

# Residents' Needs Serve to Solve Local Environmental Problems:

## A Case Study on the Overgrowth of Aquatic Plants in Lake Biwa

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In recent years, a trans-disciplinary research approach that includes scholars and other stakeholders such as residents, NPOs, and government officials to solve problems has been adopted to solve local environmental issues. This approach often faces difficulties because diverse actors have different standpoints and values. This paper clarifies how residents and scholars differ in their interests and objectives regarding the use of aquatic plants. It focuses on the overgrowth of aquatic plants in Lake Biwa in Shiga Prefecture, which has become a significant local environmental concern in recent years. The data in this paper are based on participant observation and interviews with people who collected aquatic plants that had washed up along the lakeshore and used them for cultivation in Otsu city between October 2019 and February 2022. This study reveals that while the scholars view the use of aquatic plants as a “nutrient cycle,” “environmental conservation,” or “environmental volunteer activity,” the residents used aquatic plants to meet the needs of themselves, their relatives, or neighbors. This result shows how residents’ need in the natural and social environment drives their behavior and demonstrates why scholars must investigate the needs of local people to address the problem of the local environment.

### Keywords

needs in everyday life, aquatic plants, volunteer, community, Lake Biwa, local people in trans-disciplinary studies

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## I Introduction

The overgrowth of aquatic plants in Lake Biwa, an issue that began in 1995, has become a significant local environmental concern, causing foul odors, impeding ship navigation, and demanding more of the prefecture government's budget to dispose of the plants. The overgrowth has also worsened the environmental sustainability of the region. One of the projects conducted by the Research Institute for Humanity and Nature (RIHN) organized a “research project to solve the overgrowth problem of aquatic plants in Lake Biwa (aquatic plant project)” in 2017. This aquatic plant project aimed to encourage local people to utilize aquatic plants as a resource, rather than merely disposing of them as waste. The author had belonged to the aquatic plant project as an anthropologist researcher at RIHN between September 2018 to March 2021. One of the fellow members of the aquatic plant project, Mr. Y, had regularly collected aquatic plants washed up on the lakeshore before he participated in the project. Other members of the aquatic plant project recognized his actions as an “environmental volunteer”, and some members of the project declared that with “more people like him, the more easily the overgrowth problem of aquatic plants would be settled.” The author also agreed with that assessment.

However, My interview with Mr. Y revealed another purpose to his activity. Rather than simply disposing of

the aquatic plants as waste, Mr. Y enjoyed distributing aquatic plants for use by people growing vegetables on a farm to sell for rent. Furthermore, the people were selling their harvests to their community members at a low price. Mr. Y did not tell any member of his aquatic plant project about his volunteer activities. This seemed strange to me, who asked him for an explanation. Mr. Y simply answered that he had told none of his coworkers about his donations simply because no one had asked him. Yet his behavior was consistent with the project's objective of the “usage of aquatic plants as a resource initiated by local people” and completed two simultaneous goals: that aquatic plants were removed from where they had been causing environmental problems, and that they were used to grow vegetables in everyday life in the community (Figure 1).

This paper clarifies the differences between the methods used by local people in the community and research project members in coping with the “increased aquatic plants,” keeping in mind the previously-mentioned questions that I had during my interview with Mr. Y. Once such differences are clarified, they may provide useful suggestions for exploring methods for trans-disciplinary research widely requested in solving local and global environmental problems (Tachimoto 2013: 193). Trans-disciplinary research is a method for solving problems involving researchers who work together across different academic fields and administrative agencies, especially in the case of environmental prob-

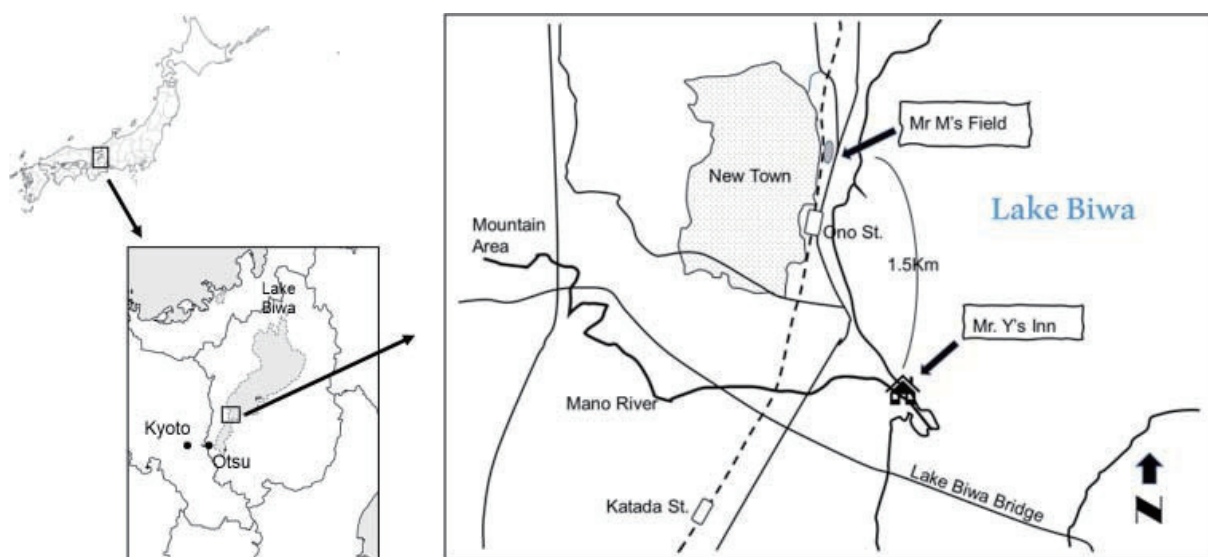


Figure 1. Location of Katata and Ono Areas

lems with complex causes and for developing a sustainable society. These researchers might hail from municipalities and the national government, citizen sectors such as NPOs and businesses, educational institutions, and other diverse actors. Trans-disciplinary research is considered effective and necessary for building relationships among widely differing actors to address local problems (Padmanabhan 2018: 3).

The action research focuses on incorporating people and their practices in society to solve a problem, with an emphasis placed on engaging people who are engrossed in volunteer activities and closest to the problem (Stringer 2014: 2). Cultural anthropologists suggest that such an approach (i.e., including people and practices in societies) is essential for the success of action research. Nevertheless, collaboration with actors whose positions and backgrounds vary from those of researchers can create various issues. This paper will shed light on what is produced by local actors by focusing on the practices conducted in their everyday lives in their communities. The interests, actions, and purposes of these everyday practices should contribute to a future trans-disciplinary research project that is necessary for addressing environmental issues but difficult to implement.

However, due to time constraints and regulations at my institution, it was impossible to conduct a survey that involved physical residence in a community member's home. The constraints of the COVID-19 pandemic were also a concern. Therefore, this research adopted participant observation, in-person interviews, and telephone and Facebook interviews. Fieldwork and interviews, along with a literature review, were intermittently conducted from October 2019 to January 2020.

## II Lake Biwa, Aquatic Plants, and Everyday Life

Lake Biwa is the largest freshwater lake in Shiga Prefecture in Japan, adjacent to Kyoto Prefecture. Lake Biwa occupies 670.4 square kilometers and has a maximum depth of 103 meters (Hiratsuka et al.). Lake Biwa supplies water to a wide slice of Shiga, Kyoto, Osaka, and Hyogo Prefectures in the Kinki region and is often referred to as the “water tank for the Kinki

region.” According to the Shiga Prefectural website, 14 million people in the Kinki region use water from Lake Biwa and its watershed (Shiga Prefecture).

A local community surrounding a lake has its own culture, referred to as “Satoumi culture (local lake culture)” in Japan. Satoumi culture is “an ecosystem developed around a lagoon that incorporates the living activities of humans, whereby the diverse use of the natural resources of the lagoon by humans develops a circular system” (Sano 2008: 31).

The Shiga prefectural government plays a central role in addressing aquatic plant problems. Although there does not exist data covering all the years of this persistent problem, the plants' habitation area is stated to have expanded from 5 square kilometers in 1984 to 40 in 2009. An aquatic plants task team has been operating in the prefectural government since 2010 (Biwakokankyobu Biwakoseisakuka 2013). In 2019, the team removed 5,518 tons of aquatic plants. The plants that the team removes are usually transported to the prefectural compost storage area in Tsuda, Omihachiman City, Shiga Prefecture, where they are fermented over two summers to become compost. The compost is then distributed to residents, primarily via free-delivery events (Figure 2). The residents are only consumers or receivers in this process and are not directly involved in collecting and transforming the aquatic plants into compost. In 2019, the prefectural government delivered aquatic-plant compost to 856 people through six free-delivery events, to four schools for testing free of charge, and to two businesses for research for a fee.



**Figure 2. Aquatic-plant compost free-delivery event**  
(Photo taken by the author, 16 March 2019)

The Shiga prefecture government also planned and held an aquatic-plant-cutting event that was open to the public (Asahi Newspaper 2006), where the participants cut the plants and the prefecture carried them to the compost yard. In this way, it was not the residents but the government that had taken initiative in resolving the issue. Kada states that, regarding the pollution problem of Lake Biwa, “Unless the pollution progresses to a level that directly threatens the actual living conditions, there is little opportunity for people to make the reality of the pollution their own affair” (Kada 1984: 238). Because the prefectural government had already addressed the issue of aquatic plants in some ways, people missed an opportunity to internalize this problem. Therefore, the government looked to promote residents’ autonomy and voluntary activities in resolving the issue by promoting the use of aquatic plants for compost use.

There are two causes for the overgrowth of aquatic plants at Lake Biwa: natural environmental factors and artificial factors. Regarding the natural environmental factors, the water levels of the lake have been recently affected by drought (Shigaken Biwakokankyobu Biwakoseisakuka 2013: I-5). Now, sunlight can easily reach the bottom of the lake and accelerate the growth of aquatic plants. However, the scientific mechanism causing the plants’ overgrowth is not fully understood. The second cause—artificial factors—includes the post-war industrialization of this area and the population growth of adjacent areas. Aquatic plants are no longer used for agricultural compost to the same extent as previously, due to the advent of chemical fertilizers and the reduction of fields and rice paddy areas, which have been replaced by residential sites.

### III Previous Research and Everyday Life

Most of the research concerning aquatic plant overgrowth in Lake Biwa stems from the natural sciences—ecology in particular. These sciences have focused on measuring the distribution and quantities of aquatic plants with remote sensing techniques (Yadav, Yoneda, Susaki, Tamura, Ishikawa, & Yamashiki 2017), examining the efficacy of reaping aquatic plants (Maruno &

Maruhata 2016), and detailing the deterioration of the local ecosystem by the development of the littoral zone (Nakanishi & Sekino 1996), as well as studying the history, society, and industry of aquatic plant usage (Hiratsuka, Yamamuro, & Ishitobi 2006).

From the perspective of environmental history, there has also been research conducted on aquatic plants in the early modern period. In one such study, Sano (2008) emphasized that, in terms of environmental conservation, it is important to consider the influences on the lake stemming from human activities as well as from biological sources.

Despite the existence of research on this topic from various viewpoints, there has been some social science research on the overgrowth problem of aquatic plants in present-day Lake Biwa by RIHN researchers (Okuda 2020; Kondo 2021). However, there are no studies that target local environmental initiatives that exist in the community. The reality and meaning of volunteering in the local community might not be properly recognized, as Kondo mentioned that the research and Y’s activities happened at the same time, but Y had begun volunteer activity before the aquatic project started (Kondo 2021).

To engage with people who are continuously engrossed in volunteer activities and who are closest to the problem (Stringer 2014: 2), I decided to focus on the activities of cleaning at the lakeshore and utilizing aquatic plants for the vegetable field.

With this social problem as a starting point, this paper focuses on “everyday life” activities to resolve environmental issues. Why focus on the everyday lives of ordinary citizens? Certeau (1987) finds that there can be creativity in everyday life activities, so reading books, talking, walking around the city, and cooking may produce additional creative benefits. This creativity might also be found in the everyday activities of people living around Lake Biwa and may be utilized in resolving the issue of aquatic plant overgrowth.

The research field for this paper was the area near the Katata and Ono Train Stations in Otsu City of Shiga Prefecture. This area merged with Otsu City in 1967 and became the prefectural office location. The area of Otsu City is 464.51 square kilometers, and its population numbered 340,973 as of 2019 (Otsu City). A new town

close to Ono Station was established in 1967, where there was previously a forest and field, and its current population is approximately 8,000.

#### IV Meeting the Needs of the Lakeshore by Cleaning

This section focuses on Mr. Y's activity of cleaning at the lakeshore. Mr. Y is in his 50s and runs a ten-room pet-friendly inn with his wife on the shore of Lake Biwa. Mr. Y was born and raised in the mountain area ten kilometers from his inn. When his relative decided to sell this inn, Mr. Y's father was attracted to its location in front of the shore. In 1989, he purchased this inn and made his son who had worked for a company run it.

Traditionally, the shore and the adjacent swamp were places to collect shellfish, aquatic plants, and carps, as well as places for children to play (Kada 1997: 74–77). By the 1970s, the residents only needed to clean the area once a year. For example, in the 1980s, the Manohama Swimming Beach Inn Association in Manohama and the cooperative organization of stores in the Katata area each conducted regularly cleaning activities. People removed aquatic plants that washed up on the lakeshore or sludge that flowed into rivers and waterways and laid them out across the bank. When the water plants dried up, farmers brought them to rice fields to be used as compost. The owner of a well-established store near Katata-Hama described this situation as “we used to manage beaches”<sup>1</sup>.

However, the Lake Biwa Comprehensive Development Program was initiated in 1972 as a national project for water resource development, agriculture promotion, and concrete embankment construction. This program made it impossible for people to collect the aquatic plants, and the vegetation was left on the rocky shoreline. In the summer, the anaerobic aquatic plants rotted and emitted a foul odor.

Since 2014, Mr. Y (Figure 3) began addressing the issues caused by the massive amounts of aquatic plants washing up on the shore. The dirtiness of rotting vegeta-



**Figure 3. Mr. Y collecting aquatic plants on the shoreline in front of his inn**

(Photo taken by the author, 15 November 2019)

tion prevented tourists from visiting his inn. Mr. Y began collecting the aquatic plants on the shore and had the city government dispose of them. When he first began, he recalled his sentiments as follows.

I started cleaning the beach with a sense of duty.  
Why should I work for this? Why me?

As Mr. Y continued to clean, he came to notice his feelings changing. At one point, he noted that the aquatic plants, which he had piled up into little mounds, had naturally dried up, and he realized that they could be used as compost for his field. After this, he left aquatic plants sitting outside for several days before using them in his field. This idea was sparked by his memory of his father who had collected mosses from the mountains, dried them to reduce their weight for transport, and then sold them to plant shops. He imitated his father's way of transporting aquatic plants to his field.

However, Mr. Y then noticed that the dried aquatic plants emitted foul odors from rotten small fish tangled in the plants, making the plants unsuitable for compost.

Participating in a garbage-gathering volunteer event held in Omihachiman-city in for segregating various types of garbage became a turning point. He removed fishing lines, cigarette butts, plastic bottles, and other debris from the aquatic plants. Removing the small fish

<sup>1</sup> Nakagawa revealed a new relationship between humans and nature that considers small scale and invisible workings as “practice,” even in annual cleanups (Nakagawa 2008).



**Figure 4. Dried aquatic plants piled up on the shore**

(Photo taken by Mr. Y, August 2015)

made the foul odors disappear<sup>2</sup>. At this point, he erected a sign on the piled-up aquatic plants (Figure 4) with his contact information that read, “Please take this as you like for your field,” and some people responded.

According to Mr. Y, in August 2015, the aquatic plants were most abundant. He loaded and reloaded his light pickup truck to capacity with 350-kilograms of aquatic plants every day, driving five to ten round trips from the shore to his field.

One day, Mr. Y noticed that the more beautiful the shore became, the more people visited the shore. He changed dramatically:

I started cleaning the beach with a sense of duty. I did not like to let the beach get dirty. I was complaining while cleaning, but as I cleaned, it became fun after all. Was not this a beautiful place here? I realized that I could keep it clean with only my own hands.

After that, Mr. Y increased his activities. Around 2016, he made tools for efficiently collecting aquatic plants and called them “Fork No. 1” and “Fork No. 2” (Figure 5). The base of Fork No. 1 is made of scrap metal taken from the beaches’ old diving platform and dismantled 10 years ago but kept by Mr. Y in his warehouse in case of future need. Mr. Y bought a unicycle and a fork, welded them on the base, and painted them

with rust preventive and paint. However, it was too heavy to use, so he made fork No. 2 using the rear car.

Sometime after Mr. Y started cleaning, he realized that most of the visitors to the beach during the summertime were families with children. Moreover, people walking on the beach were now helping him pick up trash they found on it. While nobody ever thanked Mr. Y, he was proud and appreciated the work he had done. Even though he had complained about his duties in the beginning, he noted the following:

Sometimes I want to boast that I am cleaning this place by myself. It is not good for me to be the only one to see and enjoy such wonderful scenery. After all, I want more people to come here and delight in this beach. I am always thinking about what I can do to ensure this. Recently, many people have been coming here to walk, and they pick up garbage while doing so.

In Mr. Y’s case, he realized the significance of his activity by seeing how it inspired other people to change their behavior, further benefitting their collective society.

Some people continue to support his activities; they gather litter and use the aquatic plants he collects. Mr. Y



**Figure 5. Mr. Y’s handmade tools for collecting aquatic plants: Fork 1 (right) and Fork 2 (left)**

(Photo taken by Mr. Y, August 2015)

<sup>2</sup> This garbage-gathering volunteer event was not organized by the government, but by an individual. Mr. Y received information about the event through Facebook. Having participated in many events, he does not clearly recall the organizer or the date of this event.

sensed that many people supported him—beachgoers, pedestrians, and farmers alike—thus, he could continue his voluntary work. While perceiving the “social existence value” (Fukino & Kataoka 2009: 19), in which one’s existence is recognized by its relationship to others, an individual is motivated to continue his or her activities.

The greatest number of water plants washed ashore in 2015; after this, their numbers gradually declined until their presence was nearly completely absent in February 2022. As a result, as of February 2022, local activities will now focus on trash pickup, and activities to dry water plants and deliver them to the rental farms have been suspended. Mr. Y describes this new situation as follows.

I first initiated my cleanup activities because I had a problem with the large number of aquatic plants that were being washed on the lakeshore and that were deteriorating the landscape of the lakeshore. I’m glad the aquatic plants aren’t being washed up on the lakeshore anymore. I wonder what I should do next.

Initially, Mr. Y began his activities out of a “need” to solve the overgrowth problem of aquatic plants in front of his inn, the presence of which was adversely affecting its operation. In the beginning, he carried out cleaning the shore in a spirit of self-sacrifice, but through his activity, he encountered various people in the community and developed relationships with them. He was also able to gain various kinds of a “sense of fulfillment,” which in turn inspired him to devise a better way to remove aquatic plants. This led him to take pride in his activities as “activities that only he could do.” However, it was not so much the connection with the community in which they lived, but rather his desires, that triggered his activities.

## V Meeting the Needs of Neighbors by Farming

This section describes people growing vegetables using aquatic plants at rental farms close to R New

Town in Kosai, Shiga Prefecture. R New Town is three kilometers from Mr. Y’s inn. It covers an area of 196.1 hectares; its first residents settled in 1974. There are 5,000 planned house units and a planned population of 20,000 (Ootsushin Website); R New Town is intended to be a commuter town for those who work in Kyoto and Osaka. Mr. S moved to R New Town at the age of 35 when the first subdivisions of land were sold in 1974. The area allotted per parcel was a spacious 330 square meters. In 1975, a year after Mr. S moved there, Mr. M moved to the area S in R New Town when he was 27 years old. The rural town’s population grew for years, and two elementary schools and a new train station were built sometime after 1980. Mr. M explained how he and his spouse came to start a new life there.

When I told some of my friends that I was moving to Kosai district, they all asked why I was moving out there. But this place is abundant in nature. I wanted to come here.

Mr. S was from Kyoto and worked as a freelance designer in Kyoto city. Mr. S rented a farm and started to grow vegetables with his wife, who hailed from a family with a big farm and was eager to live there. Influenced by his father, who was also a part-time farmer, Mr. M rented an abandoned plot of land after moving into R New Town and began to grow vegetables; however, he soon moved to a rental farm 16 or 17 years ago, which he rents to this day. Mr. M used to work as a kimono designer; Mr. M still occasionally takes on the tote bag and other work for remuneration after his retirement. Mr. M is a caring person and was the president of the local community eight years ago. Mr. S and Mr. M met at this rental farm.

This rental farm was founded after the death of a landowner who had been a farmer for generations and was divided into ten lots. The location is close to R New Town, and as soon as a lot becomes available, applicants are quick to rent it. However, it is not the landowner but Mr. G, who also lives in R New Town, who had looked for a tenant. Mr. G works in video production and he sometimes produces videos targeting this area, and this hobby has created connections with various people. He

passes on information about available slots in the rental farm to his acquaintances, and this information spreads rapidly through word of mouth. Mr. M stated the following.

The locals don't directly ask people to rent out their farmland. They initiate organizing festivals for local shrines and solicit donations from presidents of a neighborhood association. But they don't take the initiative to talk to people they don't know.

Before R New Town was built, agriculture was one of the major local industries, and there are still terraced rice fields in the neighborhood. Although the traditional community and the new town community of R New Town are quite different, it is clear that Mr. G plays a role to connect these different communities. Mr. M described Mr. G as "the boss of the rental farm."

They consumed harvests mainly with their families. The vegetables, grown without pesticides, were well-received by their grandchildren, who visited occasionally.

Moreover, gardening has become a hobby for the retirees in the town, who are working diligently to maintain their aging health.

Around 2015, the residents began selling vegetables harvested from the rental farms at the community hall in the S area. R New Town is now facing the problem of decreasing birth rates and an aging population; in contrast, compared to other locations, area S still has relatively strong neighborhood associations. That might be because of increased S area events (such as children's unions) that pander to the younger generation that has started to live there. Vegetables began to be sold in Area S about once a month to enrich the summer festival, and this activity became a huge success: vegetables proved so popular that they were sold out in about 30 minutes. This success led to regular vegetable sales at the community hall. In contrast, vegetable sales are held roughly once a month at the community center in R New Town, though vegetable sales before the New Year's holiday are popular. Mr. M said:

Generations of children who left for the R New

Town bring their family back home during New Year's holiday. The elderly want to cook and wait for them, but some households have no cars and cannot shop. So they come here to buy vegetables. Before New Year's, radishes sell well. We don't make a profit. We are doing this for the community.

Residents began selling vegetables to meet a local demand to enliven the summer festival, but after seeing how well the vegetables sold, they came to realize that they could also help strengthen community ties and aid residents who have difficulty attending supermarkets to buy food or commodities. Although Mr. S is not a resident of the S area, he established friendships with those in the S area by growing vegetables.

Mr. M has since withdrawn from vegetable sales and consumes vegetables only with his family. Currently, only a man living in the S area who rents a large piece of the vegetable garden and produces vegetables on a large scale sells vegetables at the community center.

In 2017, some users of the rental farm began utilizing aquatic plants in their fields. The impetus for this was coincidental. Mr. Y bought a fallow field visible from the rental farm several years before creating a petting place for pets brought by guests. Mr. S talked to Mr. Y, and the two decided to utilize the aquatic plants in the rental farm as feed. Of the ten people who occupy the rental farm, only five have any major use for the aquatic plants, and the unused portion was left piled up next to the farm for general use. They supplied Mr. Y's inn with harvest in return.

Local farmers devised several unique uses for aquatic plants in their rent field (Figure 6). The first is weed control. Traditionally Japanese farmers used to use rice straw or husks to prevent weeds from growing and to prevent the soles of their shoes from picking up mud when working in the passages between the field ridges. Now, such farmers have replaced straw and husks with aquatic plants. The second was as a soil fertilizer. Farmers used the aquatic plants for soil improvement on the farm, which was originally a rice paddy field and thus not suitable for cultivating vegetables. The third was moisture control. Aquatic plants could be placed around the stalks of taro to retain moisture and help





**Figure 6. Mr. M and his friend enjoy using aquatic plants in various ways in agriculture**

(Photo taken by the author, 9 October 2019)

prevent the soil from drying out. The fourth was as a substitution for soil to cover and stretch the white parts of leeks. Because of the area that used to be rice fields, the leeks do not have enough soil covering them, and the aquatic plants can reduce the amount of sunshine they are exposed to since they create a fluffy mount, which soil cannot. Thus, it is noteworthy that the farmers did not intend to use the plants as fertilizer. In each of the four methods, the aquatic plants were initially utilized for four unique purposes, and after several months, these aquatic plants became mixed with the soil and were converted into compost in the field. Mr. M said:

We do not have much soil here because it was a rice field here. That's why aquatic plants are useful.

Aquatic plants are soft, and I think it's better than soil for growing green radishes. Aquatic plants protect weeds and prevent them from becoming dirty with soil. We are thinking well, aren't we?

The farmers did not use aquatic plants immediately as compost, instead of using them for other purposes beforehand. In this way, they have developed a recursive method for achieving multiple uses of their resources. Mr. M said.

You are like a scholar and prefecture staff when you talk about the "compost" or "nutrient cycle" of aquatic plants in Lake Biwa, aren't you? We have

never thought like that. I just enjoy working at the rental farm. I just happen to have some water plants on hand, so I'm using them in a variety of creative ways. I wonder if I can do something good with them. We use them like this. If water plants are left alone, they naturally become compost.

Mr. M and his group fulfilled their own needs for entertainment and health after retirement, as well as fulfilling the needs of their families and community for delicious vegetables through farming. In particular, Mr. M and his group believed that these activities would help address the issues of the aging population and the weakening of relationships that had become a problem in the new town. They also needed to dispose of a large number of aquatic plants from Lake Biwa. These were very real and present needs that required being personally addressed. They obtained aquatic plants to solve the need of others, but they were ingenious in their use of them in their farming. Aquatic plants had a direct and positive effect on awnings, weed control, soil improvement, and vegetable harvests. The innate qualities of aquatic plants matched their needs in producing tasty vegetables, and the aquatic plants became embedded in the activities of this group, meeting the needs of its own, the community.

## VI Conclusion

In closing, this section will discuss how the described daily practices related to aquatic plants in local communities differ from those in research project practice. These daily practices will be summarized in terms of the behavior observed to date, but since the volunteer labor reward system planned by the project is not yet operational, the aquatic project will be analyzed in terms of the goals it aims to achieve.

First, the problems to be addressed by the project were different than those the residents addressed. Project participants were intended to be involved in the project as a matter of environmental concern. The project aims to encourage each people to volunteer for protecting the environment by a point reward system as an incentive. However, as we have seen, the actors in

everyday practice were not trying to solve an environmental problem but were simply responding to individual and empirically derived needs. They were acting out of experientially perceived needs of their natural and social environment. The beach in front of Mr. Y had no one to clean it, and there existed a need to clean up a large number of aquatic plants that had been washed up on the shore. The group of people in the rental farm did not feel indebted to Mr. Y for his bringing aquatic plants to them; rather, they asked him without hesitation: “We don’t have enough aquatic plants, please bring us more!” This is because aquatic plants were not viewed as a resource to be purchased, but instead as an abundant natural resource. Several members of the rental farm group also were aware of the weakened human relationships and aging-related concerns in their new town, and they saw the exchange of aquatic plants as a means of addressing these needs.

Second, there was a discrepancy between the attitudes of the actors in the separate groups. Project participants are expected to receive information and learn through study and workshop participation. On the other hand, people in daily practice focused on the functions of aquatic plants and made use of them through repeated trial and error and their ingenuity. In addition, they found enjoyment in taking the time and effort to be inventive, which is like the “pride” of those who perform minor subsistence pointed out by Matsui (Matsui 1998: 252–253). Matsui defined minor subsistence as a secondary subsistence activity that is carried out separately from the main subsistence activity in the unique natural environment of the area and that is passed on with passion and pride to each generation performing the activity.

(Those who engage in minor subsistence) have inherited knowledge from their predecessors, and have worked hard to make the results of minor subsistence as great as possible through their ingenuity. This is a source of pride for those who are doing minor subsistence. (Matsui 1998: 252–253)

The residents used waste and existing materials, traditional knowledge, and their childhood memories to

create a new cultural method. They are “Bricoleur” who make things with their own hands using the tool materials available (Levi-Strauss 1976: 22).

Third, there is a discrepancy in anticipated benefits. Project participants will recognize their contribution to environmental issues through the use of numbers and statistics since the amount of labor will be quantified. Participants are expected to engage in a variety of volunteer activities over a long period, which allows them to recognize the totality of their volunteer efforts. In addition, this arrangement boasts a high exchangeability of reward for volunteer labor. Volunteers can exchange the points they earn for greater convenience in their own lives. However, Bowles points out that while intrinsically motivated behavior produces “feelings of competence and self-determination,” incentives risk diminishing such intrinsic motivations (Bowles 2017: 91). Our observed actors in daily practice, on the other hand, recognized the benefits in the context of individual, on-the-spot relationships in which the aquatic plants were exchanged. The increase in the number of people picking up trash on the beach, the change in the landscape, the increase in the number of people visiting the shore with their families, the fact that the vegetables consistently sold out in a short time, and the smiles of those who ate vegetables were all details that motivated people to continue the practice.

Historical research also shows that there exists a need to promote the use of aquatic plants. (Sano 2015). Until the early modern period, people had mainly relied on grass from the fields and undergrowth from forests as sources of compost. After the urbanization of Kyoto, the field and mountain area of Shiga adjacent to Kyoto was excessively developed for energy and food production. This included cutting trees, digging out pine tree roots, double cropping, and alternating the use of land between grass fields and rice paddies or vegetable fields, which in turn led to both a decrease in available compost and an increase in the overall need for compost. Historical records show that aquatic plants were first utilized as fertilizer for rice fields in Lake Biwa in 1616. This custom did not begin to spread around Lake Biwa until the early nineteenth century. Since then, people have started to use aquatic plants much more commonly

(Sano 2015). This was so much so that when the soaring cost of fish fertilizer hit the production of cotton in Japan, the cotton field facing Nakaumi, which was had an abundance of aquatic plants, was not affected (Oka 1988). Thus, history shows us that the key to using a resource previously untapped is to create a need for it.

As we have seen above, the approach to the problem of aquatic plant overgrowth differed between those of the aquatic plant project and those of everyday practice. The project provided incentives for people who did not see the problem as their problem and encouraged them to participate in volunteer activities such as aquatic plant cutting. More emphasis was placed on the “labor” of the volunteers than on the function of the aquatic plants. On the other hand, in a real-world setting, water plants were treated to meet specific needs. The benefits of treating and using aquatic plants ranged from creating beautiful landscapes, increasing tourism, producing delicious vegetables, and creating pride in one’s ideas of how to utilize resources. Environmental concerns embed themselves in everyday life, culture, and living consciousness, as Kada mentioned (Kada 1997: 46).

Tanabe focused on the relationship-building aspects of people’s daily lives as they talk, think, and act (Tanabe 2002: 1). This paper also revealed that people have talked, thought, and acted as a group with relation to the aquatic plants on the beach and in the new town. Cleaning up the beach gave rise to the notions of “turning aquatic plants into resources” and of building a relationship with people who rented a vegetable farm for fun, notions that were different from the community Mr. Y originally possessed. Renting a vegetable farm for fun contributed not only to the consumption of aquatic plants but also to community building. People’s behavior in everyday life, according to Matsuda, involves recognizing the problems with which they are challenged and determining their attitudes toward those problems on a case-by-case basis (Matsuda 2009: 165).

From the results of the discussion in this paper, it is also possible to interpret why Mr. Y did not disclose his activities to other aquatic plant project members. The practices of Mr. Y and Mr. M and his friends are designed to meet the minute needs of the individual and the people involved. The practices include the enjoy-

ment and pride of one’s ingenuity. The functional aspect of meeting needs and the spiritual aspect of enjoyment and pride go hand in hand in the daily practice of the community. If the community felt that a particular project, such as the aquatic plant’s project, was not interested in these aspects of community practice, they might distance themselves from the project. The situation with Mr. Y was a testament to this.

As Konaka’s study on local currency indicates, a reward point system for volunteer activities may certainly function as a communication tool in those volunteers’ communities (Konaka 2005: 54). Certeau revealed that ordinary people have tactics to transform their daily lives into something worth living by adopting and accommodating a variety of interests and pleasures (Certeau 1987: 32). Such people who can implement new things into their everyday lives leave open the possibility that these new tools might also be utilized in other ways that their creators may not have anticipated.

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