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PRESERVATION OF WATER RESOURCES PUBLIC PARTICIPATION WATER CULTURE GROUNDWATER

OCHRONA ZASOBÓW WODNYCH POPRZEZ WYKORZYSTANIE STRATEGICZNEGO UCZESTNICTWA SPOŁECZEŃSTWA

1. Purpose

The city of Kumamoto, with 680,000 citizens, has long provided high-quality spring water to all the households of Kumamoto for use as the daily water supply, making the city a truly rare example in the world. Within the city itself, numerous natural fountains and a rich history surrounding our spring water can be found, along with our traditional cuisine and cultural events, thus creating our own “water culture.” As in the overall Japanese culture, Kumamoto City is a place where water greatly affects our lifestyle as well as local culture.

However, the steady losses of ground and spring water, as well as the deterioration of our water quality, are our greatest concerns. Furthermore, our lifestyle has changed since the systems of water supply and sewerage were installed. As a result, the community network is not as strong as before, which leads to the diminishment of our traditional culture, which has revolved around water. The relationship between “water” and our community, as well as the relationship between water and individuals, has gradually but significantly changed.

Given the above, we believe it is critically important for each individual to acknowledge that our water can be one part of our many cultural aspects and think about water from the viewpoint of our local culture. Consequently, the Kumamoto City government, in October 2006, set forth a “spring water declaration” entitled “Kumamoto Water and Life.” Under this declaration, individuals and members of the business community have cooperated with the city government in maintaining the efforts toward water conservation, such as individual household conservation and groundwater recharge, as well as in preserving the history, traditional events, cuisine and arts that revolve around water. More specifically, we have put forth a comprehensive effort on behalf of the three key projects:

1. Information services via a new guidebook as well as a website in regard to our water and culture;
2. Communication projects to promote awareness and experience in water-related culture among citizens and business people;
3. Preserving our local culture, which centers on water, and developing human resources that help promote our local culture for inheritance by the succeeding generations.

Each of these projects enables sustainable development focused on water. Moreover, our efforts encourage citizens to be aware of and care about water resources, promote water conservation and, ultimately, work on sustainable development in our local communities.

2. Outline of Our Activities

2.1. Research of Groundwater Systems

Groundwater research was initiated by our citizens who spearheaded the movement of groundwater conservation. They began their movement by expressing an objection to condominium construction in areas close to water resources. Their actions encouraged the Kumamoto City Council to pass the “Declaration of Groundwater Conservation” in March 1976. The following year, the Kumamoto City Government issued the “Groundwater Conservation Ordinance” and organized a section that would work on behalf of groundwater conservation. In cooperation with the Kumamoto Prefectural Government and professionals, investigations and studies of the groundwater system were conducted and a groundwater observation system was established. As the result of several years’ research, it was found that Mt. Aso and the traditional rice paddy fields, which were developed 400 years ago, were the main contributors to our groundwater production.

2.2. Treated Wastewater Reuse for Rice Irrigation

Experiments were performed with regard to the application of treated water for reuse. The objective of the research was to evaluate the optimal concentration of treated wastewater and fertilizer applications for rice cultivation. The combined nitrogen content of the wastewater and fertilizer is crucial to success in rice cultivation, as excessive fertilization is known to cause low pest resistance, ripening lesion, the lodging (i.e., falling down) of the plant and poor crop quality. The effluent from a treatment plant was introduced to the rice field in order to cultivate rice under different wastewater concentrations and fertilizer applications.

The rice crop grown with treated wastewater and regular fertilizer applications resulted in crop lodging, and this was probably due to excess nitrogen. Contrastingly, the rice crop grown with treated wastewater but no added fertilizer was found to have sufficient growth and harvest. However, the use of treated wastewater as the only source of nitrogen was found to be inadequate, given the eventual decline in soil fertility and the uneven distributions of nitrogen caused by the lack of uniform water flow and associated stagnation. To address these issues, the treated wastewater was blended with an equal volume of freshwater, with additional fertilizer. The resulting rice crop was satisfactory when 50% to 70% less basal fertilizer was applied to the crop.

The experiments demonstrated that successful rice cultivation could be achieved with treated wastewater applications, thereby reducing the volume of freshwater and limiting the application of fertilizer.

2.3. Groundwater Recharge Project Utilizing Existent Rice Fields

We, in cooperation with related organizations and rice farmers around the upstream area, have been working on our groundwater recharge project. One reason for groundwater loss is the reduction of rice fields due to the adjustment of rice production. Kumamoto City established the “Groundwater Conservation Agreement” and set up a fund to subsidize rice farmers who cooperate in conservation projects. As part of the agreement, Kumamoto City requires that rice farmers allow water to flow into the fields that are no longer used for rice cultivation. More than 400 rice farmers participated in the agreement, and it is now estimated that the city recharges more than 10 million cubic meters of groundwater per year. Additionally, the city promotes awareness of the need to maintain those traditional rice fields, and promotes understanding among rice farmers in the upstream and downstream areas. Further, there is an effort to promote the concept of “local production for local consumption” among those farmers. As part of an educational program, we organized a study tour for parents and children, through which they could participate in a rice harvest with farmers in the upstream area and learn about local history, including groundwater production. Moreover, we provide parents and children in the upstream area with opportunities to visit the city and observe spring resources and fountains. We promote local products from the upstream to be used for school meals in the city. Last but not least, Kumamoto City established the “Forestation Agreement” for municipalities in the upstream areas and has been working on a 630-hectare forestation project, as a gift from our ancestors.

2.4. Citizens’ Involvement in Water Conservation

The Water Conservation project is carried out by citizens’ organizations. Kumamoto City, in collaboration with the citizens, established a committee to promote water conservation and partnership in 2005. Thus the citizens, being blessed with abundant natural spring water, play a key role in promoting water conservancy movements among citizens. Every July there is a water conservation experiment in which each individual participates in water conservation projects on a daily basis, aiming for a 10% reduction

of water consumption. Each day during the month, the city announces the quantity of water consumed per citizen. Further, the citizens' committee established a "water conservancy club" in collaboration with individuals, organizations and business owners. The committee also provides information and examples of water conservation.

2.5. School Education and Lifelong Education

The city organizes educational projects with regard to water resources and culture. To promote environmental education for young children, we have published and delivered brochures to elementary schools and encouraged each school to work on education about water. The city has also installed a rainwater collection tank at each elementary school and regularly promotes education regarding water conservation and recycling. As for lifelong education projects, we organized a seminar for our citizens so that they can learn about water resources and water-related culture. The seminar is popular throughout the community.

2.6. „Water Culture” Guidebook and Website

The guidebook and website are educational communication tools for the preservation of a culture that revolves around water. These educational materials explain the history of our spring water, traditional events, cuisine, customs and art, all of which are closely associated with water. We have published a guidebook entitled "Kumamoto Water & Life" and routinely promote awareness of water culture. As for the website, please refer to the following, which provides information about water culture, the current status of water resources and citizens' activities:

<http://www.kumamoto-waterlife.jp/>

2.7. Kumamoto Water Heritage

Kumamoto City designates tangible and intangible water-related assets that we should pass on to the next generation as the "Kumamoto water heritage." This is part of our educational communication projects with citizens' involvement. Our citizens and local communities send suggestions and recommendations of which sites and traditional events should be designated to the city. Some spring fountains and local events that revolve around water are already designated and we have issued a Water Heritage Certificate and created signboards at these sites. We have organized a tour to visit these heritage sites and provide seminars and lectures for our citizens.

A traditional event, called "Wakamizu," is held on New Year's Day. Participants drink spring water in the early morning, since it is believed that all the evil spirits will disappear if you drink a cup of spring water drawn from a fountain in the early morning on that day.

2.8. Kumamoto Water Examination

The Kumamoto Water Examination was launched in 2008 to help our citizens become more aware of our water resources and water-related culture. This is also part of the educational communication program designed to preserve water-related culture through public participation. It will be an official examination containing interesting quizzes in which everyone can enjoy learning about water. Designed for all generations, this examination deals with world issues as well as local issues related to water. The examination is intended to motivate the citizens to become knowledgeable about water and the environment during this crucial time in the era of environmental conservation. This program will also allow participants to interact with their families and community members regarding these issues.

2.9. The Eco-partner Kumamoto Project

This project focuses on public involvement. We created an alliance called "Eco-partner Kumamoto," which is comprised of our citizens, private sectors and the city government. A working group of Eco-partner Kumamoto alliance organizes groundwater study tours for citizens' organizations and business owners, as well as related meetings. Additionally, the working group publishes information booklets that explain our groundwater recharge projects, which utilize paddy fields and introduce local cultural aspects related to water. The books emphasize the importance of maintaining our traditional paddy fields as resources.

2.10. Promotion of Groundwater as Bottled Water

Bottled water, derived from the groundwater resources of the area, was manufactured in order to generate public awareness about the use of groundwater and then promoted throughout the country in 2006.

Kumamoto recognizes this PET bottle as official water, distributed at international conferences, etc., held in the city, and sells it at a kiosk in Kumamoto Station as well as the expressway and antenna shops in Tokyo.

2.11. Revision of Kumamoto City groundwater Conservation Ordinance

Kumamoto City's groundwater conservation ordinance was completely revised in December 2007.

The revised ordinance consisted of comprehensive regulations that included the volume and quality of water as well as some unique regulations not found in other municipalities across the country. For example, in order to promote the infiltration of rainwater in a housing lot, etc., it requires the installation of rainwater infiltration facilities.

Moreover, the obligations to make a reasonable effort to recharge groundwater and systematically implement water conservation measures have been imposed on those who collect water on a large scale. Additionally, reference has been made regarding measures to reduce chemicals such as nitrate nitrogen.

2.12. Integral Valley Management of Groundwater

Fourteen municipalities that shared groundwater in Kumamoto Prefecture and the region in September 2009 settled on the "Kumamoto regional groundwater synthesis maintenance management plan" (the plan covers the period from 2009 to 2024), and began the execution and examination of various measures based on the first stage of the plan (from 2010 to 2014).

One notable approach provided in the action plan was to initiate the mechanism that uniformly managed groundwater, aiming to establish the continuous water circulation of groundwater.

Previously, the groundwater conservation business was carried out separately in each municipality and was not considered an activity to be shared among neighboring municipalities. Moreover, the coordination between the groundwater conservation businesses conducted by neighboring municipalities was inadequate. Then, an organization specializing in groundwater control for the entire region was established, and a system of management for the continued use of groundwater was constructed under the concept, "The groundwater shared by a region is defended by the entire region."

Challenges such as the need to secure the details of the system for management, organization, the field of activity and capitalization are now being arranged.

3. Effects

1. All the projects mentioned above enable our citizens to realize the significance of Kumamoto's water and life, deepen their understanding and preserve the shared asset of abundant spring water through their own efforts. Our projects also encourage citizens to initiate and create new phases of culture.
2. The study tour of Kumamoto's Water Heritage sites and seminars related to "water and life" and "water culture" have become popular among our citizens. Some spring fountains have been designated as heritage sites, and have thus motivated people in the community to get involved in community developments that revolve around our water.
3. The "Water Culture" guidebook has earned a high reputation among the citizens. Learning about Kumamoto spring water and its culture further develops one's love and care for one's hometown, and love and care for one's hometown also leads to greater concern for water conservation.
4. The groundwater recharge project utilizing traditional paddy fields is respected by professionals in various fields. We have received many visitors to study this project, and the media coverage has been frequent. Dr. Tsutomu Ichikawa, of Kyushu Tokai

University, reported that some spring fountains are regaining water after suffering severe losses of water quantity.

5. Kumamoto City was recognized for its long-term groundwater conservation activity, and in 2007 it won the tenth Japanese Water Grand Prize.

The Water Grand Prize is awarded to the Japanese group and individual that works to ensure the healthy circulation of the water system.

Kumamoto City was chosen for the highest prize from among 145 applicants from all of Japan.

