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Practical Research on the Dual River Leaders System in the Context of Watershed Governance: A case study of Guiyang city, Guizhou province

Xuan HUANG[1], Yuyu HU[1]& Emako MIYOSHI[1]

Abstract

This study focuses on the Dual River Leaders System, which can improve the water environment and combat the increasing basin pollution in China. It was born in the reform of the government's internal administrative system, and developed during the process of seeking cooperation between government and non-government. In particular, this study investigates the Dual River Leaders System in Guiyang City, Guizhou Province, where it was implemented in 2010, ahead of the rest of the country. We examined the changes over time through participatory survey methods and participation in practice as an environmental volunteer. This study discusses not only the improvement of water pollution but also the watershed governance of multi-subjects from the perspective of the local community. Moreover, we present new insights that challenge the inherent structure of China's environmental governance. We found that the Governmental River Leader System and the Non-Governmental River Leader System play important roles and have a complementary relationship. In addition, the Non-governmental River Leader System centers on the Civilian River Leaders who composed of intellectuals. In the process of continuous exploration, selecting suitable individuals from local village residents to serve as Civilian Environmental Supervisors has not only helped resolve regional conflicts but has also increased the environmental awareness of local residents. Thus gradually established a Watershed Governance Mode. The Non-Governmental River Leader System considers the relationship between nature and human beings and creates interactions between individuals that change the environmental consciousness and behavioral habits of local residents, while also fundamentally improving pollution. Furthermore, it tries to protect the environment of the local river basin by promoting cooperation among nongovernmental entities. Therefore, the Dual River Leaders System is not imitated Japan, Europe, and the United States, as a means of civilian participation, but it can empower local residents to participate in Watershed Governance, and create a new kind of "Chinese-style civilian participation." In addition, the Dual River Leaders System

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[1]Graduate School of Human Sciences, Osaka University, 1-2,Yamadaoka, Suita, Osaka 565-0871, Japan

has played a critical role in civic behavior. The findings of this study suggest that its implementation in Guiyang City is favorable for the development of Dual River Leaders Systems throughout China.

Key words: Watershed Governance; Dual River Leaders System; Non-Governmental Participation

1. Introduction

Since the introduction of China's reform and opening-up policies in 1978, rapid industrialization and urbanization increased the burden on the natural environment. Consequently, serious water pollution has spread countrywide. The current administration has unprecedentedly encouraged the "construction of an ecological civilization," promoting it as a slogan, and has adopted the stance of radical solutions to environmental problems including water pollution, which has become increasingly problematic.

Although water pollution in China has been the subject of various studies, an attempt to actually solve the issue requires identifying the structural issues of governance related to water pollution in China from the perspective of the country's unique political, economic, and social dimensions. For example, in his discussion on China's water environmental governance theory, Otsuka (2015) notes the need to pay attention to the political, economic, and social structures surrounding the watershed, which differ from those in Japan and other developed countries. Further, Chiashi (2015) argues that the structural, economic, political, and social factors surrounding contemporary China underlie the country's environmental problems, including the political economy surrounding the regional economic zones formed in the process of economic growth and their relationship with the global economy. Chiashi further notes the need for a discussion based on field research. However, according to Fu (2016), these characteristics have not yet been fully examined. Although the Chinese government is aware that China's environmental problems including water pollution are due to prioritizing economic growth, it consistently adopts such policies, and the inherent structure of ignoring environmental improvement despite developing environmental laws has been an obstacle.

China's "socialist market economy" greatly influences environmental issues and is generally understood to be "politically socialist and economically capitalist." However, this dichotomized understanding does not sufficiently indicate the characteristics of China's market economy. In other words, China's current market economy is based on the Communist Party's control of both politics and the economy, leading to aspects that differ significantly from the market economies of other capitalist countries (Fu, 2016).

On the other hand, civil society, communities, and non-governmental organizations (NGOs)

are key to resolving environmental problems such as water pollution in China as in Japan, Europe, and the United States, and emerging discussions are emphasizing collaboration between them (Wang, J., 2011; Hu, 2012; Zhu, 2015; Ma, 2015; Wang & Wu, 2017; Liu, 2018). However, these issues are difficult to solve by imitating developed countries, because as Fu (2016) mentions, civil society and communities in China have a unique structure. According to Fu (2016), Chinese civil society and communities have yet to establish systems and behaviors to participate in autonomously solving environmental issues such as water pollution. In other words, Chinese civil society and communities do not recognize the importance of environmental issues based on natural resources for public interest, but focus on the interests of their own lives as a standard. Therefore, citizen lifestyles are oriented toward affluence, consistent with the party and government's priority of economic growth. Moreover, the current strong dependence on the party and government emphasizes the need to change the governance structure for environmental issues.

However, although Fu's argument captures the peculiarities of Chinese civil society and communities, it refers to the governance system comprising the government, market, and community, which are the basic concepts in the discussion of environmental governance in institutional environmental economics. In other words, since generalizations are made for each subject, it is difficult to say that they reflect the complex realities on the ground. There is also the increasing possibility that the finer details of individual and dynamic changes as well as the mutual influences occurring in each region are being overlooked.

Therefore, this research focuses on the case of Guiyang City, Guizhou Province, the first city in the country to implement the Dual River Leaders System[1)] in 2010. This is a system of collaboration with the non-governmental sector in the River Leaders System (details follow) created by the administrative system reform within the government. In the analysis, the peculiarities of China as pointed out in previous studies are kept in mind. Specifically, the changes over time are analyzed through a participatory survey, and one of the authors participated in the implementation work as an environmental volunteer. Based on this, the paper discusses the situation from a local community perspective—not only to improve the water pollution situation, but also to promote the reform of local residents' environmental awareness build cooperation between the entire community—and attempts to present new knowledge to overcome the inherent "structure" of environmental governance in China. In doing so, the paper clarifies its difference in position from previous research (Luo, 2018; Leng, 2019) on the Dual River Leaders System and its case in the Guizhou Province, focusing on the dynamics and potential of civil society and the community through trial and error.

To achieve sustainable growth, the Chinese government systematically promoted laws, constructed water treatment facilities, and positioned environmental measures related to the governance of water pollution as an important issue, focusing on the recently promoted River Leaders System. Under the River Leaders System, River Leaders are assigned from the

key leadership cadres from all levels of the party organization and government to improve water governance. These River Leaders are responsible for comprehensive water-related environment projects to guide the maintenance and protection of the rivers and lakes in their charge and to ensure reliable implementation of water environment governance. The River Leaders System was first implemented in 2003 in Xing County, Huzhou City, Zhejiang Province. Subsequently, the local government of Guizhou Province first introduced the River Leaders System in 2009. Many rivers in Guiyang City in Guizhou Province, the subject of this study, were polluted, emitted foul odors, and did not meet the national Environmental Quality IV Standards for water (water standards for industrial water). The 118 km-long "Mother River" Nanming is used for drinking water for citizens, and the riverside had been a place of relaxation. However, since the 1970s, its water became polluted and emitted a strange odor, which was at its worst in the 1990s. The complex karst topography and effect of the urban-rural flow of people rendered it difficult to improve the watershed environment, and the local Guiyang City government recognized the problems a single government would face in understanding and improving the condition of the watershed environment. However, recent years have seen many environmental disputes between the government and non-governmental sectors in the region, and there is a need to build trust between them.

Against this background and as mentioned, in 2010, the Guiyang City government introduced the non-governmental sector to the River Leaders System, pioneering the implementation of the Dual River Leaders System, which includes both Governmental River Leaders and Civilian River Leaders that are not affiliated with the government or other public organizations. This was initially implemented for the Nanming River and then on a wider scale. This is one of the reform measures. It targets the largest watershed and largest population in Guizhou's ecological civilization reform. Currently, based on the Guiyang City trial, local governments in Zhejiang, Jiangxi, Hunan, Jiangsu, Sichuan, Yunnan, and so on are also implementing trials of the Dual River Leaders System. Since Guizhou is not an economically and politically advanced region in China, dynamically examining the implementation details of the Dual River Leaders System and its effects from a regional perspective would provide valuable insights including a comparison with other regions. On the other hand, although it has been ten years since its first trial in Guizhou Province, existing research highlights the importance of non-governmental sector participation, but only from the perspective of government cooperation. No studies have thus far examined the regional impact.

Therefore, the first author of this study conducted practical research while participating in the work of Civilian River Leaders as an environmental volunteer from 2018 to comprehensively understand the practices of the system. In particular, he was involved in the Civilian River Leaders system through field surveys and remote web research using action research methods. This study also deepens the discussion of the formation and implementation

of the Dual River Leaders System, emphasizing the impact of Civilian River Leaders on local communities, by organizing public and internal documents, integrating participant observation, conducting interview surveys, and through the author's practical experience.

2. Changes in the Dual River Leaders System and Analysis of Previous Research

2.1. Overview of the Implementation of the Dual River Leaders System and Case Study Status

China has many departments related to water administration[2)] and a long history of unsuccessful cooperation between them. The status of watershed governance is well known, and people colloquially refer to it as the "Nine Dragons of Water"[3)] (nobody is responsible).

In this context, in 2003, Changxing County, Huzhou City, Zhejiang Province became the first in the country to implement the River Leaders System to improve the Nine Dragons of Water situation and serious water pollution (Guangming Daily Survey Group,2018). Although this was the first form in which the River Leaders System was implemented in China, the actual work proceeded slowly because of the lack of clarity regarding the responsibility for river management in many sectors such as environmental protection and water use. The River Leaders System was subsequently introduced in August that year when Wuxi City in Jiangsu Province faced a drinking water crisis after the water supply source was contaminated by an outbreak of blue-green algae in 2007. For the first time, the concept was institutionalized and implemented on a large scale. Since 2009, the local governments of Guizhou and other provinces have introduced the River Leaders System (Otsuka, 2010; Asano, et al., 2011; Liu, 2016).

Although implementing the River Leaders System has had some success in improving water quality, its effect on the water pollution problem has been limited, because the causes thereof are complex and closely related to the livelihoods and production activities of people living around the basin. Reviewing the actions taken by the governmental River Leaders shows they have converged on cleaning polluted water through building more facilities, improving laws and using technologies, or punishing companies that illegally emit water. In other words, it has been almost impossible to effectively control local behavior. In response, there have been calls for greater non-governmental participation based on arguments that "the River Leaders System lacks the power of the non-governmental sector" and that "despite China's strong government, citizens, civil society, and communities need to be emphasized to solve environmental problems such as water pollution" (Wang, J., 2011; Hu, 2012; Zhu,2015; Ma,2015; Wang & Wu, 2017; Liu,2018).

Consequently, in 2010, Guiyang City, Guizhou Province reformed its existing River Leaders System and implemented the Dual River Leaders System ahead of the rest of the country, and the trial commenced. Under the Dual River Leaders System, the Governmental and Civilian River Leaders Systems were launched simultaneously, followed by gradual development and

linkage.

The first author has volunteered in work conducted by the Civilian River Leaders since September 2018. Table 1 provides an overview of the historical background of the Dual River Leaders System from 2010 when it was launched, to 2018, and summarizes the historical background based on prior literature, public documents, and internal documents obtained by the first author. In this context, Civilian River Leaders, civilian environmental supervisors, regional Civilian River Leaders, and experts were newly named and mobilized at the watershed-level under the leadership of H—appointed as the General Civilian River Leader of Guiyang City and Civilian River Leader of the Nanming River. Furthermore, the implementation of these systems would impact local businesses and residents. The details are elaborated later.

Table 1.

Background of the Establishment of the Dual River Leaders System in Guiyang City Guizhou Province (until 2018)

<table>
<tr><th>Year</th><th>Governmental River Leaders System</th><th>Civilian River Leaders System</th></tr>
<tr><td>2010</td><td colspan="2">Based on the River Leaders System, the Dual River Leaders System was implemented before the rest of the country and trial work carried out.</td></tr>
<tr><td rowspan="2">2011</td><td rowspan="2">River Leaders System implemented in Nanming River in Guiyang City</td><td>H was appointed as the General Civilian River Leader of Guiyang City and the Civilian River Leader of Nanming River</td></tr>
<tr><td rowspan="3">Mobilization of civilian volunteers, the government called for integrated water resources management, and a series of Civilian River Leaders appointed and established in each basin</td></tr>
<tr><td>2012</td><td>Received permission to implement the River Leaders System in Wujiang and Qingshui River</td></tr>
<tr><td>2013</td><td>Implementation of the River Leaders System officially started in 10 districts in the Chishui River basin</td></tr>
<tr><td>2014</td><td rowspan="2">Guizhou Province was designated by the center as one of the National Ecological Civilization Construction pilot zones. River Leaders System implemented in eight major river basins in the province</td><td rowspan="2">Civilian River Leaders organize coordinated surveys and meetings such as roundtables, briefings, expert meetings, etc., and mobilize civilian environmental supervisors for local ordinary villagers and enterprises to participate in the survey and conservation of the water environment.</td></tr>
<tr><td>2015</td></tr>
<tr><td colspan="2"></td><td>A suitable person is appointed from among the Civilian River Leaders in the basin at the regional level to take charge of the region.</td></tr>
</table>

2016	River Leaders System incorporated into local regulations for the first time in Guizhou Province (Guizhou Province Water Resources Conservation Regulations)	All 98 rivers in Guiyang City have Civilian River Leaders.
	Project began to be promoted on a larger scale after the central government released the Comment on the Overall Promotion of the River Leaders System	Six expert Civilian River Leaders in the fields of water treatment, chemistry, law, etc. related to the environment
2017	The Guizhou Provincial Peoples Government issued the "General Plan for the Overall Promotion of the River Leaders System in Guizhou Province" (General Office of Guizhou Provincial Committee of CPC, General Office of Guizhou Provincial People's Government [2017] No. 22) to set up provincial-level River Leaders for 33 rivers (lakes) in the province and extensively promote the River Leaders System in all provinces.	Consultations held under the Civilian River Leaders system with government departments or enterprises in each area of Guiyang to clarify mutual rights, responsibilities, and obligations
January 2018	For the first time, the River Leaders System was included in the People's Republic of China's Law on Water Pollution Prevention and Control at the central level, strengthening the responsibility of local governments such as Guiyang City for water pollution.	

First author's draft based on public documents, internal documents, and previous studies (Luo 2018; Leng 2019)

2.2. Issues in Previous Research and Perspectives of This Study

This section summarizes the findings of previous research on the Dual River Leaders System, and based on it, clarifies the perspective of this study for the development of further research.

Trends regarding the institutional innovation of environmental improvement in China include the marketization and diversification of participating entities. In this context, the Dual River Leaders System, a diversified governing body that promotes citizen participation rather than a single-government body, has been positioned as new development and innovation based on the administrative reform of the River Leaders System (Xu, 2014; Hou, 2017). Further, the implementation of the Dual River Leaders System will decrease the government's labor, time, and other costs; improve efficiency; and guarantee the public's right to information and participation. Tian et al. (2018) focus on Guizhou, Jiangsu, Zhejiang, Hunan, Sichuan, and Yunnan, which promoted the Dual River Leaders System while actively using non-governmental environmental protection organizations and analyzed the implementation of the system in these provinces. The results showed that the traditional government-led environmental management systems could not adapt to increasingly complex environmental problems, and that local governments should promote and optimize cooperation with social organizations in water improvement, which is the root of sustainable development. Further,

Li (2019) examined Yongzhou City in Hunan Province, which implemented the Dual River Leaders System in 2017, as a case study to analyze the characteristics and operational logic of the system from a governance perspective. The author suggests that the root of environmental governance lies in citizen participation and that the government should provide a participatory function in watershed governance and give equal rights to citizens. In addition, the power of the private sector must be fully employed to promote the construction of a governance network for the whole of society including the government, social organizations, and citizens. However, these previous studies focus on the Dual River Leaders System itself, and even when investigating the regions where the system has been implemented, most are examined from a governmental perspective. Hence, as Tian et al. (2018) mention, the institutional content and implementation plans, work methods, and measures in the Dual River Leaders System are similar in each region. The only differences are in the specific methods and degree of cooperation.

Two previous studies on the Dual River Leaders System in Guiyang City, Guizhou Province, similar to this study, deserve particular attention. The first is Luo (2018), an administrative management field study at Guizhou University that investigates institutional innovation from an ecological communities perspective[4)]. It emphasizes cooperation between organizations in ecological communities comprising individuals with the common goal of environmental conservation, which will lead to achieving the joint growth of all parties. Luo argues that under the Dual River Leaders System, the Governmental River Leaders System, a one-dimensional entity, is supplemented by the Civilian River Leaders system, an ecological community. They share the common goal of water environmental conservation. The study organizes and analyzes the institutional innovation of the Dual River Leaders System from three aspects: the goals, structure, and an action mechanism regarding the formation of ecological communities. First, the Dual River Leaders System clarifies the goal of the sustainable development and use of the water ecosystem. The shift from the original Nine Dragons (nobody is responsible) water management system, where no government agency acted individually, to the Dual River Leaders System strengthened mutual cooperation, united authority and responsibility, and actively supported non-governmental participation. It also introduced new structural relationships formed through their introduction, such as Civilian River Leaders, volunteers, and communities. Further, the study focuses on the significance of cooperation between the government and civilian river governance systems through activities and interviews referring to the development stage of the action mechanism over the past two years from 2016 to January 2018. It specifically emphasizes the importance of cooperation between the government and society, which should work together and help each other in implementing the tasks under watershed governance. To conclude, the study states there is a need to improve the legislation around the Dual River Leaders System, raise the environmental awareness of the government and non-governmental sector, share information,

and build cooperative governance for further improvement.

Second, Leng (2019) examines the impact of the Dual River Leaders System based on the Guiyang City case. For example, the establishment of a five-level Governmental River Management system (provincial, municipal, county, township, and village) promoted cooperation among government departments; increased funding for watershed governance; improved government supervision and management capabilities; and formed the basis for a multidimensional, coordinated watershed governance system through the mobilization of non-government sector supervisors and cleaners. However, though the water quality of rivers in Guiyang City is clearly improving, substantial practical difficulties have been observed in the implementation of the Dual River Leaders System. As such, the in-depth study on resource alignment and mutual coordination between the government and non-governmental sectors for the implementation of the Dual River Leaders System suggests it will not lead to the large-scale development of watershed governance practices. Specifically, the legal framework for the Dual River Leaders System is insufficient to ensure the steady improvement of the effectiveness of watershed governance, and the administrative division management system tends to neglect cross-region pollution problems.

These studies discuss the importance of the Dual River Leaders System and direction of institutional innovation in the future, and mention the advantages of the system based on case studies. Further, the concept of government-society cooperation was established in line with the situation in China, and more specific measures were proposed based thereon. Although these findings are important, both the theoretical and practical research focuses on government actions and how they should address issues. While recognizing the importance of the non-governmental sector, they do not discuss the surrounding circumstances or how this sector should address the issues. Luo (2018) repeatedly emphasizes the importance of non-governmental sector participation, noting that the ecological community includes not just the Government and Civilian River Leaders, but also volunteers and communities. However, the focus of the study is on the two Dual River Leaders Systems, and the analysis is primarily from the government perspective. Thus, Luo does not address how to mobilize actors external to the Dual River Leaders System to participate in watershed governance. As the results of this research further clarify, implementing the Dual River Leaders System in Guiyang City promoted the participation of the internal system and wider non-governmental sector. Leng's (2019) study was also conducted from the government perspective, and no studies have specifically focused on the non-governmental sector.

As mentioned, existing research on the Dual River Leaders System is based on specific cases, but studies on the formation and implementation of the Civilian River Leaders System is scant. However, water pollution is the deterioration of the water environment due to human activities, and everyone is responsible. This is because each entity to varying extents and either directly or indirectly has some impact on the surrounding water environment. On

the other hand, note also that human actors have the ability to restore and protect the water environment, and it is important to extract their power to do so and to seek a direction that encourages governments and a wider range of private stakeholders to work together to fulfill their responsibilities regarding the water environment. Therefore, based on this relationship between humans and nature, it is important to examine the individual activities of humans involved in watershed governance and their changes in addition to the institutional and governmental aspects. In other words, to comprehensively understand the practical aspects of the Dual River Leaders System born from innovations to the existing River Leaders System, it is important to study the Civilian River Leaders System itself, which is not as systemically constrained but needs reform, and to examine the capabilities of the local communities outside the system and their mutual influence. Further, following this, emphasizing and organizing the matters regarding the process including practical trial and error will enables us to present points that can be referred to when other governments implement the Dual River Leaders System in the future.

Therefore, based on the results and suggestions of previous research, this study focuses on the situation and social practice of the Civilian River Leaders System and private practice outside the system. Drawing on the experience of H, who was appointed as the General Civilian River Leader of Guiyang City in a private NGO, we analyze the tried-and-true achievements developed in the Civilian River Leaders System and assess their impact on the region and its potential to clarify the reality of multi-actor participatory watershed governance. The field survey is described in detail next.

3. Research Outline and Methodology

3.1. Overview of the survey site and situation surrounding H, who was appointed the Overall Guiyang City Civilian River Leader

Guizhou Province is located in the southwestern part of the People's Republic of China and has a pronounced convex karst topography. The provincial capital is Guiyang City, abbreviated as Qian. The city is a plateau city with an area of 8,034 km^2 and altitude of 1,100 m. As of 2018, it had a resident population of 48,819,000 people. It consists of six districts: Yunyan, Nanming, Wudang, Huaxi, Baiyun, and Guanshanhu; one county-level city, Qingzhen; and three counties, namely Kaiyang, Xifeng and Xiuwen.

Even before the River Leaders System was introduced in Guizhou Province in 2009, stakeholders in watershed governance had been increasingly concerned about environmental issues due to serious water problems. At the time of the survey in Guiyang City in 2018, according to H, Guiyang City General Civilian River Leader and Z, a villager in Village Y, the interests of people's livelihoods had for more than 10 years coincided with the severe watershed pollution in the city, and people were deeply concerned about it. Petitions to

government departments and conflicts among stakeholders regarding the environmental damage sometimes occur in Chinese society. However, underlying these petitions and conflicts is a desire for stakeholders to raise environmental awareness and participate in environmental protection in watershed governance. This social situation better explains the introduction of civilian power during the subsequent reform of the River Leaders System.

The General Civilian River Leader H, born in 1954 in Guangdong Province, joined the Guizhou Daily Media Group in 1990 as an environmental protection reporter and has been working in Guizhou City for about 30 years. He records interviews and engages in geographical study, biodiversity research, eco-water resources, and environmental protection. In the course of the long-term reflection and synthesis of these studies, he accumulated research experience and professional knowledge on watershed governance. As a reporter, he interviewed a diverse range of people for many years and has rich communication experience. In addition, H is an environmental media reporter, honorary professor, a member of the Guizhou Province Political Consultative Committee, and member of the Standing Committee of the Guiyang City Political Consultative Committee. His wealth of practical experience, communication skills, professional knowledge, academic foundation, and relatively high popularity were the reasons he was appointed the General Civilian River Leader.

In addition, H said he established the NGO organization G in early 2010 to continue his work in water environment protection after his retirement. The main tasks of this organization include public relations, public interest litigation, and third-party supervision of civic participation and environmental protection for ecological construction in Guiyang City. Organization G's establishment has also contributed to the subsequent development of the Civilian River Leaders System.

Finally, in 2010, the local government of Guiyang City decided to implement the Dual River Leaders System beginning with the Nanming River. H, who had gained the trust of the community based on his judgment, was appointed the General Civilian River Leader of Guiyang City and Civilian River Leader of the Nanming River. When H was assigned as the General Civilian River Leader, there were no other Civilian River Leaders, so he had to rely on volunteers from his NGO organization to develop his work.

According to H, "It is difficult for one person to work hard alone to improve the water environment." The water pollution in Guiyang City was becoming a serious issue not just for the Nanming River but other watersheds as well. Thus, H thought, "To fully improve the water environment in Guiyang City, it is necessary to establish Civilian River Leaders in every Watershed." He then mobilized volunteers under the slogan "Let us protect our home," and appointed and installed Civilian River Leaders (Watershed Civilian River Leaders) in each watershed to promote integrated water resource management. In 2015, the government appointed suitable individuals from among the Watershed Civilian River Leaders in each region to take charge of each region as Regional Civilian River Leaders. With various

backgrounds, Civilian River Leaders include teachers, journalists, university students and members of the public. By 2016, all 98 rivers in Guiyang City had Civilian River Leaders, and the Civilian River Leaders System had been largely established in Guiyang City.

3.2. Research Methodology

The first author contacted a private NGO where H, the General Civilian River Leader of Guiyang City, had been working since the end of July 2018 to apply for environmental volunteer work. We conducted field surveys for three months in September 2018, March 2019, and September 2019 to better understand Civilian River Leader participation. In addition to participating in special events and activities, we also adopted an action research approach, working with the Civilian River Leaders for almost nine hours a day from Monday to Friday during the field research period, and sometimes providing our own opinions and advice. Even when away from the site in Japan, we kept daily track of the practices of the Civilian River Leaders through the social network service WeChat and communicated with each other once a week.

In the field survey, we used the regional language (Guizhou dialect) to emphasize familiarity and reliability. Further, to understand the process of formation of the Civilian River Leaders System before the field survey, we primarily collected, organized, and analyzed documents and interviewed the people involved. As described above, we investigated the water environment in Guiyang City and implementation of the Dual River Leaders System from 2018 through observation as an environmental volunteer, data collection, interviews, etc., and drew on personal experiences.

3.3. Development of the Private River Leaders System since 2018

The Dual River Leaders System in Guiyang City was implemented 10 years ago. The system is now relatively stable based on trial and error as well as experience. The history of the Dual River Leaders System before 2018 in Section 2-1 suggests that it had already been completed; however, as Table 2 shows, it was actually under continuous reform after 2018 when the first author joined the Civilian River Leaders System and engaged in the work.

Table 2.

Year	Governmental River Leaders System	Private River Leaders System
2018	Five-level Governmental River Management system (provincial, municipal, county, township and village) was fully established	Mobilization of local enterprises to establish a Green Enterprise Promotion Association
2019		Environmental volunteer association established in the Civilian River Leaders System
2020		Groups formed not just for watersheds and regions, but also for special projects (e.g., waste incineration plants in watersheds)

(Prepared by the first author from interview surveys and participant observation)

Newly appointed Civilian River Leaders felt they had limited capacity and difficulty in comprehensively assessing the watershed environment within the civilian river management system while developing their work. This was because the karst terrain in Guizhou Province, which consists of mountains, rivers, waterfalls, and limestone caves, makes it time-consuming and expensive to measure basin conditions, leading to insufficient information. Therefore, to supplement the power of the Civilian River Leaders System, especially in terms of promoting maximum citizen participation, each Civilian River Leader set up Civilian Environmental Supervisors to mobilize as many local villagers and businesses as possible (elaborated below). At the time of the survey in 2018, three to five local residents were assigned as Civilian Environmental Supervisors per area. The influence of the Civilian River Leaders and environmental supervisors has been raising the environmental awareness of ordinary citizens and driving their actions.

Further, each Civilian River Leader believes in the necessity of the unified supervision of companies to strengthen supervision and mobilize local enterprises to participate in the project to ensure the full implementation of private participation. Therefore, Civilian River Leaders planned to mobilize companies in the region to establish the Green Enterprise Promotion Association in June 2018. The first author was able to observe and participate in the meeting to promote the preparatory plan for the Green Enterprise Promotion Association in September 2018 and the first meeting after its establishment in March 2019. These meetings clarified the main measures for improving the environmental management level of local enterprises through various methods such as training on environmental policy and law, exchange learning, and mutual supervision. In other words, the idea was to use the Green Enterprise Promotion Association as a platform to promote self-management, self-supervision, and self-control in enterprises and to fully demonstrate the proactive responsibility of enterprises in environmental management. Further, they planned to establish an Environmental Volunteers Association under the Civilian River Leaders System from November 2019 to support the mobilization and participation of environmental volunteers.

In the past, finding and discussing environmental problems as well as their resolution and supervision in the process of conducting research on the watershed environment often resulted in conflicts because the limitations of time and distance prevented quick and effective communication. Note that in addition to the meeting format, each Civilian River Leader has set up regional WeChat groups within the human network of the watershed. This is for stakeholders to review and mutually supervise each other through timely and effective dialogue to resolve issues related to water while keeping track of the water environmental issues. The first author's participation has kindled trust with the environmental volunteers, and he has been part of the regional WeChat group since March 2019 where a variety of information is shared with him.

To date, Guizhou Province has established provincial-level Governmental River Leaders

for 33 rivers (lakes). The River Leaders System covers the 8 major water systems in Guizhou Province, forming an institutional model over a land area of 137,467 km^2 and 746,700 people. It has installed Civilian River Leaders in all major watersheds (98), especially in Guiyang City, the provincial capital.

This measure falls under the ecological civilization reform of Guizhou Province, which has a large watershed and population.

4. Watershed Governance System with Non-Governmental River Leaders

4.1. Leadership and Focus of the Dual River Leaders System

4.1.1. Limitations of Government Management and the Necessity of Civilian River Leaders' Participation: Case Study of J Village

Here, we examine the need for Civilian River Leader Participation from two perspectives: the government's position and the local situation.

As mentioned, many previous studies examined the situation from a government perspective, referring to the "leading role" of the government in implementing the Dual River Leaders System. The national polity in China is government-led, which is an objective fact and effective guarantee of the government's strong administrative rights and social control. However, as mentioned, the government has limited ability to understand and improve watershed problems and supervise the public in this regard. On September 13, 2018, the first author participated in the government's collaborative activities, finding clear evidence of these difficulties in understanding; for example, government officials could only survey each location for 10–20 minutes when inspecting the water environment because of their administrative tasks. To supplement the governmental survey through these collaborative activities, H, the General Civilian River Leader, organized the Regional Civilian River Leaders and on September 17, 2018, volunteered to conduct the survey again. This civilian collaboration enabled the government to integrate the power of the private sector while understanding the realities of the watershed environment.

On the other hand, the reality of Guizhou Province, with its large poor population,[5)] requires the government to focus on economic development. Particularly, the population outflow from rural areas to cities in recent years has led to the construction of illegal buildings in places beyond the government's administrative boundaries, making government control increasingly difficult. Village J in Huaxi District, Guiyang City, where the first author conducted field research, is one of the places where such population flow is strictly controlled. J Village belongs to the Nanming river watershed. The area is adjacent to four railroads and not within Guiyang City's administrative division, and under the jurisdiction of the government railroad department, meaning housing construction is not permitted in this area. However, between

1985 and 2018, 46 houses were constructed housing 481 people. They came to Village J in Guiyang as migrant workers from poor rural areas to work. They built simple dwellings and have been living there for nearly 30 years. Over the past decade or so, these circumstances have led to sewage outflows throughout J Village. Garbage has piled up, the odor has worsened, and residents have begun to complain.

The research conducted in this study suggests that the environmental pollution in J Village has not improved over the years, which is characteristic of the Nine Dragons of Water system. As mentioned, the houses in J Village were built in violation of the law, but the Guiyang City government did not force the people to relocate given that they have been living there for 30 years. On the other hand, the railroad department, which has jurisdiction over the area, is not considered responsible or obligated to manage the residents. The related construction and urban management departments have also washed their hands off J Village. In this context, we conducted an interview with Villager A.

"We come from a poor village. We knew we couldn't build a house here because we didn't have enough money and couldn't afford an apartment, so we had to build a simple house to live in. I think most of us did not consider this as our real home because we always worried the government would kick us out."

The interview suggests that A does not feel a sense of belonging to J Village, and though it is clear the environment there is deteriorating, A is not actively trying to change it. Therefore, it is extremely difficult to solve the environmental problems of this watershed. The case of J Village is not unique. Rural areas in China tend to have many tributaries or watersheds clustered in places without well-developed sewerage systems, unlike larger cities where such issues are easier to manage, making it difficult to solve environmental problems caused by human factors. There is a desperate need to introduce Civilian River Leaders for the immediate task of accurately understanding these complex watershed environmental problems and promoting awareness among residents.

4.1.2. Promoting the Functions of the Dual River Leaders System focusing on Civilian River Leaders

The Civilian River Leaders who emerged from the abovementioned pragmatic standpoint have performed their functions well, effectively compensating for the shortcomings of government functions and promoting government–private actor cooperation. Today, Guiyang City has more than 100 Civilian River Leaders including teachers, lawyers, media personnel, environmental researchers, and ordinary citizens with some environmental knowledge and awareness. Compared to Governmental River Leaders, the Civilian River Leaders System, which substantially covers all fields, further enhanced expertise and deepened interest in and enthusiasm regarding the watershed environment. For example, in a survey in Qingzhen in March 2019, Civilian River Leader L said:

“In the past, H, the General Civilian River Leader, decided to sell his house because of a lack of operational funds. He later bought the house where he lives now.”

Aligned with the traditional Chinese proverb, “If there is no house, there is no home,” H, the General Civilian River Leader, devoted himself to the watershed environmental conservation project for several decades, selling his own house to ensure the smooth operation of the conservation work. S, another Civilian River Leader of the watershed, is also an active lawyer and provides free legal aid and expert advice on environmental public interest litigation and other law-related issues. Their hands-on approach has affected many people.

Civilian River Leaders do not act individually but in a systematic or organized manner. In Guiyang City, most rivers run across multiple regions. Thus, the regional Civilian River Leaders are in charge of specific work in their areas, and the related Watershed Civilian River Leaders have adopted a method of cooperation with these operations to better develop their work. The General Civilian River Leader, H, mainly provides instructions on how to handle specific cases and focuses on understanding the overall development of the Civilian River Leaders System.

Thus, the primary role of the Civilian River Leaders is to manage the environment together with the Governmental River Leaders, which can be summarized in three points. First, they mainly conduct patrol inspections of the watershed they are in charge of to obtain information on the status and current environmental conditions of the river. This involves supervising on the status of water resource protection in rivers, immediately reporting the situation and issues to the River Leaders at each level of government, actively devising solutions and presenting them to the government, and supervising the subsequent handling thereof.

Second, they provide supervision and management of the enterprises. In addition to establishing the Green Enterprise Promotion Association mentioned earlier, our survey revealed that since March 2016, the Civilian River Leader System led by H, the General Civilian River Leader, signed agreements with government departments and enterprises in various areas of Guiyang City. These agreements are equivalent to a contract for the purchase of services by the government or a company to a Civilian River Leaders System, and clarify the responsibilities, obligations, and cooperation in solving environmental problems of each of the parties to the agreement. Regarding this situation, L, a Regional Civilian River Leader, explained:

“The government wants to solve the problem of a lack of manpower, capacity, and time in water environment governance, and companies want to avoid conflicts with citizens and the government as well as administrative punishment because of environmental pollution. To this end, the Civilian River Leader helped in their environmental work and acted as a bridge between the government and enterprises.”

Here, the government department or enterprise that has signed the agreement pays a service fee of 180,000–200,000 yuan /year (about 2.8–3.2 million yen /year)[6] to the Civilian River

Leaders System, which is also the main source of funds supporting its daily operations. It is also possible to obtain the assistance of the entire Civilian River Leaders System with which the agreement was made with no burdensome funding.

Third, they promote the participation of the public, which is a major concern of this study. The participant observation of this research showed that the Dual River Leaders System in Guiyang City is not only a narrow collaboration between governmental and civilian systems, but is further developed through involving private sector participation in a wider area. In other words, the implementation of the Dual River Leaders System emphasizes the building of multi-layered partnerships between stakeholders in the watershed (Figure 1). This promotes the participation of both Civilian River Leaders and the public in watershed environment conservation, which will help to more actively and effectively solve the environmental issues pertaining to the watershed and improve the watershed pollution caused by human factors. As such, through Civilian River Leaders, the Dual River Leaders System integrates the power of stakeholders in watershed governance, allows accurate and quick understanding and disclosure of information to the public[8] using WeChat groups and various meeting methods[7], and promotes the active and effective solution of environmental problems in the watershed (Figure 1).

For example, a Civilian River Leaders Roundtable was organized to promote villagers' environmental autonomy on September 13, 2018 in response to the abovementioned circumstances in J Village, which have become more serious because of urban-to-rural personnel flow. The roundtable participants included Civilian River Leaders and the residents of J Village, and the village committee, volunteers, media, and relevant administrative departments of the Governmental River Leaders System. The details of the meeting are summarized as follows:

1. Villagers were provided with details on correct environmental protection and safety awareness. For example, the impact of garbage and sewage on the environment, location of garbage loading, and sewage discharge norms were explained.

2. Each government department and Civilian River Leader explained the details of their respective work to the villagers, not just the parts that required their cooperation, but also that the villagers needed to cooperate. They further clarified the villagers' rights and duties.

3. Villagers' participation in self-governance was highlighted. For example, villagers can elect sanitation workers and security guards to inspect issues pertaining to environmental health and safety (the village is adjacent to the railroad, which gives rise to safety issues). The possibility of taking turns to take charge was also raised.

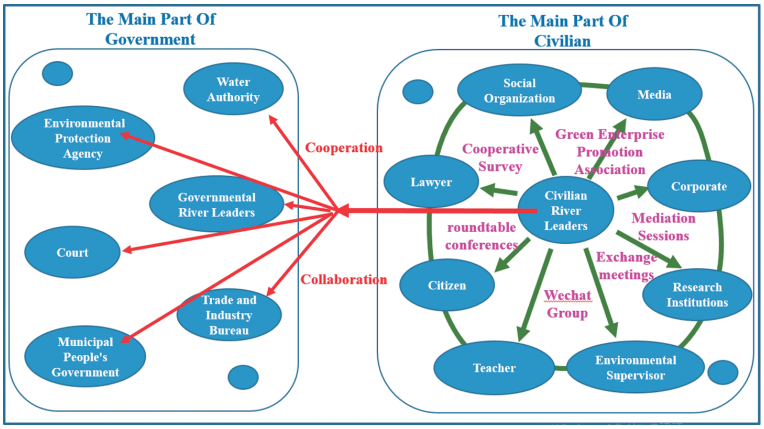

Figure 1 The Dual River Leaders System Focusing on Civilian River Leaders
(Drawn by the first author based on the participant observation)

As mentioned, in the watershed governance network shown in Figure 1, the government retains a leading position in China's national system, and it is sometimes necessary to rely on government coercion to solve environmental problems. However, in this established network, the Civilian River Leaders System is positioned at the center and plays a more important role in the practice of the Dual River Leaders System.

4.2. Interaction between Civilian River Leaders and Private Entities

4.2.1. Two-Way Cooperation Between Civilian River Leaders and Government Entities

As mentioned, a watershed governance system has been established with the Civilian River Leaders at the center, which better aligns the power of each entity and promotes mutual cooperation to improve the watershed environment. However, these explanations may be perceived as similar to the traditional watershed governance model, which is still a government-led top-down system or single line of action. However, this research has clarified that the Governmental River Leaders System and Private River Leaders System are necessary and that both have an important role to play. In other words, the relationship between Governmental River Leaders and Civilian River Leaders is not just hierarchical or driven by necessity. The only Civilian River Leader appointed by the government, H, was involved in environmental conservation projects in the basin for more than 30 years and had organized many volunteer activities through his NGO. H, the General Civilian River Leader, appointed the other Civilian River Leaders. This was not conducted through government intervention. Although becoming official Civilian River Leaders did not affect their enthusiasm and motivation to engage in environmental conservation, participation under the government's Dual River Leaders System policy did increase the significance of the Watershed Conservation Project. In particular, strengthening coordination and cooperation with the government makes

it possible to more efficiently solve watershed problems. From the government's perspective, it is important to build and strengthen trust between the government and private sector to ensure the government can use Civilian River Leaders more effectively to better understand and improve the watershed environment, and that the central policy to promote civilian participation remains practical.

4.2.2. Interaction between Civilian River Leaders and Private Actors

The interaction between Civilian River Leaders and private entities is important, but has not yet been addressed in previous research. It is discussed next.

(1) Civilian River Leaders and Civilian Environmental Supervisors

An examination of the relationship between the Civilian River Leaders and other private actors reveals that the River Leaders do not unilaterally instruct citizens on environmental protection. This also manifested in the establishment of Civilian Environmental Supervisors. Most environmental supervisors are villagers living in the vicinity of the watershed, and although they have a low level of education (elementary, junior high, or high school), they are active and enthusiastic in participating in environmental conservation in their immediate living space.

However, we found that the appointment of civilian supervisors is difficult. A case study of Z, a resident of Y Village in Qingzhen, Guiyang City, illustrates this challenge:

Z originally made a living as a fish cultivator in Y Village. However, the government allowed brick factories, aluminum factories, cement factories, and other plants to move into Qingzhen over the past few years to promote the economic development of the region, which has added industrial pollution to the traditional living and aquaculture pollution, exacerbating the water quality problem. In 2018, fish cultivated by Z died in large numbers, which Z believed was caused by the pollutant emissions from a company. Z repeatedly contacted the local government's Ecology and Environment Bureau, but the government department did not try to solve the problem. Therefore, with other villagers, Z was involved in environmental conflicts with the government sector and businesses.

Due to the negative impact of these conflicts, the Ecology and Environment Bureau commissioned a Civilian River Leaders System to resolve environmental disputes in 2018. L, a regional Civilian River Leader, continuously communicated with Z to understand his motives and needs to resolve the dispute.

Residents of Y Village spoke about Z, a trustworthy, reasonable person who liked to help others. After understanding the situation regarding the dispute, L, the regional Civilian River Leader, took Z to investigate the emissions of the surrounding companies and explained the relevant policies. Considering that the aquaculture method could also result in fish death, L contacted experts in this field and explained scientific breeding methods to Z. These efforts

were successful, resulting in fewer fish deaths. This built trust between the regional Civilian River Leaders L and Z, and the environmental dispute was resolved.

Later, considering villagers' good understanding of the local geography, L, the regional Civilian River Leader, consulted with H, the General Civilian River Leader, and decided to appoint Z as a Civilian Environmental Supervisor in November 2018 for the dual purposes of thoroughly investigating and understanding the local watershed environment, and promoting local civilian participation. This case shows that the creation of Civilian Environmental Supervisors is more than just an innovation in the implementation of the Dual River Leaders System in Guiyang City. It is a new light born from the conflict-driven discussions on watershed environmental issues between the Civilian River Leaders System of intellectuals and ordinary villagers.

Participant observation indicated that the Civilian Environmental Supervisors were checking the domestic and industrial wastewater discharge and the status of the water environment in the watershed every day, day or night, when they had time. This attitude enables them to quickly understand the status of the watershed environment and inform the Civilian River Leaders. The Civilian River Leaders then verify the situation and provide guidance on how to solve it. Through this process, the participation of Civilian Environmental Supervisors helps Civilian River Leaders in their work, and the Civilian River Leaders can promote the environmental awareness and knowledge of the Civilian Environmental Supervisors: a complementary situation.

Figure 2.
According to the first author and Z, an Environmental Supervisor, Survey of the waterway near C cement factory. (Photo by L, Civilian River Chief, March 06, 2019)[9)]

Figure 3.
Civilian River Leaders, Environmental Supervisors, and Government Departments Collaborate to Investigate Inside C Cement Plant (photo by the first author, March 12, 2019) [9)]

Following is another case study-based example. From the end of February to the beginning of March 2019, Civilian Environmental Supervisor Z conducted an investigation for a certain

period and found an illegal wastewater problem in C cement factory. Z took photos and videos using a mobile phone and through WeChat, contacted L, a Civilian River Leader in the area. To confirm the situation, the first author went to the site with L, the Regional Civilian River Leader, early on the morning of March 6, 2019, and met with Environmental Supervisor Z to investigate the waterway near the cement factory (Figure 2). The waterway had a small hole in it hidden underground and was very dirty, and a drain was found in the hole. Using a pH test paper at 3:00 am and 5:00 am, Z discovered that alkaline sewage was discharged from the waterway. However, another check the next morning detected no alkaline sewage on the pH test paper. Usually, companies that discharge illegally tend to do so secretly and irregularly, so it is difficult to immediately obtain evidence. More surprising to the first author was the fact that Z, the environmental supervisor, who was an ordinary villager, was not only interested in the environment enough to have mastered simple investigation methods like pH tests, but was also willing to conduct an investigation at night, spending many hours to discover illegal emissions.

Later, to better understand the situation, L, a Civilian River Leader in the area, thought it necessary to go inside Cement Factory C to investigate. The WeChat group was used to contact the relevant Governmental River Leaders System to obtain government authority.

On March 12, 2019, in the presence of the first author, L, the regional Civilian River Leader, and Civilian Environmental Supervisors Z, W, and X along with the Ecology and Environment Bureau and management committee (government department) went to investigate the inside of Cement Factory C (Figure 3). During this process, Civilian River Leader L explained the points and methods of the investigation in detail to the Civilian Environmental Supervisor. The staff of Cement Factory C admitted that the outlet surveyed on March 6 was owned by the factory, but did not admit to illegal emissions at night, arguing that the photos and videos provided by Z did not show the time when they were taken and might be photos or videos taken several years ago. In response, regional Civilian River Leader L told the Environmental Supervisor, “We need to gather evidence for the investigation, and in the future, using a mobile application that shows the time and place of recording would be better to prevent something like this from happening again.” To the first author’s knowledge, the regional Civilian River Leader’s instructions have already been applied in the Civilian River Leaders System. Thereafter, Environmental Supervisors Z and W repeatedly surveyed the outlet of C Cement Factory at night, obtained photos and videos showing the time and place they were taken, and submitted them to the WeChat group. L, the regional Civilian River Leader, discussed this with the government department and management committee, and through the government’s administrative authority, compelled the maintenance of Cement Factory C.

(2) Civilian River Leaders and Ordinary Villagers

In addition to the Civilian Environmental Supervisors mentioned in (1), there are

interactions between the Civilian River Leader and ordinary villagers. In J Village, which was affected by the rural–urban population flow, the residents initially had little sense of belonging to the village and were not interested in improving the environment. However, in mid-August 2018, when the villagers complained, the Civilian River Leader System took notice. H, the General Civilian River Leader, contacted the relevant government departments on behalf of the Civilian River Leaders System and conducted a coordinated investigation from August 21, 2018, which uncovered polluting enterprises such as illegal aquaculture farms, illegal plastic factories, and illegal lime factories in the surrounding area. These were then gradually closed down. In parallel, Civilian River Leaders have been going door-to-door almost daily since the beginning of September 2018, using easy-to-understand language and persistent and polite methods to provide risk communication, environmental protection education and to guide them in implementing improvements, and encourage them to actively participate in improving their living environment.

When we conducted interviews in J Village in September 2018, most memorable was the never-fading smiles on the villagers' faces when they talked about the changes in the living environment of the village. Pointing to his house with a huge smile, A, a villager, said, "Civilian River Leader H and the other leaders were not afraid of getting dirty and working with us to improve the village environment, so it is now clean." Villager B also smiled and said, "Coming from a farming village, I did not understand or care about environmental issues before. So the Civilian River Leader carefully taught me about the effects of sewage and garbage, as well as the government's policies. They also encouraged us to voluntarily clean up the environment around our houses and improved the drainage system and garbage storage areas. Now, I am happy that the environment has improved and I think we should participate in activities to improve it further. We deepened our friendship with the River Leaders and had meals together when we had time." Thus, the villagers were pleased about the improvement of their village environment, and satisfied with the significant increase in their interest in the environment and willingness to protect it.

On the other hand, from the perspective of the Civilian River Leaders, the spiritual satisfaction and self-realization the villagers derived became the driving force for them to engage in environmental conservation projects in the long term. Leaving a lasting impression, General Civilian River Leader H said, "People who can only see money are not suitable for environmental conservation projects. I'm happy to make friends with the villagers and have a cup of tea at their house." Currently in China, private actors and organizations engaged in environmental conservation projects are poorly paid and do not have much social recognition. In response, L said, "To be honest, there were times I've been upset because many jobs paid two or three times more than what I was earning. However, we were able to solve the environmental problems in the watershed through our own efforts, and the villagers' attitudes changed from initial concerns to trust, and from indifference to active participation in

environmental issues. Through this process, I have been able to support myself with a sense of satisfaction and accomplishment, and have been working on watershed environmental conservation projects for almost seven years."

Thus, despite a shortage of material wealth or money, the spiritual wealth cultivated in the course of work is the driving force needed to be immersed in environmental conservation projects.

4.3. Exploring Civilian River Leaders Systems and Fostering Watershed Governance Modes

In Guiyang City, the first in the country to implement the Dual River Leaders System, it is noteworthy that in a series of reforms over the past 10 years, the city has sought a new approach based on partnerships with wide-ranging stakeholders for water resources and watershed governance under the River Leaders System. The purpose was to replace what was traditionally the responsibility of the government's Water Conservancy, Agriculture, Construction and other departments. However, previous studies highlighted various issues for further improvements, such as the need to improve the Dual River Leaders System legislation, equal voice and environmental awareness for the government and private sectors, information sharing and cooperative governance, and issues related to cross-area pollution. However, the following issues are of further interest to this study.

First, this survey has revealed training Civilian River Leaders in a uniform manner is still insufficient. In particular, there is currently no comprehensive personnel training system, and the educational background and ability level of Civilian River Leaders varies. Thus, everyone has their own way of doing business, and this process changes the effectiveness of implementing watershed management measures in each area, posing a challenge. For example, the survey found that the watershed governance situation in Qingzhen, Guanshanhu, and Baiyun in Guiyang City was relatively good. Further, middle-aged people aged in their 40s have a strong interest and enthusiasm for watershed environmental conservation, as do young people born in the 1980s and 1990s, who are gradually becoming a major force in environmental conservation projects. However, the values of the middle-aged people and the post-80s generation differ greatly, with the latter being described as having a strong sense of self (Wang, F., 2011). Reportedly, "young people (born after the 80s) are confused about their life goals; lack idealistic pursuits, social responsibility, and a spirit of social service; and have little political awareness." Although such statements should not be generalized, the differences between the post-80s youth and middle-aged people cannot be ignored in terms of experience and spiritual richness in watershed environmental conservation. Therefore, the relatively frequent turnover of Civilian River Leaders and lack of personnel who can ensure their effective participation in the long term means the Civilian River Leaders System is not sufficiently stable. At present, it would be best to concentrate on perfecting the project implementation mechanism to reduce the impact of personnel mobility on the Civilian River

Leaders System. Further, though there is more private sector participation in the improvement and conservation of the water environment in Guiyang City compared to a decade ago, the city-wide participation rate is still limited.

The dynamic survey conducted as part of this study indicates that the implementation of the Dual River Leaders System has led to some improvement in the issues highlighted in the literature, such as the equal voice of the government and private sectors, environmental awareness, information sharing, cooperative governance, and cross-regional pollution. In addition, some of the meetings that the first author was fortunate enough to attend included discussions on various measures to optimize cooperative governance and to establish a training system for Civilian River Leaders. Some of these proposals have been agreed on and implemented. For example, at the conference held in September 2019, “The Lack of a Comprehensive Training and Regulation System for Civilian River Leaders and Civilian Environmental Supervisors” was presented.

Moreover, the first author was able to participate in these projects as part of action research. Based on his research since 2018, the first author prepared and amended numerous times a trial “Flow of the Development of Operations of Civilian River Leaders.” This was prepared with reference to the materials recording the opinions of H, the General Civilian River Leader; L, the Qingzhen Civilian River Leader; J, the Guanshanhu Civilian River Leader; and B, the Baiyun Civilian River Leader in Guiyang City. Currently, this Flow of the Development of Operations of Civilian River Leaders is used to organize the system of operations development of Civilian River Leaders in all areas of Guiyang City, and functions as training material for the Civilian River Leaders System to promote the creation of a training system. The first author plans on being more involved in this process to conclude it. Furthermore, the process is expected to enable Civilian River Leaders to provide further environmental policy guidance to Civilian Supervisors and for them to share their own experiences.

In addition, even though the first author was able to participate in field research for about three months, he could only participate in the discussions by phone or online when he was away from the site. However, he was free to submit advice and opinions without any problems despite it being a mode of watershed governance like the Civilian River Leaders System. Therefore, the Dual River Leaders System mode was fostered in a multi-actor interactive process and did not have a standardized form from the beginning. Rather, it was constantly improved and flexibly developed in the process of implementation according to the reality on the ground, which may be a reason for its rapid implementation and effective promotion. It plays a much more flexible role than the traditional Governmental River Leaders System; thus, it is able to deal with various known problems and overcome unknown issues, suggesting it is now established as a new mode of watershed governance.

5. Private Sector Participation in Watershed Governance from a Dual River Leaders System Perspective

Based on these findings, this section is an in-depth examination of non-governmental participation in watershed governance from the following three perspectives that have not been covered thus far.

5.1. Evaluation of Effectiveness and Factor Analysis of the Dual River Leaders System

The implementation of the Dual River Leaders System has improved Guiyang City's water environment to a certain extent. The abovementioned examples also show that the impact of villages on the watershed water environment can be controlled. However, its effectiveness in terms of the criteria for determining whether the water quality of the 98 rivers in Guiyang City has fundamentally improved has not yet been confirmed. Nevertheless, this cannot happen overnight, and we find hope in the fact that the watershed environment of Guiyang City has been improving, not deteriorating, since the implementation of the Dual River Leaders System. In particular, changes in the perceptions and actions of the private sector are evident, and the Dual River Leaders System is effective in terms of behavior.

The direct contribution of each Civilian River Leader, especially the Overall Civilian River Leader, is a factor in this effectiveness, but not the only one. It is more important that their actions brought the residents together in a unified effort. By bringing together relevant government departments as well as intellectuals and ordinary citizens who wanted to contribute to the watershed environment conservation project, they changed and concentrated the once-dispersed power. In the past, government officials had to deal with various problems while developing their work, such as the lack of manpower and expertise to conduct surveys. However, now, the aid of Civilian River Leaders including experts in various fields has enabled them to combine their power and wisdom to create a more convenient and quicker mechanism and clarify specific routes and methods.

The actions of the Civilian River Leaders have improved citizen environmental awareness, and the citizens have formed their own perceptions of the environment and environmental protection from their daily practices. However, have the actions of the Civilian River Leaders led us into a more "accurate" or "rational" direction? The case of Civilian Environmental Supervisor Z described previously is one piece of evidence in in this regard. In the process of improving the watershed environment, the villagers actively considered the relationship between people and nature. These changes are believed to have formed an environmental protection network.

As mentioned, the Dual River Leaders System has been effectively implemented, especially in terms of human behavior, and has effectively controlled pollution and reduced environmental conflicts through changes in awareness and behavior. This offers hope for the

future in terms of improving the watershed environment.

5.2. Possibility of Implementing the Dual River Leaders System in Other Regions

Based on the results in Guizhou Province, the Dual River Leaders System is now being implemented in Sichuan, Zhejiang, and Hainan provinces, but is far from implementation countrywide. The Governmental River Leaders System can be deployed quickly and widely because it only requires adjusting the administrative system within the government. China has a top-down administrative system from the center to local governments. This makes it simple to develop a governmental River Leaders System where the central government announces policies and local governments implement them. However, Guiyang City's Dual River Leaders System, particularly the Civilian River Leaders system, is not a conventional top-down administration system, but a new system wherein all entities interact with each other. Essentially, the spread of the Dual River Leaders System is more than a question of local governments' active efforts to promote it. Rather, the conditions in each region mean it will take time before the program can be rapidly deployed nationwide.

Here, the conditions for development, that is, whether the participation and support of private intellectuals and the public can be successfully realized in other regions, need discussion. The efforts and contributions of H, the General Civilian River Leader, enabled the fast formation of Guiyang City's Dual River Leaders System. It began with the mission of one General Civilian River Leader, H, and the Civilian River Leaders System was gradually constructed around him. H's work history and popularity in the region has played an important role in this. H's story might give the impression that he alone drove the implementation of the system. However, based on his strong interest and passion for environmental protection, relevant professional knowledge and experience, and good human relations and communication skills, suitable persons who could play a central role in civilian river management in other areas may be found.

However, the case of Guiyang City cannot be generalized, especially in China, because each region has its own geographic conditions, level of economic development, and cultural habits in terms of citizens' perceptions and awareness of the environment. Today in China, environmental problems including water pollution are structural and global issues as pollution is trans-boundary. Essentially, each region faces its own environmental problems and has formed a perception of them, and previous studies indicate that citizens in each region are responding in their own ways. If so, Guiyang City can be used as a model for other regions for measures to build comprehensive networks and matters (e.g., the establishment of Environmental Supervisors) formed from trial and error experiences, taking advantage of the fact that "the implementation of the Dual River Leaders System played an effective role, especially in terms of human actions." In addition, the results of this study are expected to encourage the dissemination of the Dual River Leaders System.

5.3. Government Management and Private Sector Participation in Watershed Environmental Protection

There is a limit to how useful government participation alone will be in implementing watershed environmental protection measures. Thus, it is essential to make efforts to employ private resources (manpower and knowledge) for surveys, supervision, and proposals for solutions. Further, since the deterioration of the basin environment is due to the accumulation of the environmental burdens of daily living and business activities of the residents around the watershed, its conservation can be ensured by adjusting human activities to suit the environment with "people" as the unit. This is why the government's administrative management alone is not enough. To achieve it, it is expected that the traditional regulatory and supervisory approach to watershed management will be replaced by a collaborative approach to watershed protection, leaving the initiative to companies and the public. The Dual River Leaders System is a typical example of the new watershed governance system, which builds trusting relationships with the private sector and integrates the power of the private sector while taking a proactive approach to preventing pollution and environmental conflicts.

As mentioned in the analysis of previous studies, in recent years, China, like Japan, Europe, and the United States, has been emphasizing the importance of cooperation with civil society, communities, and NGOs as key players in solving environmental problems such as water pollution. However, these issues are difficult to solve by imitating developed countries, because as Fu (2016) mentions, civil society and communities in China have a unique structure. The Dual River Leaders System may be considered a new development that utilizes structures specific to the Chinese situation. As this study revealed, I believe the "Dual River Leaders System" is a new form of "Chinese-style private participation," a way of non-governmental participation that demonstrates the power of the private sector.

Furthermore, the findings of this study emphasize that interactions between people, rather than the influence of policies, as the key to private participation measures. This is illustrated by the case of Z, who had been involved in environmental conflicts but later became a civilian supervisor under the influence of a Civilian River Leader.

The following quote from Z is impressive,

"In the past, it was very difficult for us as ordinary farmers to lobby in case of any environmental problems. For the past two years, whenever we had environmental problems, H, L, and other Civilian River Leaders would take us to investigate and solve the problems with us. Whenever we go to a dirty or dangerous place, they almost always walk ahead to guide us, conduct surveys, and show us the norms in person. I have been so impressed that I want to participate in solving the environmental problems around me as much as possible."

Furthermore, people's awareness and behavior are easily influenced by those close to them, and Civilian Environmental Supervisors W and X have been involved in the conservation of the watershed environment because of Z's influence.

W, an Environmental Supervisor, said, “When I learned that Z’s case of fish death had been resolved, I realized that the issues he investigated were emphasized and resolved, and I wanted to be part of it. If one day I were to suffer environmental damage, I would know what to do.” Many volunteers in the WeChat group in which the first author is currently participating have been inspired to participate in the conservation of the watershed environment by their fellow villagers and friends. The influence of the people around them has awakened the environmental awareness of the private sector, and this shift to active participation can improve the development of watershed environmental protection projects.

Currently, China lags behind Japan, Europe, and the United States in terms of the breadth and depth of private participation, and China’s administrative system still leads the government. However, the implementation of the Dual River Leader System, which was created by Civilian River Leaders, has broken through the former stance of “promoting private participation in watershed environmental protection,” considered an empty government policy or slogan. In other words, private sector participation has gradually grown and developed under China’s administrative system through continuous trial and error and practice, while conforming to the country’s national conditions. This has led to the construction of a new watershed management system, which is different and unique to China, unlike previous systems. At present, the implementation of the Dual River Leaders System is a new method of private participation aligned with China’s reality. This has had a definite impact, and is expected to develop in the future.

6. Conclusion

This study focused on the case of Guiyang City, Guizhou Province, the first city in China to implement the Dual River Leaders System by reforming the traditional governmental River Leaders System. This was achieved by constructing and implementing the Civilian River Leaders System and introducing private participation in the governance of China’s unique watershed. This Civilian River Leaders System, led by Civilian River Leaders, considers the relationship between nature and humans, facilitates interaction between people, changes conventional environmental awareness and behavioral habits, fundamentally controls pollution, and promotes cooperation with private entities to conserve the local watershed environment.

The next step is for the Civilian River Leaders System to understand the values of stakeholders in the watershed environment, share information, understand different perspectives, provide information on pollution control measures in the watershed, secure the right to participate, ask questions, and supervise the private sector. Currently, steps are being taken to promote dialogue among stakeholders. In general, there are five points: (1) mobilizing relevant actors in the watershed to participate in the improvement and conservation of the

water environment, (2) using participation methods that fit the specific realities, (3) setting up appropriate participation platforms, (4) promoting the timely exchange and disclosure of information, and (5) promoting the improvement of environmental awareness and behavior of private actors.

On the other hand, a lack of precedent means that Guiyang City's Dual River Leaders System is still at the stage of exploration and practice, and still faces numerous challenges. Further research is needed to solve these problems, including establishing a comprehensive training system for the Civilian River Leaders System, drafting a plan to ensure the stability of the Civilian River Leaders System, and promoting the participation of various stakeholders in the local watershed. However, considering the flexibility and possibility of restoration of the Civilian River Leaders System in the development of the Dual River Leaders System, future prospects are bright. In addition, given the history of its development as the sum of various trials and errors and experiences, a method of private participation that corresponds to the reality of China is expected to bring new hope to watershed governance.

We will continue to conduct action research and monitor the future development of the Dual River Leaders System in Guiyang City, and develop a more comprehensive study by combining other cases.

Notes

1) Otsuka (2010) mentions in the definition of the Dual River Leaders System that in June 2008, the Jiangsu Provincial Office issued the "Notice on the Implementation of the Dual River Leaders System in the Major Inlet Rivers of Lake Taihu." The notice states that for each of the 15 rivers flowing into Lake Taihu, the provincial leadership and local leaders will become River Leaders and be responsible for the formulation, implementation, coordination, supervision, and inspection of the comprehensive river water environment improvement plan. Note that the Dual River Leaders System in Jiangsu Province in 2008 refers to Governmental River Leaders at the provincial level and Governmental River Leaders at the local level, while the Dual River Leaders System in Guizhou Province in this study includes Governmental River Leaders and Civilian River Leaders, which is an important distinction.
2) For example, the Ecological Environment Department is in charge of environmental protection affairs, the Water Conservation Department has jurisdiction over water supply administration, the Construction Department is in charge of the administrative management of building and construction related to water facilities, and the Agriculture Department controls sources of pollution in agriculture.
3) Nine Dragons of Water: Because many dragons are in charge of rainfall, which means differing opinions cannot be resolved, no dragon is responsible for the jurisdiction of

rainfall. A similar phrase in English is “too many cooks spoil the broth.”

4) In November 2012, the 18th National Congress of the Communist Party of China (CPC) proposed the concept of a “Community with Shared Future for Mankind.” It emphasized that no individual or group of individuals can survive without mutual dependence and support, and that we should “live and laugh together” believe in the bonds between people and the power of human beings. Based on this idea, “ecological community” embodies the idea of a “community of destiny” in the ecological environment, emphasizing the symbiotic relationship between parties. Governments, individuals, enterprises, and communities living in the same environment are considered interconnected communities of destiny, living together in mutual dependence and support. We should work together to create a new win-win partnership of cooperation and unite our minds to achieve the sustainable use of the ecological environment.
5) Guizhou Provincial Bureau of Statistics: In 2015, there were 4.93 million poor people in Guizhou Province, ranking first in the country and accounting for 8.77% of the nation’s poor population. The entire province contains 66 poor counties, 190 poor townships, and 9,000 poor villages.
6) The annual salary of a general manager of a small department with 3–5 employees in a local company is about 180,000 yuan. As such, the service charge of 180,000–200,000 yuan/year is equivalent to the company hiring one more employee. As this burden alone can provide the overall support for the Civilian River Leaders Systems, companies will not reject this type of proposal.
7) WeChat groups were established that include the public, volunteers, private river captains, representatives of related companies, related government departments, experts in various fields related to environmental protection, the media, and others interested in local environmental protection. Citizens who discover environmental issues in the watershed can use the WeChat group to report it to the Dual River Leaders System. Subsequently, Civilian River Leaders can examine the issue and report their findings on the WeChat group. Expert members of the group can provide professional guidance based on the situation, and the relevant Governmental River Leaders System and enterprises can cooperate in watershed governance.
8) The method and effect of environmental improvement will be disclosed to the public so that they can supervise it. If a special environmental problem arises, public participation meetings such as roundtable conferences, briefing sessions, exchange meetings, and mediation sessions will be used to promote the resolution of environmental problems and avoid disputes. The first author has participated in several public participation meetings.
9) We obtained consent from our fellow investigators to publish the photos.

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