framework as regional soundscape research

Since the soundscape was formed by a particular group or society, it could be said that the soundscape is formed on a regional scale and shared within the region. Furukawa and Sasaki (2010) investigated the residents' soundscape in Gujo-hachiman and established three ideas about the relationship between the residents and sound: (1) the impression of the sound is evaluated by the position of sound in one's life, (2) the sound become a living base, (3) it is used to recall the past. The sounds studied in this article were the sounds of water, Gujo dance, and bells. It is meaningful as a case of comprehensively examining keynote sounds and soundmarks. On the other hand, it is not clear how the objective physical properties inherent in the sound shape the soundscape. The environment created by the sound is very sensitive and observed sounds depend on the sound source

and surrounding environment. Therefore, it is necessary for the soundscape to be grasped from both the conceptual framework of region and society and the physical framework of the space in which the sound can be heard. Especially in the study of keynote sounds, it will deepen understanding to consider physical and mechanical sound environments such as the spatial range and sound pressure level where the sound can be heard, as well as the semantic sound environment of the person listening.

There are three kinds of sounds heard by humans; keynote sounds, signals, and soundmarks have different characteristics. Through empirical research, a comprehensive discussion is also possible of the soundscape as a local resource. Therefore, in this research, I will progress according to the following order. In Chapter III, as a case in which the soundscape was converted to a local resource, I will address community making utilizing the bell cricket in Matsukawa village, Nagano Prefecture. I will discuss the soundscape changes as local resources using the concept of keynote sounds and soundmarks. Then, in Chapter IV, I will take up the water sound of a canal in Kanazawa city, Ishikawa Prefecture, where the sound is steady but not recognized as a local resource. Here, I will examine the "usefulness" as a local resource of keynote sounds by letting residents express their consciousness of the sound of the canal. Chapter III and Chapter IV contrast a case of managed local resources with a case not recognized as a local resource. In Chapter III, the characteristics of soundscape as a resource surface not by physically reproducing the sound environment the residents actually heard, but by organizing the discovery and utilization process of the soundscape chronologically, including changes in residents' consciousness. Meanwhile, since Chapter IV deals with sounds that are not treated as local resources, we will examine quantitatively the real sound environment and the consciousness of residents listening to it. By comparing local resource conversion in these regions, Chapter V discusses the characteristics of the soundscape as a local resource.

Signals are not covered in this study. The reason for this is that focusing on the soundscape of local residents, the meaningful sounds are soundmarks and keynote sounds that are steadily heard.

Chapter III: The process of discovering and utilizing the soundscape as local resource

In this chapter, I focus on a case in which the soundscape is converted to local resources and clarify the characteristics of the soundscape as a local resource.

The research procedure of this chapter is as follows. Section 1 outlines the area covered by this research. Next, in Sections 2 and 3, I describe the activities of the residents' group that transformed the soundscape into a local resource. In Section 2, it is civil society that worked for community development throughout the village. Based on interviews with members and current representatives involved in the establishment of this organization, I examine how they implemented soundscape as a local resource. Then, in Section 3, I analyze the consciousness of residents that inhabit the area around the sounds by speaking to the residents about themselves and their activities. In addition, I use a questionnaire survey to clarify how target sounds are heard by others. Using these, Section 4 considers the characteristics of the soundscape as a local resource based on the difference between the significance of sound and the methods residents employ to utilize them

1. Research area

The area covered by this chapter, Matsukawa village, is located in the northern-western part of Nagano Prefecture, at the foot of the North Alps. The northwest side is Omachi city, the south side is Azumino city, the eastern side is Ikeda town across the Takase river (Figure 1).

Matsukawa village is the location of the bell cricket and unique in Nagano prefecture. In 2015 Nagano Prefecture Red List,¹⁵⁾ the "bell cricket population of Nishihara district, Matsukawa village" in the local population is registered as likely to be extinct because its ecology is in danger. Originally, bell cricket inhabited all of Japan, and its chirping was heard everywhere. However, due to the large-scale alteration of the natural environment and the use of agricultural chemicals, wild bell cricket has decreased throughout the whole country. In Matsukawa village in the 1950s, the chirping of bell cricket was heard in the Godohara alluvial fan area but is only in the Nishihara district now.

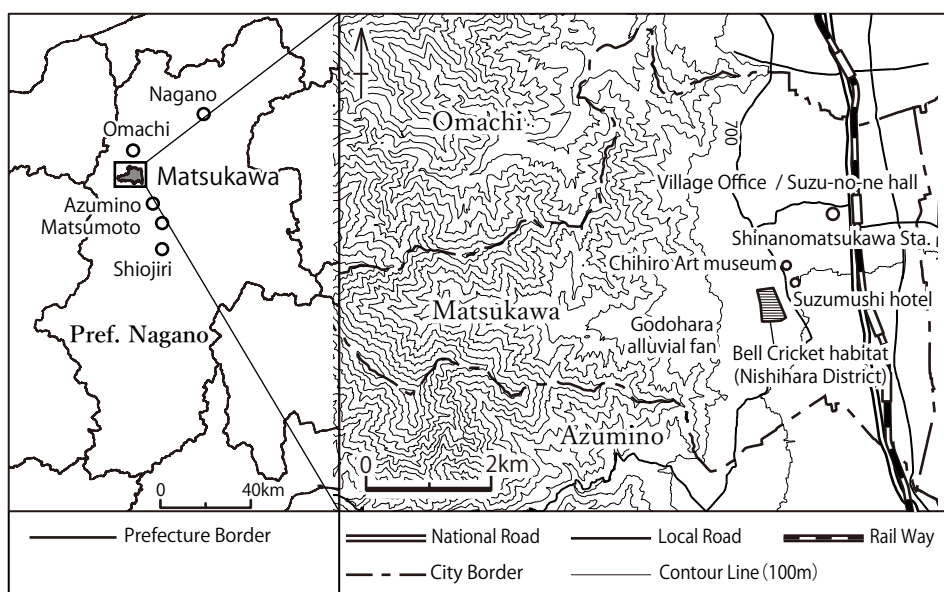


Fig.1 Study area

The bell cricket in Matsukawa village also appeared in village tales and has been popular since the Middle Ages. In addition, there are records that villagers came to pick up the bell crickets with torches in autumn (Editorial Committee of Matsukawa Village History 1988a: 302). From the above, it is understood that Matsukawa villagers have lived with bell cricket since ancient times.

2. Process of local resource management by Muraokoshi Kobushi group

1) Formation of Muraokoshi Kobushi group

The "Muraokoshi Kobushi group" (hereinafter "MKG") was an organization formed by 23 youth volunteers in Matsukawa village for the purpose of creating a sense of community in Matsukawa village in 1985 (Table 2). The occasion for its formation was a lecture on regional promotion held by the Chamber of Commerce. This lecture was about elements of community development, such as the One Village One Product Movement that was popular at the time. External lecturers focusing on regional promotion were invited a member said, "When I heard the lecture, there was a shock like a thunder strike. I strongly thought that I wanted to do community development." One of the young people said, "we will make community development in Matsukawa village," and other young people agreed. MKG was formed as a result of this.

In the 1980s, the Azumino area and Omachi city adjacent to Matsukawa village was a major sightseeing spot where sightseeing buses traveled. In the Azumino area and Omachi city, there were tourism resources such as the North Japan Alps, rural scenery, wasabi rice fields, and Kurobe dam. However, the Matsukawa village that was sandwiched between these lacked the tourism resources that could appeal to the outside world. In such a geographical situation, the young people of the village decided to form MKG and aimed to foster community development.

Founding members of the MKG were agricultural workers, housewives, self-employed personnel, and staff of the village office around the age of 30. In the management of the association, they adopted a subcommittee system. The members who wanted to engage in community development became directors and other members took part in it. As a result, various subcommittees

Table 2 History of bell cricket-related activities

	Residents in nishihara district	Group of Muraokoshi-kobushi	Administration and Matsukawa village
1985	First music festival	Inauguration by 23 persons	
1986		Begining of bell cricket breeding	
1987		preparation for sending bell crickets	
1988		First sending / studing for incubation	
1989	First crystal symphony		
1990		Failure in natural incubation	Symbolization and protection of bell cricket
1997		Installation of incubating machine	
1999	Changed organizer of crystal symphony	Establishment of Partnership with administration	Establishment of Partnership with group of Muraokoshi-kobushi
2004		Lowering of incubation rate	
2006	Inspection in habitat		First bell cricket summit
2007	First bell cricket observation		
2009		Building of bell cricket habitat / Failure in natural incubation	
2010		Failure in natural incubation	Pregulation of bell cricket protection
2013		Sending bell cricker finished	First bellcricket gathering event
2016			

(Making by hearing investigation and report of Kobushi-kai)

were formed, for example, a group to create landscape telephone cards, to collect and recreate folk tales conveyed to the village, and to investigate the history of the village. What is distinctive is that no one held the position of President and there was only loose connection as each person did what they wanted to do.

The earliest MKG had many activities that turned their attention towards the village. These activities reconsidered the history and culture of Matsukawa village and rediscovered the scenic resources of the village so the members of the MKG developed their connections with the village. This can be inferred from the following description in the afterword of the folk tales collection published by the MKG.

The MKG is a group that thinks carefully about yourself, your family, the area in which you live, and what you should leave the next generation. ... One day, it is not imitative, it leads to community development that is truly full of vitality and charm The folk collection rooted in this home is not only for the children or for the PR of the village, but also the desire to plant seeds of community development. (Supervision by Matsukawa village Muraokoshi Kobushi Group 1989: 125)

Here, it is written that the thought of the village and the community development are not just external PR. It is said that the MKG aimed for regional development to create a "place of living," that is to foster regional identity.¹⁶⁾

2) MKG's utilization of the bell cricket chirping

The year after MKG was formed, Mr. K who was a bell crickets enthusiast joined the MKG. At that time, there were many bell cricket enthusiasts in Matsukawa Village, breeding bell crickets at home and hunting in the fall. Mr. K formed the bell cricket subcommittee for community development. In 1986, he donated bell crickets to six members of the subcommittee and each began farming them

at home.

In 1987, they tried a "parcel of bell crickets (hereinafter, parcel)¹⁷⁾ that mailed living bell crickets throughout Japan. This entailed mailing postcards and bait for insect baskets eight times a year without any bell crickets dying. Since 1988, they started the parcel in earnest as a service. They started to try control bell cricket hatching and chirping. They thought that a good timing for chirping would be on August 15. In 1992 it became possible to use temperature control to regulate the timing of hatching and chirping.

In 1997, they set up a hatching house in the Azumino Matsukawa Road Station. They started to collectively manage the bell crickets and it was possible to cultivate more than 30,000 per year. However, members who were in their 30s at the time of formation were in the 40s and 50s at this point and were increasingly busy with work, including as executives of the village. It became difficult to engage in the activities of the group. Ultimately, the MKG shrank with its declining membership, after which it was decided to continue with Mr. K as the representative of the association, which was now down to only two members.

The parcel were picked up in the media, including newspapers and televisions, and in many years about 700 boxes were ordered and on average about 500 boxes were ordered during this time. It was playing an important role in raising the village's name recognition. Therefore, in order to save the project, the Economic Affairs Division of the village office assisted the MKG starting in 1999. In 2013 parcel was to be suspended due to the poor physical condition of Mr. K. Currently they are mainly engaged in aquaculture, and they are distributing bell cricket only to those who come to pick them up directly at the village office.

Since the parcel was suspended in 2013, the bell cricket catch is held at the Azumino Chihiro Art Museum. It is organized by the Matsukawa village tourism association, and MKG is cooperating by providing bell crickets.

MKG has been principally in charge of the parcel since Mr. K joined, but also has done other activities related to bell crickets. One of these was the release of bell crickets. According to NKG's

data, in 1990, they released about 2,500 bell crickets into the park, but in the following year they heard almost no chirping. Several more tries still did not lead to colonization. Mr. K mentioned the difficulty of relocating farmed bell cricket into the natural environment and confirmed the precarious nature of their current habitat.

In addition, as the popularity of bell cricket in Matsukawa village rose, the villagers became interested in the activities of MKG and began to participate. An example of this is an event from 2004. In that year, MRG's bell crickets became mostly extinct. Therefore, MKG called villagers to collect bell crickets. As a result, about 3,000 bell crickets were gathered.

Also in 2015, a vendor managing the Azumino Matsukawa Road Station offered to manage the heating house in the facility. Since 2017, this dealer began breeding bell crickets under the guidance of Mr. K.

3) The Administration's utilization of bell crickets

The interactions between the MKG and the residents of the Nishihara district, which will be described later, began in the latter half of the 1980s, when the village administration also used bell crickets for local revitalization in cooperation with the MKG. In 1990, the administrators began activities associated with the motto "home town of bell crickets." By this time they recognized the bell cricket as a village symbol. Then in 1993, they designed a mascot for the village named "Rinta" based on the bell cricket motif, and the next year "Rinrin" was adopted. In 2006, the first national bell cricket summit was held in Matsukawa village and drew bell cricket enthusiasts. In 2010, the parliament approved the "bell cricket protection ordinance in Matsukawa village" which is the only law about of bell cricket in the world. This ordinance aims to conserve bell crickets as a local resource as well as to preserve the natural environment of the area and the country's scenery. Currently, there are facilities and crops with names related to the bell cricket. There is a stone statue of Matsukawa village's mascot character "Rinta" in Azumino Matsukawa Road Station and a monument of bell cricket is set up in front of the village office building (Figure 2).



Fig. 2 Character of bell cricket
in Matsukawa village. Taked by
the author on May 16, 2015.

3. Process of local resource management by residents in Nishihara district

1) Thoughts of residents of the Nishihara district on the area

The Nishihara district where bell crickets live was a vast forest before the Second World War, but the district was developed by a pioneer group after the WW2.

Below, the history of the Nishihara district is described based on the editorial committee of Matsukawa village history (1988b: 565-567). The pioneer group in the Nishihara district was mainly composed of young people who aimed to cultivate Manchuria during the war and initially engaged in the development of the Takase River. All 30 residents lived in a barracks and engaged in cultivation while sleeping together. Eight years later, they built paddy fields, roads, and waterways in the district. In the 1970s, during the period of high economic growth, the plans for a golf course in the Godohara alluvial fan were raised. The development company promoted the plan in accordance with the proposal of the village and started negotiations with the local residents of the four districts, including the Nishihara district. Although three districts agreed to the development, the Nishihara district continued to resist it and the golf course construction plan ended with the bankruptcy of the development company due to the oil shock that occurred during that time.

Yamamoto and Yamamoto (2013) and Yamamoto (2014) explained that the reason only Nishihara district did not agree to the gold course was that Nishihara district was a place to protect for the living of future residents and it should not be understood without the empathy of residents. This is an important factor in grasping how district residents thought of Nishihara district as a place.

2) Bell cricket concert and bell cricket observation activities

Members of the second generation of pioneers in the Nishihara district started a bell cricket concert in 1985 for the purpose of building a relationship with others of the same generation (Table 2).

Below, the circumstances and the history of these activities are described based on interviews

with three residents from the 60s and 80s who played central roles among the residents of that second generation.

They had grown up looking at their parent's generation, and they had hoped to create "their own land" like their parents had. Therefore, they thought they wanted to build something there. So, they began a bell cricket concert with the desire to do something on this land with members of the second generation. The concert was a social gathering accompanied by drinking to deepen friendship between members of the second generation. The reason the social gathering party took the form of a concert was that bell crickets were recognized as a symbol of the area for residents.

When residents began to immigrate, much chirping was heard in the Nishihara district. One person said, "It was noisy, and I could not sleep." Later, bell crickets decreased with the construction of roads and the use of agricultural chemicals. It was an important turning point when the bell cricket concert was held as a local resource using the chirping of the bell cricket. Residents said, "The chirping sounds is a nostalgic sound that is decreasing. I thought that it should not be done." This highlights the resident's feeling that the loss of the region's keynote sound was a crisis. The residents' soundscape changed because they noticed the keynote sound which had been unconsciously heard.

When the concert began, residents successfully reached out to people in other districts and in 1989 they held an event called Crystal Symphony. This event was intended to draw villagers outside the district with music performances when the bell cricket began to sing from 18:00 to 22:00 in the beginning of September. Since then, the district residents organized it until 1999. Later the tourism association proposed to take it on. With this, the involvement of the Nishihara district residents ceased.

However, the residents of the Nishihara district always had a desire to be active and, since 2007, have organized bell cricket observation activities (hereafter, observation activities) as a new event. Residents set lanterns on the roads in the district at the beginning of the week, and during the week they are lit in the evening. Among Nishihara districts, the areas where bell crickets live are limited to places with few households and no street lights, so the lanterns serve as the light that

illuminates the road surface and provide the opportunity to listen to the bell cricket chirping.

The observation activities are held on the first Saturday in September every year. The main purpose of this event is to experience walking while listening to the chirping of bell cricket at night, to have the five senses feel the natural environment of the Nishihara district. Participants first gather at the public hall in Nishihara district at 18:00 and listen to a presentation on the bell cricket. After that, participants eat rice ball and pork soy soup and start walking around the district in groups of 4 or 5 people around 19:00. The district residents join each group one by one to explain things such as the bell cricket and the natural environment of the district. Of course, it is difficult to see wild bell crickets, and participants will follow the route while listening to the chirping. The observation activities end in about 30 minutes. After that, the elementary schoolchildren engage in apple striking.

Table 3 shows the schedule of past observations. The number of participants is approximately 100 to 120 people each year. Since the observation activities are hosted by residents of the Nishihara district, expansion of the scale will be a burden to the residents. Therefore, the announcement is only circulated by pamphlets to elementary schools in the village, and many families, including parents and grandmothers and grandchildren in the village, participate. On the other hand, in the field survey conducted in 2015, there were only 3 participants from outside the village and 4 in 2016.

The schedule of the observation activities also changes each year. Rice balls and soup are offered, with the search for bell cricket as the axis, and apples striking experiences are incorporated. In addition, because it was held jointly with other events in 2014, amusements such as drum performances, magic shows, and bingo tournaments were held. The reason for such diversification of events is to gather participants, especially parents and children.

3) Comment from participants of bell cricket observation event

A questionnaire survey was conducted for participants at the searches on September 3, 2016. All 89 questionnaires distributed were collected ¹⁸⁾.

Questionnaires were divided between elementary school students and those in junior high

Table 3 Details of bell cricket observation activities

	Participants	Wether	Sponsor	Food and drink	Other
2007	75	C	Residents in Nishihara district	Rice boll	Lottery
2008	ND	C	Residents in Nishihara district	Rice boll, Pork miso soup	
2009	About 120	S	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe, Apple	
2010	ND	S	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe, Apple	
2011	ND	R	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe	Apple picking
		S	Residents in Nishihara district and Nippon travel agency	Green tea, Picles, Apple	Folk song
		C	Residents in Nishihara district and Nippon travel agency	Green tea, Picles, Apple	Folk song
2012	ND	C	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe	Apple picking
2013	ND	R	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe	Apple picking
2014	ND	R	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe	Anniversary event, Apple piking
2015	About 100	S	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe	Apple picking
2016	124	S	Residents in Nishihara district	Rice boll, Pork miso soup, Coffe, apple	

S: Suny day, C: Cloudy day, R: Rainy day.

In 2014, playing japanese drum, magic show and quiz contest in addition to anual contents.

The wether in 2007~ 2014 presumed the data of Meteorological agency and report of participants.

(Making by the date of Meteorological agency and report of Nishihara district)

school or older. More than 46 questionnaires were distributed to the older group. Questions included motivation for participation, evaluation of chirping, association with chirping, evaluation of observation activities, sounds expressing Matsukawa village, and attributes of respondents.

Below are the results of a questionnaire survey of junior high school students and higher.

First, respondents included 15 men and 31 women. This is because many mothers come with children. The age range was 1 from the 10-19 age range, 1 from 20-39, 10 from 40-49, 15 from 40-49, 5 50-59, 4 from 60-69, and 10 who were 70 and over. Regarding residence, 42 of the surveyed participants were local to the village and 4 were outsiders, indicating that most participants live in the village. Furthermore, considering the residential area of villagers, there were only 4 residents of the Nishihara district whereas 38 were from other districts. Regarding frequency of participation, 21 were attending for the first time, 9 for the second time, 15 for the third or more. One participant did not answer. The number of first-timers was approximately twice as great as the number of repeaters.

Regarding motivation for participation, 14 people answered "interesting," 12 people wanted to hear chirping, 8 "wanted children to hear," 2 "wanted to ask children." "Other," and "No answer" amounted to 10 people in total. Regarding their evaluation of chirping, participants were asked to rank it according to five classifications: "very beautiful" to "not beautiful." Thirty-two people responded "very beautiful," 13 people responded "beautiful," and 1 person provided "no answer." Forty-five respondents indicated that it was "very comfortable" or "comfortable." Many of the participants appreciated the sound. In addition, in drawing associations with chirping, multiple answers were given. At 37, "autumn" had the largest number of responses, followed by "nature's abundance" at 29, and "original landscape" at 18. There were also three participants who indicated that it was reminiscent of past memories, particularly of their childhood.

Next, considering the relationship between motivation for participation and age, it can be seen that the number of people who responded "to hear chirping" tended to be over 50 (Fig. 3). On the other hand, "interesting" was how many young people responded, which is a contrast. Children's motivation remarkably persists among residents up to the 30s and 40s. Regarding motivation for

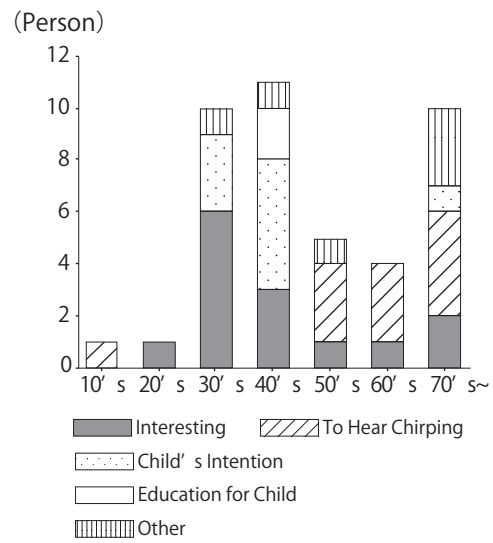


Fig. 3 Participants' motive for bell cricket observation by age

participation, since there is no notable difference in the number of participation, it can be inferred that the difference depending on age is strong.

In addition, when asked what Matsukawa village-like sounds like in a free description form, 30 responses were obtained. In order from highest to lowest, 25 responded with the chirping of bell cricket, 7 with the sound of drumming, 2 with insect chirping, sound of a tiller machine, five with the sound of water. One respondent each identified Azumi song, public relations, pigeon song, and the sound of the rice panning sound, the music, the voice of the child, and the sound of the wind. Fig. 4 shows the content of responses by age. Looking at this, it is clear that many people in their 30s and 40s answered bell crickets chirping, but that few respondents in their 50s and 60s did. The young generation had little experience hearing the chirping of bell cricket, which can be inferred from the fact that a strong impression remained from the chirping heard during the observation activities. Also, it is noteworthy that sounds of insects appears in the responses of people from their 50s to 70s. Matsukawa village is home to a number of insects, including the bell cricket but also the cricket and horse mackerel, which produce chirping. Therefore, elderly people distinguish bell cricket and other insect sounds and listen to them, which is why they respond with a comprehensive insect chirping. On the other hand, this suggests that young people may perceive all insect chirping as the singing of bell crickets.

4) Voluntary conservation activities of residents in Nishihara district

Nishihara district also has voluntary activities to protect the habitat of the bell cricket. The first was to ban the spraying of agricultural chemicals in the district. This is to prevent the decline of bell cricket caused by pesticides. The second change was to make masonry which could serve as a residence for bell crickets (Fig. 5). Since adults bell crickets live on the ground, they are often hiding under large stones in the natural environment. However, the habitat within the Nishihara district is a field that with wild cracked stone, and the living space of bell cricket decreased due to land improvement. For that reason, they built two masonry areas on the ridges of the fields. Third, villagers

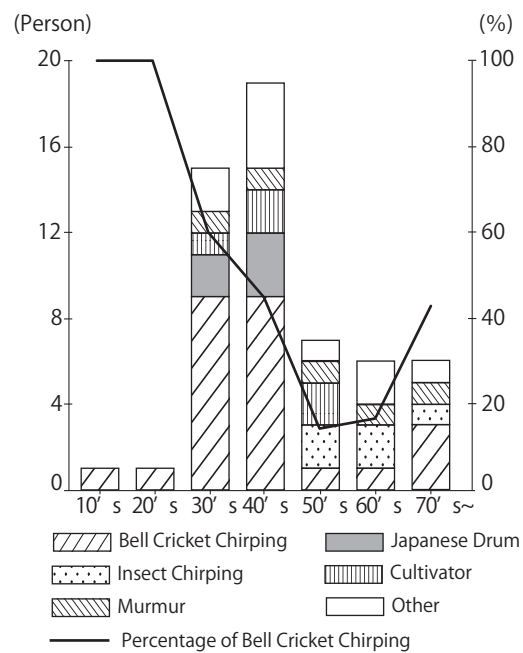


Fig. 4 Percentage of most recognizable sound of Matsukawa village for participants of bell cricket observation by age

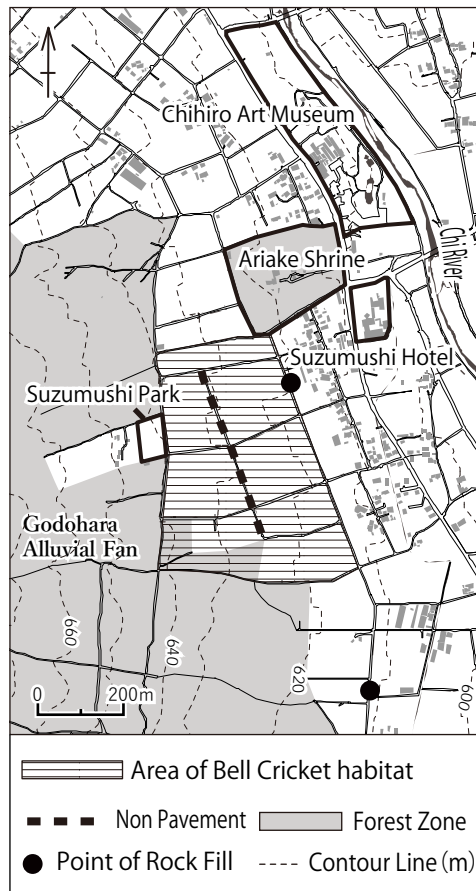


Fig. 5 Bell cricket habitat and its surrounding area

minimized land improvement within the habitat. Previously, for the convenience of the field, residents discussed when plans to lay pavement roads in the habitat were raised. The area inside is inclined because it is an alluvial fan, and the gradient is steep. As a result, although asphalt conversion was permitted in the east-west direction where concerns about sediment discharge existed, the plan was ultimately rejected because it could destroy the environment of bell crickets in the north-south direction (Fig. 5). These are all examples of activities to protect the habitat of bell cricket by residents of the Nishihara district.

4. Characteristics of bell cricket chirping as a local resource

Based on the above results, this section considers the usefulness of the chirping of bell crickets as a local resource in Matsukawa village.

1) Discussion of an auditory local resource

First of all, the problem with applying local resource theory is whether the resource was the "bell cricket" or "chirping." Of course, bell cricket and chirping are inseparable, but I need to consider on which the residents put the bulk of the value.

In regards to MKG, these two things are hard to distinguish. The reason for starting the parcel was the innovation of sending the living bell cricket, and it is hard to imagine initially that it was worth finding value in the chirping. However it is worth considering that they controlled hatching to influence chirping. The wild bell cricket of Matsukawa village began chirping in late August, but the MKG adjusted the hatching so they would sing in the bon (15th August). The reason for that, according to Mr. K, is that "There is a good feeling about the chirping of bell cricket when listen to bon." Thus the value is in the bell cricket's chirping, and the specific timing with the bon is also an important factor.

On the other hand, observation activities clearly demonstrate the value placed on chirping since people walk with lanterns in the dark without ever seeing the bell cricket itself. When walking in the habitat, participants cannot see the bell cricket, only the chirping can be heard. At the same

time, the wind rustles through the leaves and the smell of grass permeates the area. Indeed, the observation activity is the practice of feeling the environment with the five senses with a focus on the soundscape. Then, participants not only understand the environment, but also reconstruct the soundscape by listening to the chirping of bell crickets. This is what Senda (1998: 235-237) called "experience landscape"—participants perceive the landscape by listening with their ears.¹⁹⁾ And meaning is derived from that experience.

But what one should be aware of is that not all participants find similar value in the chirping. Berg (1990) said that perception of the visual landscape requires the training of a structured gaze, and that without that human perceptions are only environment. The same point applies to an auditory landscape. The understanding the context of sound and the meaning and value given to the sound depends on individual experience and thought.

This is evident from the questionnaire results of the participants. From the results in Fig. 3 and 4, when comparing those in their 30s and 40s to those in their 50s to 70s, there was no respondent who wanted to hear chirping in the 30s and 40s, while in the second group many identified it as a motive. On the other hand, nearly half of the younger cohort identified the chirping as Matsukawa village's distinctive sound, while only a few in the older cohort did so. Although young people are not as interested in the chirping, it can be inferred that they are aware of its symbolism in Matsukawa village. On the other hand, older generations who participated in observations of the chirping but did not regard the chirping as the sound of the village. From this, it can be said that it is not consciously remembered as Matsukawa village's sound, as it is recognized by the elderly as a familiar sound from long ago. In other words, the elderly recognized the bell cricket chirping as a keynote sound. On the other hand, young people are not as familiar with these sounds but have images and values attached to them by residents' organizations and administrative activities. Young people hear a soundmark in contrast to the elderly who hear a keynote sound. Although young people hear all chirping of bugs as bell crickets, elderly people distinguish individual barks, which also shows how the hearing of sounds differs depending on individual experience. This point is important in considering the soundscape as

a local resource.

2) Reasons for differences in utilization methods

The MKG and the residents of the Nishihara district started to utilize the chirping of bell crickets for community development at the same time, but their activities differ. The MKG sent out the chirping bell crickets as a parcel to the outside world, whereas the residents of the Nishihara district invited people into the area to hear chirping. In other words, the difference is that the Nishihara district residents connected the area to the outside world while MKG cut off the area when utilizing the chirping of bell cricket as a local resource. To explain this difference, I will highlight their differences in relation to the chirping.

Members of MKG reside outside of the bell cricket's habitat. They had been listening to the bell cricket chirping in their cages. In addition, they had caught the bell crickets in their habitat in autumn, so it can be inferred that these experiences detached the sound from the regional context of habitat. In other words, for members of MKG, the chirping of the bell cricket was recognized as consciously heard sounds rather than sounds heard on a daily basis in the living area. For that reason, it was a conscious activity meant to be disseminated in a meaningful way by active listening.

On the other hand, the residents of the Nishihara district have been living in the habitat since childhood and listening to the wild roosting sounds. It goes without saying that this influenced the formation of their soundscape. For residents of the Nishihara district, it is thought that the chirping of bell crickets were heard at home or in the district, and became a keynote sound in the Nishihara district. Therefore, it can be inferred that the bell cricket chirping is perceived as an area local identity which cannot be separated from the Nishihara district.

In the end, the difference between the activities of MKG and the residents of the Nishihara district is due to the difference in their respective relationships to the chirping, which is itself a difference in the environment in which they heard the sounds. This difference produced a difference in how they heard the same sound: MKG heard the roar of bell crickets as a soundmark, whereas the

residents of the Nishihara district recognized it as a keynote sound.

3) Possibilities of soundscape as local resource

Based on the above analyzes and considerations, the soundscape is a local resource in Matsukawa village for the following two reasons.

First, the soundscape is different depending on one's experience with it, so that how it is utilized as a local resource is different. The sounds targeted in this study are the chirping of the bell cricket that have been heard for a long time in the area. Residents identified new value in bell cricket chirping because there is rising momentum for protecting the natural environment all over Japan in recent years. This led the transition from the thought that "Matsukawa village lacks a tourist spot" to "Matsukawa is a village full of nature," and the symbolism of the chirping gives it value.

However, it has become clear that there are two ways of listening to the chirping even among inhabitants in the same village: the keynote sound and the soundmark. Residents who were listening to the keynote sound reconstructed the residential area through the consciousness hearing of the sound. This shift from keynote sound to soundmark can be said to have created collective meaning. Meanwhile, residents who have heard it as soundmark used it as a local resource by spreading that way of listening to other residents. This tendency is particularly likely to be accepted by residents such as young people who have not grown up with such sounds. However, it is likely that residents who consume the meaning as a soundmark now find new meaning by accumulating this experience through sound. There is also the possibility that people will transition from hearing it as a soundmark to hearing it as a keynote sound.

After all, the value added to the sound depends on individual factors, such as experience and thought. It depends on the relationship to sounds in a regional context.

The second point is the sounds function in fostering regional identity. This is important in terms of its usefulness as a local resource. In this research, MKG began to be used as a new resource for a village with poor visual landscape resources, and residents of the Nishihara district began to use

it as a resource to raise awareness.

In the process of establishing bell crickets as a symbol of the area, the MKG gave chirping a function as a soundmark and spread this way of hearing widely throughout the village. Meanwhile, residents in the Nishihara district changed the perception of the keynote sound to soundmark by reconstructing the meaning of the environmental in their own lives.

As these activities continued, the villagers and others widely recognized the chirps as regional sounds. Currently, the bell cricket chirp is everywhere in the village in autumn. It is because not only the habitat but also the station, the city hall, the hotel, and the road stations are breeding them. The staff of the Tourism Association said that "I put the bell cricket cage because villages seems to have come back to Matsukawa village" ("Sound of bell cricket in Matsukawa," Matsumoto Area Information on 20th August 2016). This shows that the chirping of bell crickets have become part of the soundscape for the local residents. It can also be said that the chirping of bell crickets has been made socially meaningful and forms a meaning space constructed by sound in Matsukawa village. It shows that the soundscape can also create a scene that supports the sense of belonging to a community with a shared culture, what Senda (1998: 233 - 235) named "the scene of the group".

Chapter IV: Potential of keynote sounds as local resources

In this chapter, we study a case where there is a steady sound that is not managed as local resource and clarify the characteristics of the residents' soundscape for a keynote sound.

The research procedure of this chapter is as follows. Section 1 outlines the research area and the target sound environment. In Section 2, I will identify the relationship between the target sound, environment, and residents, focusing on residents' activities and administrative projects. Next, in Sections 3 and 4, I examine both physical aspects of the sound environment and the human consciousness of them. Specifically, in Section 3, to clarify how much the sound is ringing in the area, I measured the sound pressure level using a sound level meter, and I surveyed through the research area. In Section 4, I examine how the residents perceive sounds that are constantly ringing, based on the results of group interview surveys and questionnaire surveys for residents. Based on these, Section 5 clarifies the residents' perceptions of the keynote sound and its characteristics.

1. Research area

1) Outline of research area

The area covered by this section is the Nagamachi area in Kanazawa city, Ishikawa prefecture, and the target sound is the water sound of the canal (Fig. 6). In 1968, Kanazawa city established the "Kanazawa city traditional environment preservation ordinance," promoting harmonious modern cities while preserving the historical environment including the canal and the natural environment. In 1989, it enacted an "ordinance on preservation of the traditional environment and formation of a beautiful landscape in Kanazawa city," emphasizing citizen participation and promoting urban landscape using the personality of Kanazawa city. Later, in 1994, it established the "Kanazawa city ko-machinami conservation ordinance" that preserves the small townscape with its historical style, and in 1996 it established the "Kanazawa municipal water conservation ordinance" (Yamashita 2018).²⁰⁾

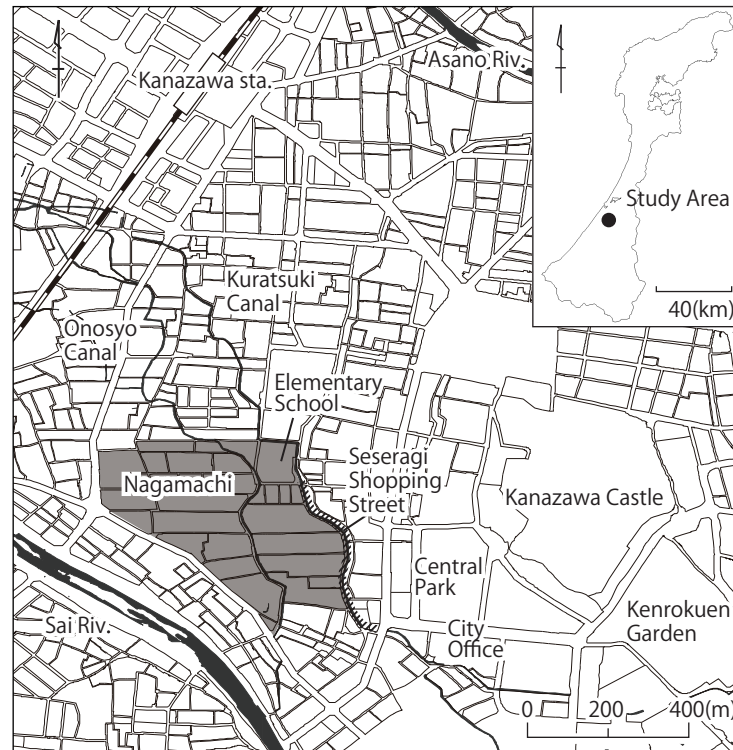


Fig.6 Around Nagamachi district

Looking at the ordinance established by Kanazawa city, it can be seen that the conservation and utilization of canals as well as townscapes and historic buildings are drawing attention. Currently there are 55 canals in Kanazawa city, the total length of which are about 155 km. Some of them are managed as preservation designation waterways, such as "water scenery," "securing clear stream," and "use of water." The canal for Kanazawa city is the oldest and has a usage record, which is familiar to Kanazawa citizens, from before the Edo era. The canal in Kanazawa city is highly valued from inside and outside the city as an important heritage, and visual conservation and utilization are done.

On the other hand, the auditory factor of the Tatsumi canal was also observed in the event in the Ishikawa prefecture in 1996 called "the sound of Ishikawa." Besides the sound of the canal, various sound types such as the bells of the temple group, the waves of the sea, and the hustle of the market were highlighted. However, in regards to the sound of Ishikawa, there has been no remarkable events since then.

To summarize the trends related to the canal in Kanazawa city, the administration evaluates it as a visual landscape resource by enacting an ordinance, while the evaluation on the auditory element is temporary. Consciousness of the sound is not emphasized. Yet, as for residents' soundscapes, it was believed that inhabitants were conscious of the sound of the canal as a soundmark in 1996. At that time, consciousness was directed towards the canal itself due to the canal conservation ordinance, and the sound was also consciously valued. However, it seems that at present there is little consciousness of the sound. In other words, although the sound of the canal was temporarily a conscious soundmark, there is a possibility that it has become a keynote sound.

2) Overview of research about the canal

The Nagamachi area covered in this chapter is an area where there is a strong relationship between the canal and the residents of Kanazawa city. In the district there are two canals for Ohno-sho and Kuratsuki, which have flowed since the Edo era as living water. Until the 1970s, it has been in close contact with life through washing and vegetable washing, and in recent years it has also been

used for fire prevention and snow melting (Yamashita 2001). Below, I outline the two canals flowing through the Nagamachi area based on Sasakura (1995) and "Kanazawa city history documents 17 Construction".

I. Ohno-sho canal

Ohno-sho canal is the oldest canal in Kanazawa. It is about 10.2 km in length and is said to have been completed between 1573-1591 (Kanazawa city history editing committee 1998: 391). It was used to carry timber from the Sea of Japan for making Kanazawa castle. Besides transporting goods, it has been used for many purposes, such as fire prevention, defense, irrigation, and snow melting (Kanazawa city history editing committee 1998: 391). Currently Ohno-sho canal is used in irrigation on the downstream side through the Nagamachi samurai residences. The Nagamachi samurai residences are one of the most famous sightseeing spots in Kanazawa city, and the walls of the samurai residences and canals serve as important tourism resources (Fig. 7). Also, along the canal some residences *kyokusui*²¹⁾ can be seen. These draw water for use into the garden of private houses.

II. Kuratsuki canal

Kuratsuki canal is a canal about 14.6 km in length extending through the center of Kanazawa city. Records only indicate that it was remodeled from 1644 to 1648, and it is not known today when it was completed (Sasakura 1995: 110-111). It is thought that it was intended for the residents' use, because records have been collected of using rapeseed oil for hydropower and irrigation (Sasakura 1995: 112). In addition, some sections were also used as a moat for Kanazawa castle (Kanazawa city history editing committee 1998: 391). When entering the Meiji era, watermills for polishing and milling increased from oil squeezes, and many of them appeared until the early Showa era. In addition, hydraulic power was used as the driving force for the Kanazawa silk foundation founded in 1874, and it was indispensable for modern industries such as twisting, machine, refining, etc. (Sasakura 1995: 119-123).

After that, although the canal served as a conduit with the progress of urbanization,



Fig. 7 Onosho canal. Taked by the author on
Nov. 2013

maintenance projects were carried out in the 1980s and 1990s, such as opening the Kuratsuki canal, maintenance of revetment, establishment of a promenade (Yamashita 2007: 567). In 2005 it was possible to walk the canal along the Nagamachi area.

2. Relationship between canal and residents

Both Kuratsuki canal and Ohno-sho canal are currently being used as irrigation water in the downstream rice farming area, so they are managed mainly by the Association of Kuratsuki Canal Land Improvement and Ohno-sho Canal Land Improvement. Since both canals pass through urban areas and sightseeing spots, flowing water is being carried out throughout the year for the function of tourism even during the non-irrigation period. Below, based on an interview survey of both associations for land improvement,²²⁾ I will review the current relationship between the Kuratsuki canal, Ohno-sho canal, and Nagamachi residents from the viewpoint of cleaning activity.

First of all, in Kuratsuki canal, the executives of the Association of Kuratsuki Canal Land Improvement, elementary school children, and the group of the Seseragi-street shops conduct cleanings each year. However, it seems that neighborhood associations have not conducted cleanup activities in recent years. It has become rare for local residents to conduct cleaning activities, even in the surrounding areas. On the other hand, Ohno-sho canal is managed by the Association of Land Improvement and the administration of the prefecture and city. As for cleaning the canal, the elementary school children and the neighborhood association clean once a year. Until around 1990, the problem of dumping dust into canals was growing, but now the circumstances of the canal and its surroundings have improved; fireflies have come to fly around the canal.

Both the Association of Land Improvement believes that it is difficult for the residents to undertake self-management of canals and that the cleaning of canals should be assigned to the city in a few years. The young generation and people who have migrated are especially reluctant to maintain the canals.

Next, I will outline the supply maintenance project implemented by the administration for

Ohno-sho canal and Kuratsuki canal. Both canal maintenance projects include opening a ditch and constructing landscapes. The projects were inspired when Kanazawa Economic Association recommended opening a ditch in 1979 (Kanazawa Economic Association 1979). As a result, the renovation of the Kuratsuki canal was started in 1981, and from 1983 to 1985 some maintenance was done. Also, from 1991 to 1992 Ohno-sho canal began to develop shore protection and walking paths.

Since 1995, the opening ditch and the maintenance of the water protection revetment began for Kuratsuki canal, and in 1996 the establishment of the water maintenance conservation ordinance culminated with opening a ditch and improvements around the canals. In a project management evaluation interview survey of local residents conducted by the Hokuriku regional agency in 2009, 28% of respondents indicated that "the landscape of the area improved," about 70% "became familiar with agricultural water," and about 80% replied that "we are now working together to clean up."²³⁾ From this, it is clear that the residents along the canal positively evaluate the opening of canals.

Between 2006 and 2014, canal maintenance was carried out in Ohno-sho canal, including the replacement of private bridges and the development of shore protection.

3. Characteristics of canal sound environment

1) Measurement method of sound environment of canal

In order to grasp the physical sound environment of the canal, I investigated the sound pressure level measurement with a the sound level meter and a "sound listening" survey using the auditory sensation of the researcher.

The sound pressure level was measured at the average height of listeners (1.2 m above the ground) using the environmental noise measurement method at the A characteristic sound pressure level.²⁴⁾ A characteristic sound pressure level is an index obtained by adding a weight to reproduce the auditory characteristic so as to correspond to the "feeling of the magnitude of the sound" heard with the human ear (Tsuchida 2006). Since both canals are used downstream for the irrigation of rice fields, the amount of water differs between the irrigation period and the non-irrigation period.²⁵⁾

Therefore, the survey was conducted during the irrigation period (May) and the non-irrigation period (November). Also, for the time of the survey, I chose the late night when the sounds of residents' daily activities and the behavioral sounds of tourists interfere as little as possible.

In the sound listening survey, I heard directly in my own ears how strongly water can be heard in the survey area. This is because the sound of the canal and other sounds ²⁶⁾ cannot be distinguished from each other in the place showing the highest value for sound pressure level. Therefore, I aimed to clarify the range in which the sound of the canal could actually be heard. The sound listening survey was conducted twice—during the irrigation period and the non-irrigation period—around 15:00, each time while conducting the sound pressure level measurement (late night).

2) Results of sound pressure level

I. Non-irrigation period

Sound pressure level around the canal was measured between 23:00 on November 19 to 0:15 on November 20 and between 23:10 on November 21 to 1:10 on November 22, 2012. Two hundred and thirty points were surveyed.

The results are shown in Fig. 8.²⁷⁾ The sound pressure level around the canal is about 40 to 50 dB on average. However, it can be seen from the figure that there are multiple spots with high sound pressure levels. The sound pressure level is 50 to 60 dB where there are weir and unevenness in the roadbed, and at the highest point it is 70 dB.

A sound pressure level of 40 to 50 dB is equivalent to a "day in a quiet residential area." Seventy dB exceeds the upper limit of the noise regulation value defined by the Ministry of the Environment (Hada and Enari 2000). This demonstrates that the pressure level point is quite loud even in the non-irrigation period.

II . Irrigation period

Next, the results for the irrigation channel from 22:00 on May 16 to 1:30 on May 17, 2013

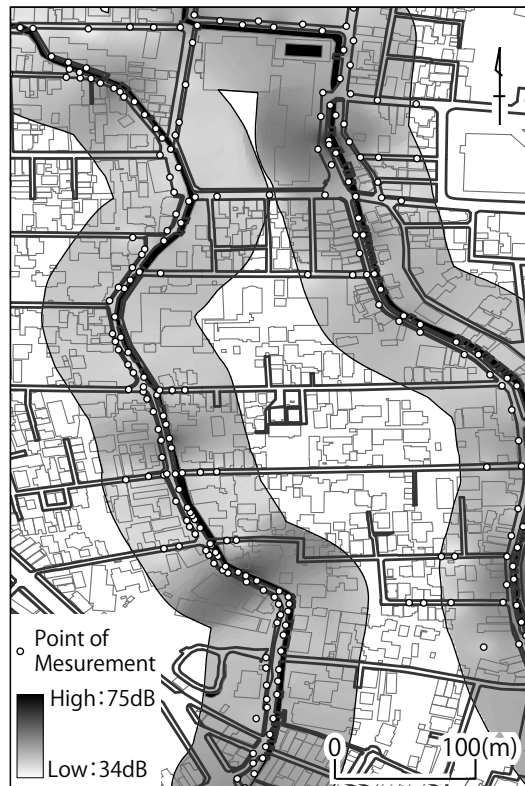


Fig.8 Sound pressure level in non-irrigation period
 Measured on 11pm Nov. 19~ 0:15am Nov. 20,2012.

are shown in figure 9. There were 173 surveyed points.

The average along the canal is 40 to 60 dB. It is about 60 to 70 dB where irregularities are present on the weir, and 75.5 dB where the sound pressure level is highest. There are several high points, and the maximum stands out conspicuously more than the non-irrigation period. It is also understood that the sound pressure level is higher than during the non-irrigation period throughout the canal.

3) Result of sound listening survey

I. Non-irrigation period

I investigated the sound range using my ear on a weekday during the daytime on November 21, 2012, 15:00 to 16:20 and weekday night at 23:00 on November 19 to 0:15 on November 20, 2012 and 23:10 on November 21 to 1:10 on November 22. The results are shown in Figure 10.

In the daytime, relatively large sounds were heard near the place where we were present due to the weirs and unevenness of roadbeds, but the sounds were often not heard even on the road along the canal because the sounds of daily life were numerous. In the vicinity of Korinbo 109, which is a large commercial facility, it was not audible due to the store's BGM and the voices the people.

Overnight, I listened to the sound all along the canal as a whole. It was found that the sound range became wide along the road vertically from the canal. The range for the sound of Kuratsuki canal during nighttime is much larger than in the daytime, but the sound of the canal was still not heard around Korinbou 109.

When comparing daytime and nighttime, the range of the sound during the nighttime is wide. The difference between day and night is remarkable, especially in the vicinity of the intersection and sightseeing spots where there are intense crowds. Also, even in the road crossing with the canal, the sound travels far in the night, which shows that the range in which it can be heard is enlarged.

II . Irrigation period

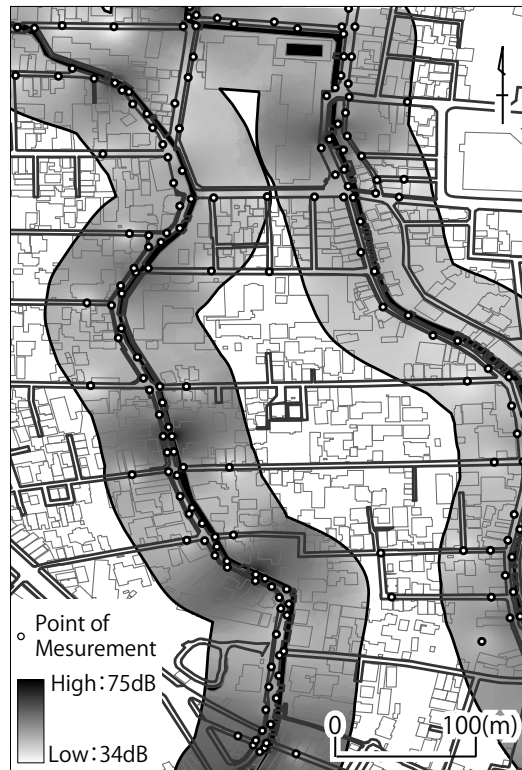


Fig.9 Sound pressure level in irrigation period
 Measured on 10pm May 16~ 1:30am May 17,2013.

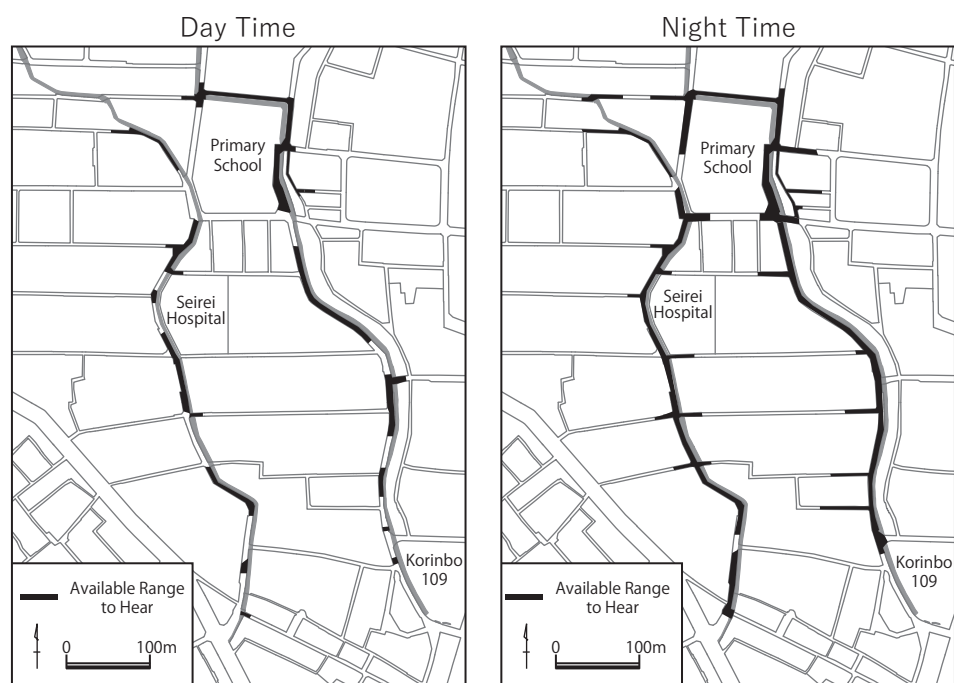


Fig.10 Available range to hear canal sound in non-irrigation period

Left ; Measured on 3pm~ 4:20pm Nov. 21, 2012

Right ; Measured on 11pm Nov. 19~0:15am Nov. 20 and 11:10pm Nov. 21~ 1:10 Nov. 22, 2012

I investigated the range of canal sound at 14:00 to 15:30 on May 17, 2013 and at 22:00 May 16 to 1:30 May 17, 2013. The results are shown in figure 11.

In the daytime, there were lot of points where the water could be heard. Unlike the non-irrigation period, the sound stretched the depth of the road extending vertically from the canal. However, along some of the Kuratsuki canal, the sound of the canal was drowned out by the music coming from a store.

In the nighttime, the range of sound is wider than in the daytime. However, the sound of the canal was not heard outside of Korinbou 109 because the sounds of traffic and people's speech were loud.

4) Sound environment of canal in Nagamachi area

Based on the above survey results, I consider the sound environment of the canal in the Nagamachi area.

First, the range of sound is different during daytime and nighttime. At night, the canal sound can be heard widely because there are few cars and the sounds of daily life are small. The sound with the widest range is in the night of the irrigation period. The sound enters deep into the narrow alleys between the central elementary school and the hospital. Therefore, it creates a space where the sound of the canal is heard everywhere. Meanwhile, in the daytime various sounds such as footsteps, the talking of tourists, sounds of daily life, the sounds of cars, sounds of elementary school children, sounds of souvenir shops, and BGM of restaurants, and department stores ring in the streets, so that the sound of water from the canal is drowned out.

Comparing the irrigation period and the non-irrigation period, the range of sound is wider in the irrigation period, and the sound pressure level is also higher overall. The range where the sound can be heard is extended by several dozen meters, so the seasonal difference of the sound environment is apparent.

From the sound pressure level measurement and the sound listening survey, there is a place

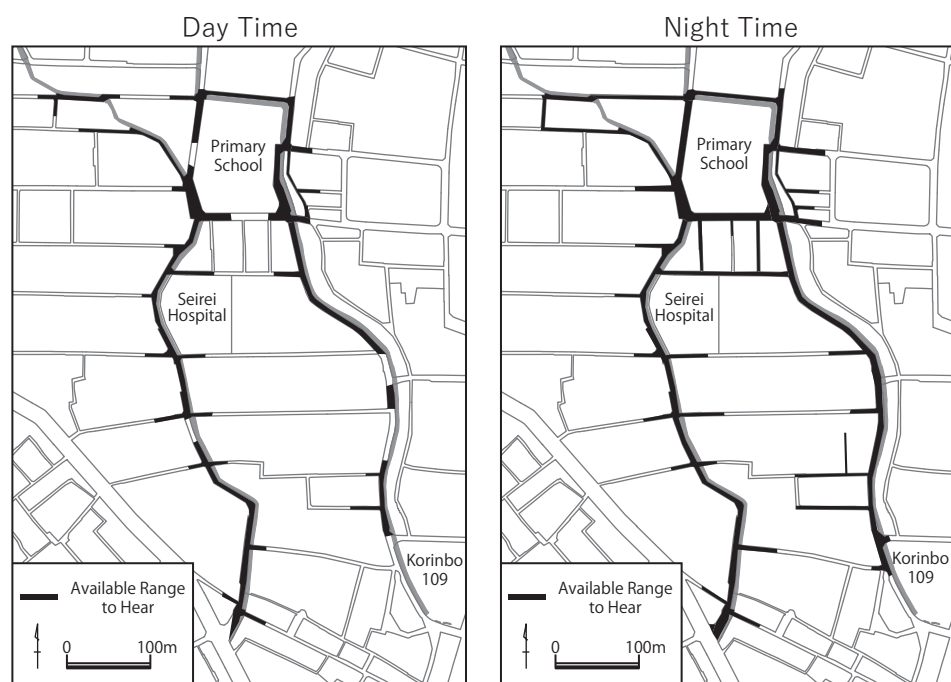


Fig.11 Available range to hear canal sound in irrigation period

Left ; Measured on 2pm~ 3:30pm May 17, 2013

Right ; Measured on 10pm May 16~ 1:30am May 17, 2013

where the sound of the canal can be heard even if the sound pressure level is low. And it is found that the sound enters a small road inward. It can also be pointed out that the range in which the sound of canal can be heard is defined not by concentric circles from the sound source but by the shape of buildings and roads.

Next, the sources of sound is coincident with the position of the weir and the unevenness of roadbed (Fig. 12, 13). The weir of Ohno-sho canal is installed into the garden of the house for Kyokusui. Kyokusui is a usage of the canal that dates back to the Edo period in this area. In modern times it is maintained as part of a samurai residence as a local resource with historical and cultural values. It can be said that the sound environment created by the weir is unique to the Nagamachi area and its samurai residences.

4. Residents' consciousness of the canal sound

1) Outline of the questionnaire survey

I investigated of residents' consciousness in the Nagamachi area by questionnaire survey from June to July 2013 in order to clarify how the sound environment of the canal was heard.

The Nagamachi area spans two associations of town councils. To residents of the Nagamachi town association, I distributed and collected questionnaires by direct visits. To residents of Nagadohe town association, I asked the chairman to participate in distribution and collection. As a result, I gathered 92 responses from more than 157 copies distributed.²⁸⁾ I analyzed 91 answers, excluding one in which more than half of the questions were unanswered.

The questionnaire survey totaled 24 questions. With reference to Yamashita (2001), who investigated the management of canals in Kanazawa city, I created questions to grasp the knowledge, consciousness, handling, and relationships concerning the canal. I also asked about the attributes of the respondents.

Also, to verify whether evaluation and consciousness of the sound of canal differed within and outside the sound range of the canal, questions were asked to determine whether the place of



Fig.12 Weirs, steps, and building with kyokusui garden



Fig.13 Weirs in canal for kyokusi garden. Taked
by the auther on Nov. 2013

residence was within the range of sound. This question divided the sample into four groups within the Nagamachi area based on the result of the night of irrigation which is when the sound had the widest range in the sound listening survey. The four groups are A: a group that cannot hear the sound of the canal but passes through the canal when going out (creating an opportunity to hear the sound of the canal); B: a group that hears the sound of the canal; C and D: are groups that do not hear the sound of the canal. The last two groups, neither of which hear the sound, are divided into C, a close group, and D, a distant group, with the range from which the sound of the canal is heard divided equidistantly.

2) Results of the questionnaire survey

Attributes of respondents are described below. There were 45 males and 46 females. The age composition was 1 person under 19 years of age, 20 in their 20s, 3 in their 30s, 9 in their 40s, 21 in their 50s, and 56 in their 60s. Those over 60 years old amounted to 62% of the total. Because the questionnaire responses are biased toward elderly people, only 3 respondents had resided in the Nagamachi area for fewer than five years or less, 4 for six to ten years, 8 for 11 to 20 years, 13 for 21 to 30 years, and 63 had been in the area for 30 years or more. There were 15 residents in the A group, 33 in the B group, 24 in the C group, 14 in the D group. Five provided no answer.

In their evaluation of the sound of the canal, 12 responded that it made them very comfortable, 57 comfortable, 16 a little comfortable, and 3 that it did not provide any comfort. It shows that many people have a positive evaluation of the sound. Fifty-three people (63%) responded that the sound evoked the feeling of the season. Eighty-one people (89%) answered that the canal is an important factor for Nagamachi.

3) Influence of life relationships and evaluation of sound environment

In order to examine factors influencing the evaluation of the sound environment, multiple regression analysis was performed on the results of the questionnaire using the experiences of the

canal and the place of residence as independent variables and evaluating the sound as the dependent variable. Ten experiences with the canal were provided: "cleaning," "washing/dish washing," "water play," "watering," "walking," "melting snow," "extinguishing," "kyokusui," "no use experience," and "others." In addition, the questionnaire asked about the frequency of walking along the side of the canal, ranging from "every day" to the "almost not passing." These were integrated into the groups categorizing place of residence.

The results of multiple regression analysis are shown in Table 4. Because the coefficient of determination (R^2) was 0.17, it was shown that the evaluation of the sound is often decided by the element which cannot be represented by the independent variable. However, it can be established that the independent variable influences the sound evaluation. It is understood that the experience of using it to extinguish a fire has a positive influence. On the contrary, experience in using snow melts has the effect of lowering the evaluation. As a reason for this, fire-fighting is an active use that protects the area, so it provides a positive evaluation. On the other hand, it can be inferred that passive utilization has an influence on evaluation because snow melting involves the heavy work of bringing snow into the canal. Attitudes were also affected by the frequency of passing around the canal.

On the other hand, there is not a clear correlation between the residential area and the reception of the sound (Fig. 14).²⁹⁾ However, opportunities to interact with the canal are closely related to place of residence. Therefore, the distance from the place of residence to the canal indirectly influences the evaluation of the sound environment.

4) Outline and results of group interview survey

Although the questionnaire survey can consciously extract residents' evaluation of the sound of the canal, it is difficult to identify the unconscious soundscape. Therefore, I investigated with a group interview survey to clarify the sound environment of the residents listening unconsciously.³⁰⁾ Watanabe (2012), who conducted a study of landscape, mentioned that group interview surveys show that collective consciousness and values are reflected as participants mutually influence each other,

Table 4 Influencing factor of evaluating sound

Category	standardized partial regression coefficient	p
Cleaning	0.05	0.69
Washing and laundering	-0.15	0.36
Playing in canal	-0.10	0.47
Sprinkling	0.02	0.14
Strolling	-0.13	0.34
Snowmelt	-0.27	0.06
Fire fighting	0.17	0.26
Kyokusui	0.04	0.76
Nothing	-0.13	0.39
Other	-0.06	0.59
Frequency in passing	0.27	0.03
Residential area	-0.01	0.94
Coefficient of determination $R^2=0.17$		

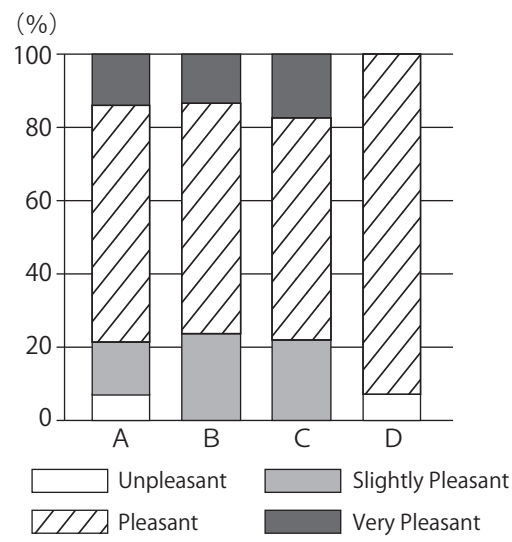


Fig.14 Evaluation of canal sound by residential area

and daily landscapes are extracted. Therefore, I thought that I could extract unconscious daily sound environments with a group interview survey in this study.

In the survey, the researcher marked memorable places in the Ngamachi area and took a form to let passerby to discuss it freely while looking at the map of Nagamachi area. The investigator did not participate in the conversation. Filling in the map was utilized because I thought that a concrete image was more likely to be produced than if memories were discussed absent any tangible aids. In this survey I did not explain the study's relationship to the sound of the canal and observed how frequently topics and words about the sound appear in the story.

As a result of the survey, the first 60 minutes I focused on each person's memories of the canal as topics for an opening project or a kodo³¹⁾ that lasted until 1970. This usage of the canal has changed with life style changes, but it seems from the conversations that it still lives on. However, I did not discuss topics of the sound environment for these 60 minutes.

Sixty minutes in, I conducted an interview survey to provide data for investigation. In response to the question "Has sound become a factor that brings in tourism resources and regional attachment?" there were three people who answered yes, and one who said no. One response indicated, "I felt the four seasons from the canal, I also felt the sound at that time." This is thought to include the sound environment in the scenery of the canal. There is also an answer that "it is better to hear the sound of river,"³²⁾ which shows that they are evaluating the sound of water. The reason one person replied no was because "the sound is difficult to be conscious of and I am not conscious of it."

In addition, there was an interesting answer below about consciousness of the sound of the canal:

"I could not sleep when I went camping on the mountain because it was too quiet. At that time, I realized that I was sleeping while listening to the sound of the river."

Although this example shows that sounds of the canal are regarded as a daily keynote, it suggests that

the sound is unconscious or not able to be heard.

In summary, the group interview survey found that the sound of the canal is not a conscious signal or soundmark for the inhabitants. However, it is believed that the sound is recognized because each person had an answer. In other words, it can usually be regarded that listening to the sound of the canal is a keynote sound.

Also, for the keynote sound, the possibility to be conscious yet not be able to hear the sound was found. Such experience can be considered a factor that changes one's way of hearing something from a keynote sound to a soundmark.

5. Soundscape produced by a canal

Both canals flowing in the Nagamachi area differ in flow rate depending on the season because their main use is for irrigation. Along with that, the sound environment changes seasonally. However, that sound will never be interrupted since the water runs throughout the year.

The sound pressure level emitted from both canals is equivalent to the noise level prescribed by the Ministry of the Environment. Even in the actual sound listening survey, it was confirmed that loud noise appears in the vicinity of the weir or the ground floor. These sounds create a unique sound environment around the canal and create a landscape that, coupled with the visual landscape, is peculiar to the Nagamachi area.

Canals have been used in the Nagamachi area since the distant past and residents still regard the canal as a symbol of the area. There were many positive responses when I asked for conscious evaluation in the questionnaire survey, although many people are not conscious of the sound of the canal. In addition, from the results of the multiple regression analysis conducted to clarify sound evaluation, it was shown that the relationship with life may be influential. Residents who frequently pass around the irrigation channel tend to perceive the sound positively, while residents involved negatively as with snow melts tend to have a negatively perception.

Meanwhile, it was revealed that in the consciousness of residents the aqueduct was mainly

comprised of visual scenic elements, and in everyday life the consciousness of sound did not surface and was and unconscious. This means that the sound of the canal is only heard as a keynote sound.

From the above results, the sound of the canal is usually recognized as the keynote sound. However, it became clear that the way of listening to the sound changes from signal to soundmark during different times of the season. Moreover, it can be pointed out that the keynote sounds are evaluated in the residents' lives, although they do not surface consciously. Since the soundmark is a consciously heard sound, its evaluation is consciously performed along with the value assigned to the sound (for example, Ohno 1994; Tsuchida et al. 2007).

Chapter V : Soundscape as a local resource

1. Characteristics of soundscape as local resources

In this research, local resources have been treated as items with utility that are incorporated into a sense of regionality. Therefore, the features of the soundscape as a local resource are summarized with the keywords usefulness and regionality as follows.

First, consider the utility of soundscape as a local resource. In the case of Matsukawa village which was covered in Chapter III, through the activity of discovering and utilizing the soundscape, residents have reimagined the region from the viewpoint of the sound environment and it has resulted in regional reconstruction and new discoveries. This work was an opportunity to change the consciousness of the residents who had thought of it as a "nothing village." As a result, it is thought that a regional identity was fostered with pride for the region. In addition, the activity of discovery and utilization of a local resource led to encouraging exchanges among the residents, creating a sense of living, and providing "a place of living." On the other hand, in terms of creating tourism resources aimed at the residents, there was no economic effect, but there was an appeal toward outside of the village through the media. Therefore, these activities associated the reputation of the village with the bell cricket. And it can be said that the improvement in name recognition raised the pride of the residents in the area. In this way, the usefulness of the soundscape in Matsukawa village is the best example of such a phenomenon fostering regional identity.

Then, in the case of Kanazawa city from Chapter IV, the soundscape is recognized by the residents as one of the elements constituting the area. Although the keynote sound was not conscious on a daily basis, it was perceived when unusual sound environments occur such as changes or stops in sound. This indicates that residents are not consciously listening to the sound environment but recognize it in their unconsciousness. Also, it became clear that the keynote sound is closely related to daily life because it is recognized unconsciously.

On the other hand, the keynote sound has characteristics that residents are not conscious of

but that they change it into a conscious soundmark for use as a local resource. From this, it can be concluded that the keynote sound is not a local resource as is, although it can be made into a local resource. Also, it is inferred that there are keynote sounds that may be converted to local resources while others are not. Although it could be assumed that the keynote sound like the water sound of the canal of Kanazawa city in a space that is important to the visual landscape would be easy to recognize, I will only suggest that there are different stages of development for local resources because there is only so much data to draw on for discussion in this research.

To summarize the above, it is necessary to recognize a sound—that is, to change it from the keynote sound to the soundmark—for the local resource management of the soundscape. It is difficult to grasp the keynote sound as a local resource because it is not useful. However, usefulness as a local resource develops for the soundscape by noticing the keynote sound and being conscious of the area's sound environment. At that point, the keynote becomes a soundmark and it obtains a new value. In this way, it can be said that the sounds inherent in the area are valued as local resources through the transition from discovery to utilization. In this respect, it became clear that the soundscape has characteristics similar to general local resources.

On the other hand, it seems that it is difficult at this time to identify common terms in the "usefulness" that produces local resources. This is because different areas have different situations, and the usefulness desired by each area also differs. However, it is clear that the soundscape also has a function in fostering regional identity through the process of discovering and utilizing local resources.

Next, I examine the characteristics of soundscapes as a local resource from the viewpoint of regionality. Humans are not constantly aware of the keynote sound in a region. However, by making an incident meaningful to this keynote sound with an event, the manner in which the sound is heard changes. In the case of Chapter III, it was revealed that a representative sound of the area and the value assigned to that sound changes as utilization progresses. Furthermore, the sound initially heard at the individual level has changed to a value assigned on the district scale. In Chapter IV, the way to

a sound was heard changed temporarily from keynote to the soundmark. In this way, the soundscape changes constantly due to the experiences of the subjects, the environment surrounding them, social relations, and so on.

The act of listening to a keynote sound is personal. It is clear from the examples of Chapter III and IV that the soundscape of the keynote develops from personal experience is strongly influenced by the culture and the natural environment of the place where the subject resides. If the characteristics of this place are elements of "region," the soundscape will be an index to characterize a specific area built up with culture, history, and natural environment. For example, although the chirping of bell crickets in Chapter III was also heard by residents of the habitat as a keynote sound, residents outside the habitat heard it as a soundmark representative of the village; in the same village the soundscape differed from individual to individual. Likewise, though the water sound of the canal which I covered in Chapter IV is a keynote in the daily life for the residents, the researcher believes that it could become for outsiders a soundmark, characterizing Nagamachi in combination with the scenery of the canal.

Unlike a soundmark that collectively alters the way people listen to sounds, the keynote sound does not share that sense of listening with others. For this reason, the spatial range that is the stage for the keynote sound is an area associated with a group of individuals with a similar subjective way of listening to sounds. However, by attributing a specific meaning to the sound, the manner of listening to changes into a social action. In other words, the soundmark is heard as a structured sound. As a result, the spatial domain is recognized as a specific area in which the soundmark is an element. Thus, the soundmark overlaps with the local culture.

This suggests the possibility of enclosing a certain area and its local residents by soundscape. Shafer (1986) attempted to define such a group as an "acoustic community." Nagahata (2001) called this a "community of sound." In Matsukawa village there are two communities of sound and the difference of regional scale in activity was revealed. Meanwhile, in Kanazawa city, although there was no difference in consciousness due to the range of sound from the canal, the evaluation of the

sound was different depending on the manner of contact in daily life. Since such a way of life is the culture of an area, it can be said that the keynote sound represents personal life and the soundmark is rooted in the viewpoint and consciousness of the group's area shared.

In that respect, the soundscape can be viewed as the sound of the local culture or as a representation of the regional culture. Furthermore, community development using the sound environment is considered the practice of soundscape. In other words, the soundscape as a local resource can be an effective tool for grasping the regional culture from the sound environment.

2. Turning point of discovery and utilization of soundscape

Residents rarely construct soundscapes from the characteristic sounds of an area. Therefore, it is uncommon that a soundscape is consciously used as a local resource. In this section, I compare the examples in Chapter III and IV, and consider the opportunity to convert soundscapes into local resources.

First of all, in the case of Chapter III, the opportunity to convert the chirping of bell cricket into a local resource was in focusing consciousness on the outside world. The MKG focused on chirping as an auditory resource while looking for the centerpiece of Matsukawa village, which had few visual landscape resources. Also, the residents of the Nishihara district carried out local resource development in a way that expanded observation activities with the goal of promoting the Nishihara district to outsiders.

On the other hand, in the case of Chapter IV, although the sound of the canal was not a conscious local resource, by raising the question of sound consciously with questionnaire and interview surveys, residents' awareness of the sound of water was revealed. In this way, at the stage of noticing the sound environment—especially at the stage of the keynote sound—external consciousness and external stimulation are thought to be a trigger for altering consciousness to sound.

Although the consciousness to outsiders is an important opportunity to discover and utilize the soundscape as local resources, it is likely that the methods of managing local resources will also

differ according to whether local resource development was promoted endogenously or externally stimulated. In the case of Chapter III, when local residents made a local resource, a variety of activities have been carried out over a long period of time. The soundscape was used to publicly inform the area and fulfilled a function similar to other local resources. Meanwhile, in the case of Kanazawa city from Chapter IV, despite the fact that the sound of the canal was selected as the "sound of the Ishikawa" in 1996, no activity related to it is currently happening. Although there was temporary change of the sound of the canal from keynote sound to soundmark, it is now returning to the status of keynote sound. And it can be said that hearing as a soundmark did not last long. Here, if it is assumed that the example in Chapter III is an endogenous soundmark and the case in Chapter IV is an exogenous soundmark, the management of the soundscape as a local resource requires the process of an endogenous soundmark. The process of an endogenous soundmark is similar to the utilization of various local resources currently in Japan, and the residents will transform local resources by discovering and utilizing potential resources in the country. Therefore, it is easy to coincide with community development, and the range of utilization widens. On the other hand, endogenous soundmarks are externally impressed on the different soundscapes that residents construct. As shown in the previous section, since soundscape is closely related to residents' life and culture, it is difficult to construct new soundscapes externally. Therefore, even in the case of Chapter IV, the water sound which became a soundmark returned to the status of keynote sound. This suggests that in utilizing soundscape, compared to other local resources, it is necessary to make use of residents more strongly more experienced and cultured.

Also, paying attention to the differences in the soundscapes of the cases covered in Chapters III and IV, whether or not they become local resources depends not on the difference between the sounds of bell cricket and canal itself, but largely on the difference of the surrounding environment and human culture. For example, visual landscape resources function as a local resources in Kanazawa city, whereas Matsukawa village with poor visual landscape resources turned its attention to auditory resources. That is, in terms of management of environmental sounds, especially keynote

sounds, it will be necessary to undertake regional re-understanding and to identify a clear purpose for noticing sound. On the other hand, in the case of soundmarks, it is necessary to create sounds that become symbols of a shared consciousness.

Chapter VI: Conclusion

The concept of soundscape was proposed by Schafer with the aim of changing the consciousness of people to sound. By paying attention to unconscious sounds, the surrounding environment more clearly emerges, and it becomes clear that humans do not consciously hear all the sounds. In this research, I examined the possibility of soundscape, which is rarely conscious in daily life, from the viewpoint of local resources. The results are summarized as follows.

First of all, it is necessary to notice the sounds heard within the region to discover and utilize soundscape. It is important to change the way of listening from the keynote sound to the soundmark or to add a new meaning to the sound as local resource. For opportunities to convert this soundscape, it is thought that external existence that makes consciousness to sound is necessary.

In this way, usefulness as a local resource appears when the soundscape is discovered and utilized as a local resource. At this stage, the soundscape becomes a soundmark, and a new value for these sounds is shared by the residents of the area. In other words, it can be said that the soundscape becomes a local resource when the soundmark becomes a keynote sound. On the other hand, though the usefulness of sound as a local resource differs from region to region, it seems that its function in fostering regional identity is ubiquitous. Furthermore, it is conceivable that in utilizing the soundscape as a local resource, considering that the soundscape is mediated by the subjective qualities of human experience and culture.

In addition, by understanding structured listening as local culture, it was possible to distinguish areas by soundscape. It can be said that the keynote sound expresses personal life while the soundmark expresses the shared consciousness of groups within an area.

In this study, local resources have been characterized by words such as "usefulness" and "region." It should be noted here that the scope for evaluating this usefulness is "region." Naturally, there are various different "regions" in Japan. Therefore, what is useful for each region and what functions as usefulness will differ in various ways. In this modern society, local resources are

distinctly “local” in their use. A viewpoint of the region grounded in the particular region must be regarded as a locality-based endogenous resource.

Thus, research on the soundscape as a local resource must understand the thoughts and lives of the local residents' in the area. By consciously grasping the flexibility of the soundscape, we can hopefully approach the identity of an area hidden through daily life. In modern times, people are looking to various local resources as a means to break away from uniform community development. This is expected to lead to rediscovery and re-understanding of the region by utilizing the soundscape as a new local resource. However, as shown in this research, soundscape as a local resource seems to have more elements demonstrating usefulness to residents in the region than resources useful for the outside world. Therefore, it seems difficult to use them as tourist resources. Likewise, in the utilization of soundscape, the influence of the personal feeling of listening is also strong, so it is necessary to consider the creation of a new sound environment and volume. There are things to be cautious of when using sound. There is a problem with the physical aspect of sound, such as the when the sound pressure level surpasses the the noise level like with the sound of the canal which was handled in Chapter IV. Since the residents of Nagamachi are listening to the water sound as a keynote sound, the volume is not a problem, but sound's influence on the body should be taken into consideration for local resource consolidation. The soundscape becomes more prominent when a soundmark is shared within the region, and there is little variation in how individuals perceive it..

The sounds dealt with in this study are the sounds of bell crickets and the canal, so it has not covered artificial sound. In the present age, technological advances mean that artificial sounds are ringing everywhere. I need to consider the influence of these sounds on the area and soundscape of communities. So, I will aim to address these in the future. Although the soundscape has rarely been dealt with in geography until now, it is indispensable for a comprehensive understanding of region. In the future geography should accumulate research on regional understanding, including the five senses.

- 1) Kanto Shin-Etsu branch of The Japan Institute of Architects "Soundscape design to explore and disseminate invisible resources of cities heard by Mrs. Keiko Torigoe (<http://www.jia-kanto.org/members/bulletin/2015/11/10-12.html>, last viewed date: November 9, 2017).
- 2) In Hiramatsu (2014) are mentioned as a concrete example of repulsion, "sound environment is sufficient and it is not necessary to use funny English called soundscape", "soundscape is fashion".
- 3) When the Ministry of the Environment elected "100 sound scenery selections", the activity about soundscape spread nationwide. For example, "the sound of Ishikawa pref." in Ishikawa Prefecture in 1996 and "Osaka sound scenery" in Osaka prefecture in 2000.
- 4) Ministry of the Environment "Japan's sound scenery 100 selection" (http://www.env.go.jp/air/life/nihon_no_oto/02_2007oto100sen_Pamphlet.pdf, last viewed date: January 14, 2018), From page 2.
- 5) Ibid.
- 6) This symposium was held at the 58th Association of Historical Geographers Convention. The minutes of this discussion are published in the historical geography 58 (1): 125-129.
- 7) Materials issued by the Ministry of Education, Culture, Sports, Science and Technology in 2011 "About rich development through utilization of local resources" (http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu3/shiryo/_icsFiles/afieldfile/2011/03/28/1303081_11.pdf, last viewed date: November 7, 2017).
- 8) See the historical geography 58 (1): 125-129 same as note 6).
- 9) Ibid.
- 10) As suggested in Gatayama (2010), I also think that organizing and unifying soundscape terms will activate discussion in geography.
- 11) According to the document "European Landscape Convention and reference documents" issued by European Landscape Convention (<https://rm.coe.int/16802f80c6>, last viewed date: November

10, 2017).

- 12) Semantic environmental is the view of "the environment that is meant and constituted by the subject".
- 13) The soundmark is "one that is markedly characterized and gives its identity to its acoustic life", or "a sound that is particularly respected by people of the community" (Torigoe 1997; 120). Soundmark is determined by the history and personality of the area, which changes depending on the ages and situations (Torigoe 1997; 121).
- 14) The sound pressure level represents the sound intensity expressed in decibels (dB). Basically, as the sound increases, the sound pressure level also increases.
- 15) "Nagano prefecture version red list (animal version) 2015" (http://www.pref.nagano.lg.jp/shizenhogo/kurashi/shizen/hogo/hogo/documents/ch3_2musekitsu.pdf, last viewed date: November 7, 2017).
- 16) Ohori (2011) broadly divides the term "local identity" at the individual level and the aggregation level. As an individual level, it is a sense of belonging to an individual's region, and as an aggregation level it is an element within an area that is shared by a lot of regional stakeholders. In this study, I use regional identity at aggregation level.
- 17) Parcel is to insert 4 males and 3 females and mail it to the ordering person 2,000 yen per box. Considering various expenses such as mailing and breeding, the monetary income is about 200 yen per box.
- 18) There were 124 people at the beginning, but since there were guardians who go home while searching, 89 people were at the end of the meeting. I collected questionnaires from all participants who returned to the public hall.
- 19) Takinami (2005: 205 - 248) also stated that the landscape is on the body sensation and memory. There are scenes that stay beyond just vision.
- 20) "Water conservation ordinance of Kanazawa municipal government" stated in Article 1 for the purpose of conserving water supply and specifies concrete measures throughout all 17 articles.

- 21) To draw water around the garden in the house.
- 22) On September 19, 2012, a hearing survey was conducted on the Association of Kuratsuki Land Improvement and Ohno-sho Land Improvement officer.
- 23) Described in Kuratsuki canal maintenance summary provided.
- 24) Custom sound level meter SL-1370 was used for the investigation.
- 25) Usually, the irrigation period is from April to August, and the non-irrigation period is from September to March. The flow rate of Ohno-sho canal is $3\text{m}^3 / \text{s}$ during irrigation period and $1\text{m}^3 / \text{s}$ in non-irrigation period.
- 26) Sound pressure levels were measured while waiting for the sound to go out, but along with the canal there are many sound resources such as restaurant and vending machine.
- 27) I used IDW of ArcGIS for the interpolation.
- 28) Although the questionnaire distributed by the authors to the residents of the association of Nagamachi Town Association is 94 copies, the questionnaire number distributed by the vice chairman to the residents of the association of Nagashiwa Wall Town Association is unknown.
- 29) Among the responses of 91 copies, I used 81 copies excluding answers that were incomplete in either sound evaluation and residential area. The breakdown of 81 residence groups is 14 in A, 30 in B, 23 in C and 14 in D.
- 30) This survey was conducted at the Nagamachi Community Center meeting room for 2 hours from 18 o'clock to 20 o'clock on 4 th December 2013. Request for cooperation of participants in this survey was also conducted through chairman of the Town Association. The participants were all male, and the age and the residence years of the Nagamachi area were "76 years old, 50 years", "80 years old, 80 years", "70 years old, 38 years", "70 years old, 65 years".
- 31) The kodo is the place of using for washing clothes, vegetables, dishes etc. in the canal until the 1970s.
- 32) Local residents say the canal is "river".

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