COMPREHENSIVE STUDY ON REVITALIZATION OF AREA AROUND DAM: BENCHMARKING CASES FOR PILOT PROJECT

By

KIM, Dokyoon

CAPSTONE PROJECT

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF PUBLIC MANAGEMENT

2018

COMPREHENSIVE STUDY ON REVITALIZATION OF AREA AROUND DAM: BENCHMARKING CASES FOR PILOT PROJECT

By

KIM, Dokyoon

CAPSTONE PROJECT

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF PUBLIC MANAGEMENT

2018

Professor Jongyearn LEE

COMPREHENSIVE STUDY ON REVITALIZATION OF AREA AROUND DAM: BENCHMARKING CASES FOR PILOT PROJECT

By

KIM, Dokyoon

CAPSTONE PROJECT

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

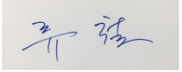
For the Degree of

MASTER OF PUBLIC MANAGEMENT

Committee in charge:

Professor Jongyearn LEE, Supervisor 

Professor Dong-Young KIM 

Professor Cheol LIU 

Approval as of December, 2018

ABSTRACT

In the 20th century, the construction of large dams has had a negative social and economic impact on the residents. The area around the dam has been submerged, causing most residents to migrate. As a result, the local economic structure weakened and the area around the dam has been restricted to various regulations. Therefore, it is necessary to improve regulations and activate the waterfront around the dam to make it a more friendly facility for the residents.

The introductory chapter explains the background of why the area around the dam must be given attention. Each of the subjects of study is handled independently or synthetically in each chapter using a similar kind of Preliminary Feasibility Study. Chapter 2 explores the background study on the status and conflicts about environmental regulation and the utilization of the area around the dam. Chapter 3 examines the brief economic analysis of its revitalization. Chapter 4 studies policy and regional development analysis with cases on improving environmental regulation. Chapter 5 suggests an establishment of governance for revitalization. The suggested measure to revitalize Daecheong dam (lake) is elaborated in Chapter 6, along with the review of basic concepts and suggestions on proper revitalization. Finally, Chapter 7 focuses on the discussion of the research findings and suggest initiatives on the revitalization, as follows. First, revitalize by improving regulations corresponding to the changes in people's demand for the waterfront and technical progress of water treatment. Second, enhance the value of the area around the dam as a local attraction. Third, activate the project by establishing good deliberative governance.

Keywords: dam, waterfront, revitalization

TABLE OF CONTENTS

I. INTRODUCTION 1

A. Background and Objectives 1

B. Scope and Methodology 3

II. BACKGROUND STUDY 6

A. Review on the Area around the Dam 6

B. Collect Socio-Economic and Environmental Data 13

C. Overseas Cases 16

III. ECONOMIC ANALYSIS 23

A. Demand Analysis 23

B. Cost Estimation 24

C. Benefit Estimation 25

D. Cost-Benefit Estimation and Limitation 26

IV. POLICY AND REGIONAL DEVELOPMENT ANAYSIS 27

A. Consistency with Policy Direction 27

B. Regulation Improvement 27

C. Policy Risks 30

D. Case Studies on Regional Impact 31

V. GOVERNANCE **36**

A. Necessity 36

B. Good Governance on the Area around the Dam 38

C. Findings and Lessons Learned 39

VI. PILOT PROJECT **40**

A. Status and Basic Concept 40

B. Comprehensive Analysis 42

VII. CONCLUSION **46**

A. Implications 46

B. Limitation of the Study 48

Reference **49**

LIST OF TABLES

Table 1. The flow chart of the study using PFS 5

Table 2. The change on financial backwardness in local government around the dam 6

Table 3. The change of population in local government around the dams 6

Table 4. Regulations in the area around the dam 8

Table 5. The economic effect of recreational activities around dams 18

Table 6. The case of eco-friendly development around dams in the U.S. 18

Table 7. Protective measures for in-taking clear water in EPA. 19

Table 8. Comprehensive analysis of Daecheong dam. 40

LIST OF FIGURES

Figure 1. The analysis diagram of the study 5
Figure 2. Status of financial backwardness and elderly population 7
Figure 3. Examples of similar facilities around the dams 7
Figure 4. Example of Daecheng dam regulations 10
Figure 5. Examples of recreation activities around dams 19
Figure 6. View of Kemnade see 21
Figure 7. Waterfront of Kemnade see 21
Figure 8. Marina barrage 22
Figure 9. Example of facilities for tourism around the dam 25
Figure 10. Tourism item of Miyagase dam 32
Figure 11. Overview and waterfront of Kanayama dam 32
Figure 12. Pilot project of Jeollabuk-do designated energy self-sufficient village 34
Figure 13. Status and SDGs of Shimokawa 35
Figure 14. Status and basic concept of the development around Daecheong Lake 41
Figure 15. Suncheonman National Garden 43
Figure 16. Garden and facilities of Nami Island 43
Figure 17. Education program on conservation and development for sustainability in ARWEC 44
Figure 18. Facilities for maintaining water level 45

I. INTRODUCTION

A. Background and Objective

1. Background

In the 20th century, the construction of large dams has had a negative social and economic impact on residents. The area around the dam has been submerged, causing the migration of most residents. As a result, the local economic structure has weakened and the area around the dam has been subjected to various regulations. These include regulations relating to the preservation of the natural environment, the protection of water resources and waterfront area, which have a negative impact on the land price decline and regional economic contraction.

Considering the benefits a dam brings to the people and the development of a country, it is time to think about the area around the dam that has been alienated due to the enactment of the special law on eco-friendly conservation and utilization of the area around the dam in June 2018. There is a need to improve the living quality and welfare of residents by reconstructing the roads around the dam and investing in public facilities. Residents must also be aided in developing a stable source of income establishing environment-friendly projects that meet local characteristics.

Previously confined to safe drinking water and environmental awareness, the public is now interested on the issues of ecosystem conservation and pleasant waterfront. As a result, the demand for cleaner water needed for the environment (ecology), scenery and recreational activity is on the rise (H. Kim, 2015). Based on the keywords appearing in newspaper articles about water environment, it can be seen that people’s interest has shifted from water quality, sewerage, and water supply to the living aquatic ecosystem and playing with water. (B. Lee, 2013)

Recently, the function of the dam as a lake has been highlighted. The lake, made by the dam, has created a new landscape and has the possibility to provide various waterfronts. For the future, the waterfront around the dam should be preserved as an eco-friendly area. However, it should be developed into a space that can provide pleasure and aesthetic satisfaction to local residents and the people.

If the waterfront around the dam is improved and developed into an eco-friendly area, it can meet the recreation and leisure needs of the residents and tourists and, at the same time, revitalize the local economy. People's awareness on the environment has increased, and the desire to enjoy cleanliness is also growing. A representative example related to this is the Suncheonman Wetland Reserve and National Garden, which actively conserves the local natural environment and resources. Local government and residents constantly striving to attract tourists recognize that environmental conservation, including water quality of the wetland, is of the utmost importance. Therefore, it is now necessary to provide incentives for environmental conservation efforts rather than by imposing regulations. It is desirable to actively manage the pollutant factors in the area around the dam and to improve its autonomous economic activities and environmental conservation.

Compared to the past paradigm, people’s awareness on dams has also changed. There is an increasing tendency to regard dams as new resources for regions or countries. The dam should no longer be used for flood control or water supply purposes but should also be used in a variety of ways, including waterfront functions. Therefore, it is necessary to develop the waterfront around the dam and turn it into a more friendly facility for the people. To this end, the new value of the dam (lake) needs to be satisfied, not only for economic revitalization around the dam, but also for people's desire to utilize waterfront.

2. Objective

It is necessary to establish strategies for eco-friendly utilization of dams for it to be more responsive to people' diverse needs while ensuring the sustainability of water management. Water must be secured and managed in a sustainable manner and its demand must be rationally coordinated right from the planning stage (H. Kim, 2015).

Therefore, this study examines the regulations concerning the conservation of the natural environment and the extent of participatory governance in order to revitalize the local economy around the dam. This study is also expected to enhance the performance of the pilot project and contribute to the establishment of a new approach and strategy for regional economic revitalization projects in the area around the dam.

B. Scope and Methodology

1. Subject and scope

There are various regulations in the area around the dam to protect and preserve the water quality, natural environment, and scenery. These regulations have contributed greatly to maintaining water quality at current levels by restricting pollutant emissions into sources. The area protecting water resources has been designated 40 years ago and has been maintained without any big changes. However, there are many socio-cultural changes and technical progress, such as changes in the population and pollution sources, the growth of people's awareness of environmental preservation, the development of water treatment technology, and so on. It is necessary to achieve conservation of water quality and revitalization of the local economy by reviewing environmental regulation based on new strategies, rather than the traditional approach of unconditional deregulation or imposing restrictions.

The purpose of this study is to investigate the status of various environmental regulations around dams, and to suggest ways to improve such regulations to achieve both water quality assurance and regional economic activation. This study also aims to suggest the establishment of desirable governance for the improvement of environmental regulation and the formation of consensus among local governments and residents about the activation of the local economy. To sum up, the scope of this study covers the revitalization of the area around the dam, the improvement of environmental regulation of the area, and the establishment of a participatory governance approach.

2. Methodology

Through a process of Preliminary Feasibility Study, each aspect of revitalization is analyzed independently in each chapter of this study. First, Chapter 2 explores the status and conflicts about environmental regulation and utilization of the area around the dams, including the result of domestic and overseas field trips. Chapter 3 discusses a qualitative economic analysis on the revitalization of the area around the dams. Chapter 4 analyzes policy and regional development through several cases of environmental regulation improvement. Chapter 5 suggests the establishment of good governance for revitalization of the dams. The project pilot for the revitalization of the Daecheong dam (lake) is elaborated in Chapter 6, together with a review of basic concepts about the pilot project and suggestions on its proper revitalization. Finally, Chapter 7 focuses on a discussion of the research findings and suggestion of initiatives to revitalize the area around the dam. To sum up, this study examines the conceptual framework about the regulation and revitalization of the area around the dams by the following steps specified in Figure 1.

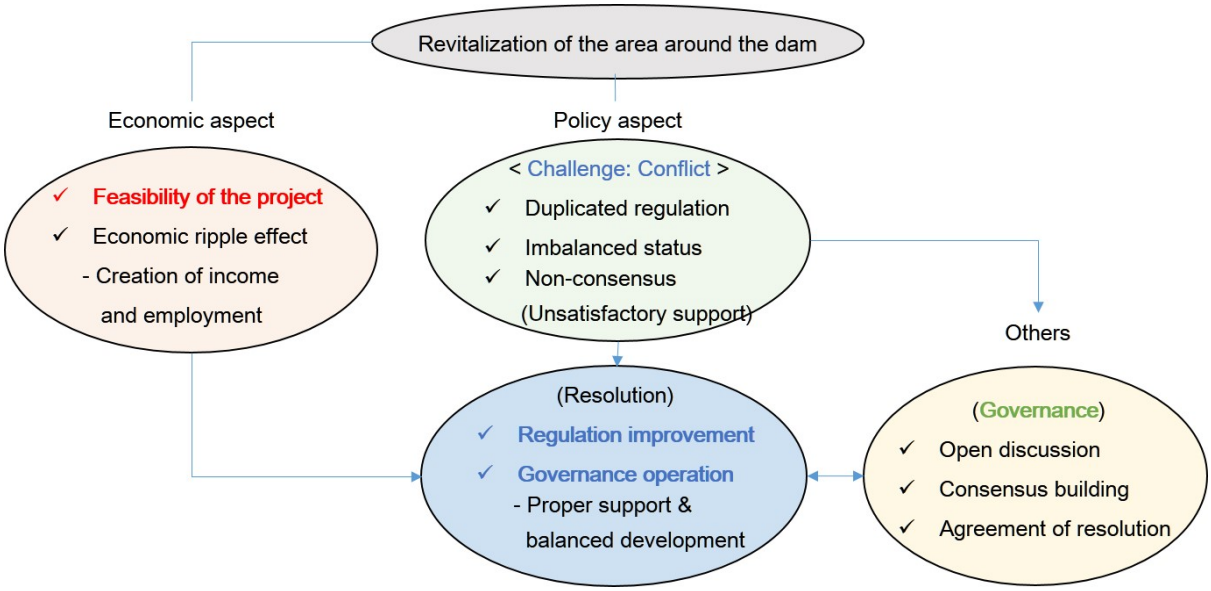


Figure 1. The analysis diagram of this study

Table 1. The flow chart of this study using Preliminary Feasibility Study

II. BACKGROUND STUDY

A. Review on the Area around the Dam

1. Economic and social status

By the end of 2016, the financial backwardness of the areas around the dams is less than half (19.9%) of the national average (52.5%), presenting a serious economic issue. In addition, the elderly population (aged 65 or over) who have low productivity is 3% higher than the national average of 13.2% (16.6%), which is unfavorable to local economic conditions (K-water, 2017 and KOSIS, 2016). Because of the poor financial backwardness of local governments, complex regulation and lack of accessibility to development areas, attraction of private capital has been limited. This cause the abolition of most plans for encouraging private capital to come in (K-water, 2017).

Table 2. The change of financial backwardness in local government around the dams

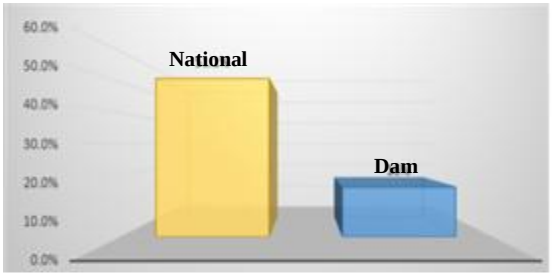
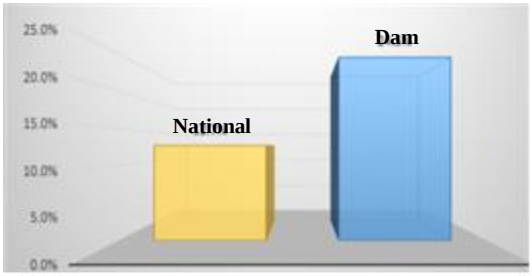
	Rate of financial backwardness (%)					
	2012	2013	2014	2015	2016	Avg.
National Avg.	52.3	51.1	50.3	50.6	52.5	51.4
Dam's Avg.	18.0	17.8	18.4	18.9	19.9	18.6

Source: K-water (2017), modified by the author

Table 3. The change of population in local government around the dams

	Year				
	2012	2013	2014	2015	2016
Population	154,252	154,630	162,404	163,031	163,256
Over aged 65	23,234	24,012	25,844	26,543	27,181
Rate	15.1%	15.5%	15.9%	16.3%	16.6%

Source: K-water (2017) and KOSIS (2016), modified by the author

Financial backwardness	Elderly population
	

Source: K-water (2017), modified by the author

Figure 2. Status of financial backwardness and elderly population

Although the plan to revitalize the area around the dam has been established continuously, it was implemented only in the vicinity, especially in the downstream area of the dams due to budget allocation. The ecological and cultural tour course was also planned around the dams, but this was concentrated only near the dam also due to insufficient budget.

Each dams does not have its own distinct tourist attractions and similar facilities (water cultural centers, sports facilities, memorials, etc.) are installed in there. Resorts and pensions near the dams operated by the private sector are also not open for tourists due to the lack of sightseeing facilities.

		
Jangheung Dam Water Culture Center	Hapcheon Dam Hwayang Park	Sumjin Dam Memorial Monument

		
Chungju Dam - Chengpung Resort	Chungju Dam - Chungju Resort	Chungju Dam - ES Resort

Source: Google images

Figure 3. Examples of similar facilities around the dams

2. Regulation status

Regulation is a means of government control. Dudley and Brito (2012) defined regulation, also called administrative laws or rules, as specific standards or instructions concerning what individuals, businesses, and other organizations can or cannot do. Similarly, the Australian Government (2014) stated that regulation may be defined as any rule endorsed by government where there is an expectation of compliance (S. Lee, 2018).

Environmental regulation

The area around the dams has many limitations due to overlapping regulations on environment and land use. There are differences in the types of regulations on each dam, and “the area on preserving natural environment”, “the area on protecting water resources”, “waterfront area” and “mountain area for preservation” are mainly applied as means for hindering the development of the area around the dam. In particular, existing dams, which was built before the 1980s, are over-regulated compared to recently built dams. As a result, regulations do not fully reflect the current social, technological and environmental changes, although the demand for deregulation has been increasing steadily. Tables 4 and 5 show the coverage and current state of regulation in each dam.

Table 4. Regulations of the area around the dam

Regulation	Designation criteria of regulated area
Area on Preserving Natural Environment①	· Areas required for conservation and protection of natural environment, water resources, coastal ecosystems, water resources, cultural assets and fisheries resources
Area on Protecting	· Water surface and adjacent areas designated for the protection and

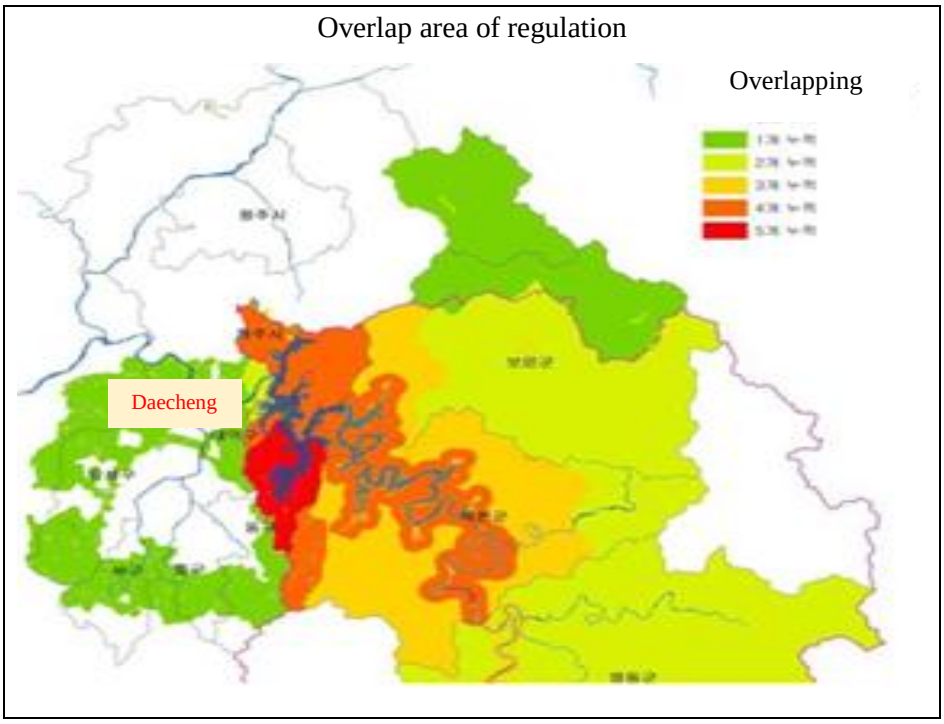
Fishery Resources②		cultivation of fishery resources
Area on Limiting Development③		· Areas that restrict urban development in order to prevent the disorderly spread of the city, to preserve the natural environment, and to ensure a healthy living environment.
Area on Protecting Water Resource④		· Lake: 4km from the water intake point (Water source with intake more than 100,000 tons per day: FWL)
Waterfront Area⑤		· Water supply dam, Geum River in special measures area: Within 1km from the dam and river boundary · Geum River outside special measures area: Within 500m from the boundary of the river · Streams directly flowing into Geum River: Within 300m from the boundary of the river
Special Measure Area⑥	Zone Ⅰ	· Considering the impact on the water quality of Daecheong Lake, the area close to the water source
	Zone Ⅱ	· Considering the impact on the water quality of Daecheong Lake, the area far from the water source
Mountain Area for Preservation⑦		· Restricted areas for reasonably conserving and using mountain areas

Source: K-water (2015), modified by the author

Table 5. Environmental regulations according to the dam

	Soyang	Chungju	Andong	Sumjin	Hapcheon	Daecheng	Yongdam
Regulation	①②⑦	⑦	①②⑦	①②④⑦	⑦	① ②③④ ⑤⑥⑦	⑤⑦

Source: K-water (2015), modified by the author



Source: K-water (2016), modified by the author

Figure 4. Example of Daecheng dam' regulations

Land use regulation

Most of the land use around dams is used as agricultural land, except for forests. The ratio of cultivated land in major dams is as follows: 90.6% of Daecheong Dam, 88.4% of Chungju Dam, 89.0% of Andong Dam, 89.4% of Soyang River Dam. On the other hand, the land used for parks, sports grounds, and amusement parks is only 1.2% on average. The percentage of "area on preserving natural environment" among the total administrative area is as follows. The Soyang Dam is 202.46 km^2, which is about 6.0%, and the Andong Dam is 229.8 km^2, which is equivalent to 15.2%. In particular, Daecheong Dam has 94.9 km^2 of area that is categorized as "preserving natural environment preservation area" and 179 km^2 is "area on protecting water resources." Most of areas around the dam are covered by two or more regulations. (K-water, 2015)

3. Conflict caused by regulation

The cause of the conflict

Conflicts cannot be solved easily because they arise from various political, legal, institutional and administrative, economic, and practical causes. The causes of the conflicts over regulation come from the inconsistency between the groups with benefits and the groups with disadvantages. Groups that benefit from regulation are able to have many interests, while residents in regulated areas are constrained by daily inconveniences and property rights. The nexus of “regulation and benefit conflicts” must always be assessed in a case-to-case basis. Without conflict assessment, there may be unnecessary conflicts in the area around the dam, which restricts the revitalization of the region due to restrictions on development

Case studies (K-water, 2016)

1) Soyang dam

Data about Soyang dam’s (2015) show that the annual water supply was at 1,213 million tons (70% utilization rate) at design, but the annual actual water supply averaged over 38 years after completion was 2,087 million tons due to increase in the inflow and flood control capacity (350 to 500 million tons). This is 171% of the calculated value in design. Despite the continuous improvement in performance, local residents have constantly been concerned about the safety of the dam, expansion of water supply facilities and installation of various waterfront parks.

The area around the dam was mostly regulated, except for farmers' houses, elementary schools and military facilities. Even the construction of the barn was limited and the property loss of the residents was serious. However, in 2010, the central and local governments released 98.43km^2 of Chuncheon, Yanggu and Inje from being “areas on preserving

environment conservation area around dam” in response to the needs of residents.

2) Andong dam

After the completion of Andong Dam in 1975, 231.51km^2 around the dam (lake) was designated as the “area on preserving a natural environment”. This corresponds to 15.9% of the total area in Andong. Residents have a negative position on the dam because of restrictions on the development due to the regulations imposed and the lack of roads and measures for migration when constructing the dam. Special support is continuously required for a rational adjustment of regulations and improvement, similar to other dams. Recently, in order to solve these problems, K-water is promoting the deregulation of the “area on preserving natural environment”. It is expected to promote the sustainable development with the lake of Andong.

Rational adjustment on regulation

The principle of regulatory adjustment can be presented in three ways. First, it must be rigorous to achieve the purpose of the regulation but it should relax the regulation that is not related to the purpose. Second, there should be enough time to provide sufficient information about the regulation in order to minimize the damage of the residents. Finally, complicated regulations should be streamlined and systematized to increase public understanding. (S. Lee, 2018)

As mentioned above, in order to relax regulations around the dam, the following policy should be considered. First, the preventive environmental protection of water resources should take precedence in accordance with the principle of precaution. Regulatory adjustments should be made on the premise that environmental risks are minimized through prior environmental impact assessments. Second, risky development should be avoided since

it is difficult to restore already damaged water resources. Development should be a sustainable way to improve water quality as well. Third, the administrative responsibility is bound to the developer. Responsible fulfillment should be done. Fourth, environmental problems are caused by economic activities, so all stakeholders should cooperate and participate. (K-water, 2016)

B. Collect Socio-Economic and Environmental Data

1. Survey on recreation pattern and activities

The following is the result of the survey of 300 people, conducted by Kangwon Development Research Institute from 2015 to 2016, about the recreational activities around dams and the utilization of the waterfront around the Soyang Dam. These results are similar to the results of the survey on Daecheng Dam and Chuncheon in this study.

Previous survey on recreation pattern

The average frequency of leisure activities was one to three times per year (47.0%), and 42.3% of the respondents said that they spend their leisure activities with their family. For leisure activities, the most suitable time for moving was within 1 hour, and it was considered to be within 2 hours. Some 55% of the respondents prefer to do the leisure activities on day time.

All respondents have had outdoor leisure activities for the last two or three years. The average annual frequency of outdoor activities was the highest at two to five times per year (65.0%). The types of leisure activities that were mainly enjoyed were visiting famous restaurant and cafes (20.9%) and enjoying natural sceneries (19.9%).

When choosing an outdoor recreation spot, respondents were mostly interested in the great landscape, food, and local specialties. If the respondent visits the waterfront area as leisure

activities, the most important factor is the variety of enjoyment and beautiful natural sceneries, especially clear water.

Results of the analysis of the survey on the preference level of outdoor leisure facilities show that “the natural scenery viewing” was the highest with 81.6 points, followed by “dining activities such as restaurants and cafes” with 76.8 points, “driving and picturing” with 76 points. “water leisure” had the lowest preference score of 56.0 and “land leisure”, with 61 points, also had low preference. As a result of frequency analysis, there were more opinions that “water leisure” was not favored and other items were relatively preferred. The preference for “on-the-ground leisure” is almost the same as the opinion on “water leisure.”

Previous survey on recreation activities around the dam

With regards to the importance of the role of the dam, 40.3% of the respondents said that it is to secure energy and water supply, while 32% answered to prevent flood. Meanwhile, 74% of the respondents said that they needed a leisure space using the area around the dam, and 41.7% said that it was because of the good scenery. In addition, most of the opinions about the attraction of leisure activities around the dam were diverse places to enjoy, such as restaurants and local specialties. On the other hand, 54.5% of the respondents chose environmental conservation because they do not need a leisure space using the dam. Despite the necessity of using the area around the dam, the preference for development is almost the same as the opinion of conservation.

2. Verification on the previous survey

The following is the result of the interviews done about the recreational activities around the dams and the utilization of the waterfront around the dam during Daecheng Dam Marathon Festival (held every October 14) and the Chuncheon Marathon Festival (held every October

28) in this study. The respondents were 46 and 32 persons, respectively, for each festival. The question asked were the same as the previous survey mentioned.

The average frequency of leisure activities was one to three times per year (52.6%), and 47.4% of the respondents said that they spend their leisure activities with their family. For leisure activities, the most suitable time for moving was within 1 hour (44.9%), and it was also considered to be within 2 hours. More than half (52.6%) of the respondents prefer to do the leisure activities at day-time.

All respondents have had outdoor leisure activities for the last two or three years. The average annual frequency of outdoor activities was the highest at two to five times per year (61.5%). The types of leisure activities that were mainly enjoyed were also visiting famous restaurant and cafes, and enjoying natural sceneries. Respondents who are members of clubs, such as swimming and triathlon, prefer water leisure.

With regards to the role of the dam, 44.9% said to secure energy and water supply while 43.6% said to prevent flood. Some 85.9% of the respondents said that they needed a leisure and healing space around the dam area. In addition, most of the opinions about the leisurely attractions in the dams show the need for shops like restaurants and local specialties. On the other hand, a few of the respondents attached the comment on the conservation and proper budget (tax) use. The results of this survey have relatively low reliability because respondents are specific groups that enjoy leisure activities frequently and the survey area is the area around the dam. Contrary to the researcher’s anticipation as low preferences, the results of this survey are similar to those of the previous one.

3. Findings

Results of the two surveys generated the following conclusion that can help to activate the

area around the dams.

First, tourists do not aim to directly visit the dam. Most of the tourists in Soyang Dam visit Chuncheon because natural scenery and simple sightseeing. They did not actively consider visiting the dam at the beginning of the trip.

Second, the representative image of the lake is focused on beautiful scenery. This can both be an advantage and a disadvantage in utilizing the value of the dam. The clearness of the landscape image can induce tourists to visit but there are no other specific means of tourism.

Third, tourists who visited Soyang Dam want to stay for an hour on the boat and walk around the waterside for an hour. Therefore, the operation of facilities on waterfront can be developed into a tourism service.

Finally, how to transport travelers to the area around the dam is an important challenge. It is anticipated that the accessibility and convenience of travelers by public transportation will become increasingly important.

C. Overseas Case

The following is a review of the cases concerning participation in education program, and field surveys. Field surveys were conducted in the United States (July 2018), Europe, particularly in Germany (May 2018) and Singapore (December 2017).

1. The United States

In the United States, the federal and state governments manage dams, while the management of the federal dams (1,782) is divided into the USACE (712), USBR (288), USFS (268), and so on, in accordance with the purpose. State’s agencies operate dams in accordance with the objectives of the dam project, and for providing public-sector recreational functions to the

private sector, each state’s agencies have a partnership with seven federal agencies (Bureau of Land Management, Bureau of Reclamation, Army Corps of Engineers, Forest Service, Fish and Wildlife Service, National Park Service, and Tennessee Valley Authority). The dam, managed by the federal government, did not include recreational facilities at the time of the construction. However, as the demand for recreational activities such as boating, fishing, swimming, hiking and so on, increased rapidly, the federal government is also prompting the installation of recreational facilities in the area around the dam. Thus, the United States considers dams as a new national resource. It is trying to maximize the new value of the lake formed through constructing dams. Dams and lakes are developed as tourism and recreational resources and are open to the public to utilize them.

The United States has established and enforced legal and institutional bases for the revitalization of dams, such as the recreation and the improvement of the waterfront value, rather than the regulation of dams. Since 1965, the Recreation Act (US federal law) has recognized recreation in dams and lakes as the rights of citizens and reflects them in the early stages of water resource development.

Case study

US state Iowa surveyed the economic effects and the number of visitors around the lake and visitors' preferences for recreational activities on 132 lakes in the state. The survey was conducted for about 8,000 people for four years from 2002 to 2005. During the survey period, the total number of visitors to the lake was 11,977,633, generating about $ 1.2 billion of revenues for the area. The economic value was estimated as $ 395 million (as of 2011), and the number of jobs created was at about 14,000. Lake visitors answered the water quality (clear water) as the most important purpose of visit. This is the same result as the above-mentioned survey in South Korea. It was surveyed that fishing and picnic activities were the

most preferred among recreational activities in the lake. In addition, the age distribution of visitors was found to be the highest, belonging to the 50-60 age group.

Table 5. Economic Effects of Recreational Activities in Iowa, USA

	Visitors	Expenditure ($, Mill.)	A. Value ($, Mill.)	Income ($, Mill.)	Employ ment
State Owned Park	3,704,306	$786	$376	$216	7,472
Federal Owned Park	24,000,000	$609	$292	$168	5,789
Trekking	1,851,011	$22	$8	$5	169
Lake	**11,977,633**	**$1,210**	**$395**	**$302**	**14,766**
River	18,780,745	$824	$269	$130	6,351
Total (A)	60,313,695	$3,451	$1,340	$821	34,533
Duplication (Park & Lake B)	3,759,848	$377	$181	$104	3,583
Net Total (A-B)	56,533,847	$3,074	$1,159	$717	30,964

Source: The Iowa Lakes Valuation Project (2009)

Otherwise, dams located in the western U.S., esp. California and Nevada, are actively utilizing waterfront activities such as walking trails, camping grounds, boats, swimming, resort, water skiing, and cruising. People can enjoy water sports on most lakes, while dams provide leisure and recreation with relaxation and cultural space in connection with the waterfront.

Table 6. The case of eco-friendly development around dams in US.

	Location and Facilities
Oroville dam (Lake Oroville)	· Oroville, northern CA, Feather River, East of Sacramento Valley · The lake offers multiple recreational activities (Fishing, Boating, Camping, etc.) for the public to participate in. · Approximately 0.3 million visits per a year
Folsom dam (Folsom Lake)	· Nevada and Arizona, American River, Northeast of Sacramento · Folsom Lake State Recreation Area (managed by California Department of Parks and Recreation), hiking, camping, biking, fishing, boating, and horseback riding. · Approximately 0.5 million visits per a year
Hoover dam (Lake Mead)	· Nevada and Arizona, Colorado River, the largest in US · Daily Tour, Cruise, fishing, boating and water-skiing etc. · Approximately 1 million visits per a year

Source: Field survey, information book and web site

		
Oroville	Folsom	Hoover

Source: Google images

Figure 5. Examples of recreation activities around dams

On the regulatory aspect, the management of the water supply in the United States suggests a system suited to the characteristics of each water source rather than a uniform rule considering the characteristics of the different water sources. Due to the recent increase in the use of various pollutants and the development of analytical technology, the EPA has provided various guidelines and regulations for conservation and development of water resources.

Table 7. Protective measures for in-taking clear water in EPA

	Protective measures for in-taking clear water
Managing Contaminants	To control pollutants and non-point pollutants that cause harm to water quality, clean and purify to reduce contaminants
Use Prohibitions	Prohibits the use or storage of hazardous substances in water conservation areas through local regulations or by acts.
Zoning Ordinances	Define the types of activities that can occur in water conservation areas, and prevent activities that could harm the water by appropriate regulations.
Subdivision Ordinances	The use of land is promoted in accordance with the development and growth period of local governments, taking into consideration the conservation of natural environment and the density of dwellings.
Purchase of Property or Development Rights	Local governments limit the use of land in water conservation areas by using funds to acquire land or easements for conservation.
Public Education	To encourage community interest in water conservation by activities such as holding workshops and fairs, and making publicity pamphlets
Local Health Regulations	Local health regulations, such as prevent contamination by preventing the establishment of a septic tank near the intake.

Source: K-water, result of field survey (2017)

2. Europe

The activation of area around dams in Europe has been used for recreational purposes like in the US. There are differences among countries, however. Spain and Portugal, where tourism is the main source of income, regard dams and reservoirs as important tourism resources. Germany is not obliged to identify dams in this regard but they consider recreation as a main function of dam reservoirs. The UK, meanwhile, has mandated the installation of recreational facilities for dam builders. The Water Resources Act of 1991, also called the Water Industry Act of 1991, was also enacted. If reservoir users or administrations want to develop and operate reservoirs that are not primarily for the benefit of local residents, it is obligatory to install recreational facilities and leisure facilities for the residents near reservoirs.

Case study: Kemnader see (Lake of Kemnade) as sound venues, Bohum in Germany

In northern Germany, the developed steel and port industries declined, and cities based on these industries, such as Bohum and Dusseldorf, also declined. A lot of urban redevelopment projects have been promoted to revitalize these cities. The representative case is Kemnader See.

The Kemnader See (length: 3km, shore length: 8.75km, area: 125ha), a lake-shaped river constructed in the 1970s by the small dam (or weir) of the Ruhr River, developed an eco-friendly waterfront. Development, conservation and preservation of the existing natural environment were balanced based on various design ideas while preserving the existing natural environment. The waterfront on the left of Kemnader See has been created as a center for leisure and recreation facilities. The right waterfront was developed as a creek and a wetland site, excluding recreation facilities (except trails, bicycles, etc.).

This spatial planning was done through research on the sustainable development of the

waterfront. The waterfront of Kemnader See reflects to maximize the biodiversity, adapting the level of space utilization and sustainable development techniques to ensure proper harmony between watershed's conservation (regulation) and utilization (deregulation). In addition, the waterfront of Kemnader See is managed as a protected area, a biodiversity area, a static and dynamic activity space, and a cultural space according to the space utilization stage in order to preserve and improve biodiversity. This case is considered to be a desirable model for sustainable and sound development through the construction of small dams in lakes.

Bird's-eyes view

Aircraft Photo

Source: Kemnader see website, https://kemnadersee.de/

Figure 6. View of Kemnade see

Left-side waterfront

Right-side waterfront

Source: Google image

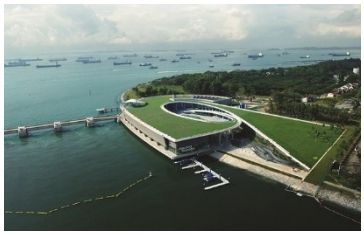
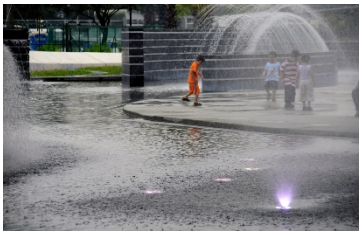
Figure 7. Waterfront of Kemnade see

3. Singapore: Marina barrage as attractive venues

Singapore's Marina barrage does not only supply and control water, it is also a multi-cultural

tourism facility that has become one of Singapore's tourist destinations. Marina barrage is a dam built on the southern shore of Singapore across the Marina channel. As mentioned above, Marina barrage serves as a resting place for citizens. In particular, the Sustainable Singapore Gallery, an environmental management exhibition, will help visitors understand the purpose of barrage installation and how to create a sustainable and livable Singapore as an education venue. Besides the Sustainable Singapore Gallery, there are facilities where people can take a rest. Green roof is installed to lower the temperature of the building and make the waterfront area freely available to the public. The central courtyard and water playground, located in the middle of the barrage, offers a spectacular view of Singapore’s skyline with a variety of water features, filled with waterfront activities children can enjoy.

These information are accessibly in the website of Singapore National Water Agency. The agency advertises that barrage brings about three benefits: water supply, flood control and lifestyle attraction. Like the other cases, recreation are an important part of the dam in Singapore.

		
Marina barrage’s overview	Sustainable Singapole Gallery	Green roof
		
Central courtyard	Water playground	Attraction on barrage

Source: Singapore’s national water agency’s web site

Figure 8. Marina barrage

III. ECONOMIC ANALYSIS

The economic analysis in this chapter only covers a specific demand and cost due to the brief feasibility review stage for the overall project. The economic analysis of this project will utilize qualitative data.

A. Demand Analysis

In recent years, tourism trends have been increasing in nature-centered ecotourism. People travel for the purposes of health, healing, education, culture and so on. While individual tourism is increasing, family tourism rather than group tourism, is also trending (Cho et.al, 2018). Waterfront areas are the subjects of natural ecosystem conservation and protection. They are also regarded as the subjects of leisure and tourism development that improve the quality of life because they are linked to human settlements, manufacturing and everyday activities (Kim. et.al, 2011). Therefore, it is important to recreate waterfront around the dam as recreation spaces for regional economic development.

Most of the area around the dam is able to promote mountain recreation and waterfront entertainment focused on natural resources. In particular, mountains around the dam are designated as national parks or municipal parks where there exist facilities to enjoy water activities. Chungju and Soyang dams are along the route of cruise ships in the lake, so they use the water resources for tourism. Overall, the dams are thought to have natural and cultural tourism resources.

It is difficult to determine the number of tourists visiting the dam but tourism is on the rise due to the increase in leisure activity with the recovery of the domestic tourist market and the change in working conditions.

The local residents living near Daecheong Dam have various demands of local residents but

these are positive for the project to revitalize the local economy. The local government and residents are expected to enhance the settlement conditions by improving the regulations, and hope to create new income sources and jobs through revitalization of the areas around the dam.

B. Cost Estimation

There is a limit to the cost review due to the early stage of the project pilot. There may also be a large variation in the cost of each facility and the area. Therefore, the costs in this part will be estimated through several similar projects in the area around the dam requested by local governments.

In 2017, Danyang-gun demanded the construction of a cruise ship dock, an observation deck, a waterfront walkway, a landscape lighting and a parking lot around Danyang submerged weir. Danyang-gun estimated the project to cost about KRW 15 billion.

On the other hand, the initial basic plan of the Danyang submerged weir project included the parks around the weir in 2007. But these parks were excluded since they are not feasible for the project (reduction KRW 8billion, original total KRW 72billion, approval total 64 billion).

The project for the ecological restoration of the Soyang Lake and the wetland creation was carried out by the request of Inje-gun to prevent the destruction of ecosystem and improve landscapes due to the water level change of Soyang Lake. It aims to create an “eco-friendly space” that utilizes the waterfront as a nature education site, eco-park, recreation, culture and leisure activities by the weir and wetland. This project will promote regional revitalization in connection with the Ice-Fish Festival of Inje-gum. The cost of the project was estimated at KRW 32.8 billion including the construction of weir.

However, the recent wall painting of Pyeonghwa Dam show another value of the dam as tourism resources. The art piece “The door to peace” shows the idea that using tourism resources is of utmost importance regardless of the cost. Listed in the World Guinness Book, the painting is the largest trick art in the world. It featured the value of time and another dam as a tourist attraction of the dam. The cost of the wall painting is reported less than KRW1.5 billion.

		
Danyang submerged weir (Chungju dam)	Inje submerged weir (Soyang dam)	The door to peace (Pyeonghwa dam)

Source: K-water report (2018)

Figure 9. The example of facilities for tourism around the dam

Cases analyzed show that costs vary widely depending on the area, size, and concept of the facilities. Although the costs vary, it can be estimated that the development of such facilities will amount to KRW40 billion, considering the maintenance of water level around waterfront. If a medium-sized waterfront park is established, the cost may estimate to approximate KRW10 billion.

C. Benefit Estimation

Direct and indirect benefits are generated from a project. In benefit estimation, however, some direct or indirect benefits are excluded. This include aspects that are difficult to quantify like the effects in the secondary market such as increased pleasure, regional development. (Lee, 2017). The projects of the revitalization around the dam are in a similar

case. It is difficult to estimate the direct and indirect benefits.

But, new attractions seem to be beneficial to revitalize the local area around the dam in a short period of time. News reports have documented that local attraction and the increasing tourism provide benefits to both residents and tourists, as officials say (Jung, 2018).

A similar case can be seen in the continuing implementation of the waterfront development project around the lake of the Korea Rural Community Corporation, which shows that the benefits of the project are enhancing as the Gosam and Yedang lake (Jeon, 2011).

It is difficult to make an immediate connection between the improvement of the site and the new income and job of the local residents. However, the continuous increase of visitors is expected to create ripple effects along with the economic revitalization.

D. Cost-Benefit Estimation and Limitation

Although the effectiveness of the project is clear and self-evident, the project should take into account budget planning, priorities and other alternatives.

As seen in the previous case – Danyang and Inje weir – it is difficult to refer to preliminary feasibility study cases because cost of the most projects is less than KRW50 billion. In addition, the Danyang submerged weir case showed a benefit-cost ratio of less than 0.1 in the economic analysis stage, thus the project was reviewed through the policy analysis method (KDI, 2009). Although this study does not extend the research of feasibility methodology for regional revitalization projects in the area around dams, this needs to consider using economic analysis methodology to determine proper budget allocation and priorities and other rational alternatives, concerning the opportunity cost.

IV. POLICY AND REGIONAL DEVELOPMENT ANALYSIS

A. Consistency with Policy Direction

The “Special Law on Eco-friendly Conservation and Utilization of the Area around the Dam” was enacted on June 13, 2018. The area around the dam is a well-preserved natural environment so the utilization of various waterfront areas for recreation and ecotourism is valuable. However, there have been opinions that there are limits to the activation of local economy due to various regulations. Therefore, a special law has been enacted to enable the eco-friendly utilization of the area around the dam in order to promote the sustainable economic promotion of the region while preserving the natural environment. This law also aims to contribute to the conservation of ecosystem and natural scenery around the dam and the sustainable development of the country. This law will be effective from June 2019, one year after the promulgation, and will remain in effect until 2027. (Ministry of Government Legislation, 2018) Therefore, it is necessary to select the proper waterfront that is difficult to develop due to the regulation. Next step is to improve the regulation and promote the project successfully during the period.

B. Regulation Improvement

The development of a waterfront around the dam can be expected not only to utilize the area around the dam, but also to make an employment and economic revitalization of the rural area. In addition, the development of recreation space using the dam waterfront can also be an important means of expanding leisure opportunities for the people and revitalizing the local economy. Therefore, it is desirable to cooperate with the state-owned enterprise responsible for dam management and the local governments to promote the maintenance and revitalization of the area around the dams. In South Korea, the policy related to the dam should provide an institutional support that reflects the well-being, health and leisure needs of the people.

Improvement of the regulation on protecting water resources

According to the “Water Supply Law”, the area on protecting water resources has been designated since 1962. While many regulations have improved over the last 50 years, they should adapt to the changing social, economic and technological conditions. Therefore, it is necessary to reflect the many social, technological and scientific changes for meeting the people’s needs instead of lifting regulations. In other words, it needs to preserve the water quality properly and at the same time to think about ways to improve the system for revitalizing the local economy. In this study, the improvement of regulation related to waterfront development will be discussed.

First, standard distances and widths of the “area on protecting water resources” should be improved after scientific investigation rather than following standards. This is to help local economic activities without affecting water quality. The development of a waterfront in a protected area should also be recognized as an objective of development, not a restriction due to regulations. Second, the influence on water quality should be examined according to regions and pollutions or other criteria as part of the diversification of management. This results to grading and managing water quality in more detail. For example, if the goal of water quality is accomplished for each watershed through the implementation of the water pollution total amount system, or if the pollutant discharged from the industrial complex does not affect the pollution of the water resource, the flexibility of the regulation should be enhanced so that local development can be carried out at a specified distance. Lastly, since the local economic revival is difficult due to regulations in the area around dams, it is necessary to find measures to ease the regulations on the living facilities that have little wastewater, and the industries with low pollution possibility.

Improvement of the regulation on the area around the dam

The area around the dam is designated as the “area on conserving a natural environment”, and it is regulated in areas where natural environment and water resources need to be preserved. The most restrictive regulations in nature conservation are the building-to-land ratio and restricting the use of buildings. In particular, in order to revitalize the area around the dam, it is necessary to take conservation measures for water quality using various new wastewater technologies to find ways to release restrictions on the use of buildings. For example, the IBK employee Education Center near Chungju Dam was constructed in the conservation area using the latest water treatment technology.

The “Special Measures Area” under the “Framework Act on Environmental Policy” was enacted in 1990 to preserve the water quality in Paldang and Daecheong Lake. The wastewater discharge facility can be installed within the range of the standard pollution concentration or the total amount, but it is impossible to install the landfill, waste recycling facility, golf course, change of the use of the building, and so on. Paldang and Daecheong are well positioned in terms of accessibility and development. Recently, advanced technologies have been developed to prevent the emission and diffusion of pollutants, so it is necessary to improve the regulations in the special measures area considering the development of technology.

Regulations in areas around dams are generally applied to the same kind of area in order to preserve the natural environment, as well as to protect the water source. When the regulatory area is widened due to the duplication of regulations, the available area becomes smaller and eventually, regional development becomes difficult. In the next chapter, it will be discussed that excessive regulation could be causing the conflicts that hinder the sustainable development of the areas around the dam. Therefore, as mentioned above, it is effective to

classify and manage the regulations around dams through technical review rather than uniform regulation.

C. Policy Risk

Dam should be regarded as a new national resource for the activation of the local economy of the area where a dam exists. The value should be maximized by establishing a tourism and recreational resource while taking water quality and environment into consideration first. Therefore, efficient promotion of resident support should be continuous and supplemented by the policy and the system.

Government financial support is necessary to revitalize the area around the dam by providing healing places for the people and pursuing a balanced development of the country. The Ministry of Culture, Sports and Tourism has a project of creating cultural tourism infrastructures on the riverside. This is an example of government giving financial support for constructing tourism and leisure sports infrastructures around the waterfront. Therefore, it seems that it is desirable to actively support the national budget in the construction of the infrastructure for the new creation of the waterfront developing the existing system.

However, as mentioned in Chapter 3, if the feasibility of economic analysis is not guaranteed, this can lead to problems and conflicts in budgeting and equitable allocation. In particular, since the financial backwardness of most of the areas around the dam is low, support and project for a specific area may stir equity problems within regions.

On the other hand, as described above in the regulation improvement, environmental regulation is more conservative than other regulations because it is difficult to restore

environmental damage. Therefore, when improving environmental regulations, precise consideration and exhaustive monitoring are required in accordance with local conditions and technology level.

D. Case Studies on Regional Economic Impact

The revitalization of the area around the dams in Japan has been cited providing attractions around dams as well as having a different concept of revitalization during the 2018 international seminar, Localizing Sustainable Development Goals.

1. Revitalization around dams in Japan

Japan conducts surveys on the resource value of dams managed by the Ministry of Land, Infrastructure and Transportation every 3 years since 1991. The purpose of this survey is to obtain data for the establishment of the plan around the dam, to use the water resources, and to revitalize local area. The results of these efforts and interests can be seen in the following cases of making the dam a tourist attraction in local area.

Miyagase dam

Miyagase Dam, located 60 km from Tokyo, has more than 1.6 million Japanese visitors per year, one of the largest tourist volumes in the country. Various programs related to dam are attracting tourists' interests, such as the regular outflow of dam for tourists every 6 minutes and the sale of a "dam curry" (Figure 10). Local residents are earning by selling agricultural products to tourists. The dam also created a tourism-jobs in the vicinity. More than 100 residents who have lost their homes due to the construction of the dam are engaged in tourism.

Kanayama dam

Kanayama Dam was built in Hokkaido in 1967. There are various accommodation facilities here such as hotels, log cabins, and bungalows, located on the upper stream of the dam. In

addition, leisure facilities such as the Lavender Park, boat riding, camping ground facilities, and a sports center are installed in the area and utilized when there are events. Tourism in the Kanayama Dam is being promoted as a deregulation project by the autonomous governance composed of local governments and residents. As a result. Local festivals and events attract around 450,000 tourists a year. The “Kanayama Lake Festival” celebrated in late July has been famous for drawing in 50,000 of people in just two days.

	
Tour outflow of the dam	Dam curry

Source: K-water report (2016)

Figure 10. Tourism item of Miyagase dam

	
Kanayama dam’s overview	Camping site

Source: K-water report (2016)

Figure 11. Overview and waterfront of Kanayama dam

2. Revitalization by localizing SDGs

As mentioned in the background study, it occurs that residents' income levels in rural areas including the waterfront around the dam have lowered relatively, and they have been aging. In addition, this tendency is expected to continue as the society and the economy develop, and the living environment of these areas can be further collapse. The following case studies show how to stimulate the economy of the local settlement as like areas near dams.

Pilot projects of Jeollabuk-do designated energy self-sufficient village

In Jeollabuk-do, many residents have suffered from energy poverty due to poor economic conditions. There were some conflicts in consuming abundant energy but interest among the locals was lacking. To solve this, the Jeollabuk-do Council for Sustainable Development has focused on three things: energy welfare, rural community building, and local economic revitalization. The committee has planned to provide benefits to many areas for energy welfare. They promoted a participatory approach of governance among the administration, the residents, the provincial congress and the private companies in order to come up with management regulations for energy saving.

Ten rural areas in Jeollabuk-do were covered by the project within three years (2015-2017). The contents of the project include energy condition survey and consultation, education on energy saving for the residents and capacity-building on hardware installation (solar power plants, solar water heaters, replacement of LED bulls in household). As a result, this project achieved outcomes even at the initial stage. First, energy welfare by the replacement of bulbs and heaters. Second, community building through energy education and participatory governance by engaging various stakeholders. Lastly, the local economy's circulation by decreasing energy consumption in 14 to 52% per each area, and fund from solar power plants

Initiative	Maintenance and education	Outcomes (Pilot project areas)

Source: LSDGs seminar presentation (2018)

Figure 12. Pilot project of Jeollabuk-do designated energy self-sufficient village

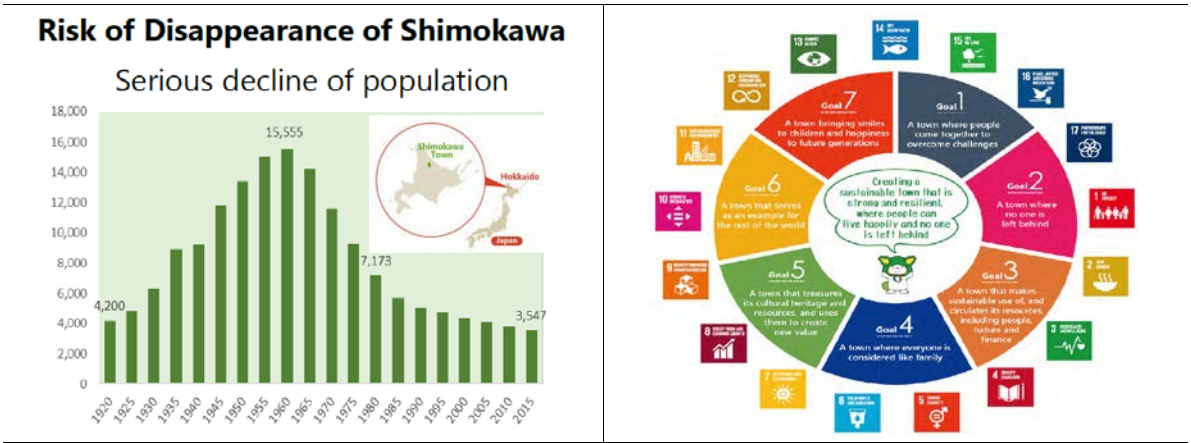
Progress and challenges in Localization of SDGs in Japan: Shimokawa Town, Hokkaido

Shimokawa is located in Hokkaido along with Kanayama Dam. With the decline of Hokkaido's core industries (forestry, mining and agriculture), Shimokawa experienced a decline in population. The town established development plans based on the SDGs: "Connecting people and nature with the future." Citizens participated in the town's efforts and participatory governance continued to present the development directions of Shimokawa that are related to the SDGs. For instance, the "Grand Design for Independent and Sustainable Shimokawa (2004)" and the "Shimokawa Basic Ordinance of Autonomy (2007)," which was prioritized by the sustainable local community development and citizen-led policy planning efforts. These efforts have led to the integration of economic, environmental and social aspects and it seems positive impacts were observed.

Still population decline occurred, but more people move to live in Shimokawa. Personal income tax revenue increased by 16% from 2009 to 2016. Thermal self-sufficiency rate also increased to 49% in 2016 from 6% in 2009, thanks to the use of forest biomass.

Shimokawa have continued to bring vision to action – the inclusion of SDGs in the town's master plan. The mayor headed the establishment of SDGs promotion headquarter and

citizens encourage the council in establishing institution for SDGs promotion. The collaboration with local government and citizens lead to the successful implementation of this project.



Shimokawa's population	Shimokawa's SDGs

Source: LSDGs seminar presentation (2018)

Figure 13. Status and SDGs of Shimokawa

3. Findings and lesson learned

In this chapter, we can find some policy directions for the sound development of underdeveloped areas, including those around the dam. The findings can be summarized as follows.

- Mitigation on excessive and redundant regulation: Residents' higher awareness or motivation on 'sustainable development' by deregulation make the local area more environmentally-sound, sustainable and resilient rather than environmentally-destructive, speculative and populistic development.
- Governance participated in persons or groups that lead residents' action: Governance make consensus building against critical challenge that may lose 'sustainability' of the local community, e.g. decrease of population, aging, local economic decline or backwardness.

V. GOVERNANCE

Governance is the institutional arrangement of steering, organizing and setting procedures to be able to run an organization. It is also about setting up structures, institutions, and ways to exact accountability and manage power and resources for the sustainability of a regime or a system. In a wider scope beyond government, governance is about the managing and solving conflicts among people and institutions.

Water governance, on the other hand, refers to the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society (Global Water Partnership, 2002).

A. Necessity

Conflicts in the area around dams arise from unequal distribution of the benefits from the use the use of public goods. The main cause of stakeholders' complaints is the decline in the property value caused by regulation-based restriction of rights. Today, complex conflicts are becoming more difficult to solve effectively with government policies. As a solution to this problem, there is a growing trend for participatory governance, a framework where stakeholders can participate directly or indirectly.

Traditionally, the governance structure is in a "post-adjustment" model wherein stakeholders are convened to resolve a conflict when it happens. The trend of participation is a "pre-coordination" model wherein stake holders, from government to NGOs and down to the citizens and the private sector, are consulted to prevent problems from happening (K. Kim, 2018).

Conflict management can prevent unnecessary conflicts from worsening and can improve the relationship among stakeholder. This saves the community time and cost of conflict resolution because an issue is resolved before it becomes bigger (D. Kim, 2009; K. Kim 2018). The resolution of conflict through communal understanding rather than resolution of conflicts by force or rights is low-cost and highly efficient for governments.

Governance should involve local residents and various stakeholders who will participate and act on the basis of a horizontal partnership. If local residents participate directly in the decision-making process, it will be possible to increase the confidence in the project and minimize the conflict through pre-coordination, which can greatly enhance the success of the project.

The OECD has identified eight factors that determine good governance, which will also be beneficial in the governance of the development of the area around the dam. These are: participation, rule of law, transparency, responsiveness, consensus-oriented, equity and inclusiveness, effectiveness and efficiency and accountability.

Based on these principles, deliberative governance should meet the followings (Hong, 2009):

- Open discussions should be possible between the parties.
- Stakeholders should participate as fully as possible.
- Neutral discussions should be held so that stakeholders do not stick with their interests.
- The rules of operation for rational discussion should be prepared.
- Information should be openly shared between the parties.

These rules will facilitate the process of discussion that can promote consensus and facilitated coordination of mutual reciprocity and dissent (Hong, 2009).

B. Good Governance in the area around the dam

The purpose of organizing a deliberative type of governance is is to engage stakeholders and draw consensus. In particular, it is important for the stakeholders to cooperate with each other in order to resolve conflicts around the dam. It is important to draw out and reach a common ground that all stakeholders can agree on in order to achieve this goal.

Governance is not about decision-making or project execution but about stakeholders' participation in problem-solving in every stage of the process. To this end, consultation with the stakeholders should be done right from the planning stage to be transparent about the contents of a project (purpose, necessity, budget, enforcement, erroneousness, efficiency, problem, solution plan, etc.).

In terms of dam area improvement, the issues that can be discussed through this model of governance are social aspects, practical or technical aspects, and environmental aspects.

Social aspects: Changes in local community and tourism patterns due to the shift in the awareness of water use. Measures for promoting local economy through increasing visitors in the local community.

Practical and technical aspects: Review of the infrastructure to improve accessibility of the area around the dam. Appropriateness of convenience facilities, affiliated facilities, etc. Efficient use and maintenance plan.

Environmental aspects: Influence of revitalization of the area around the dam on water quality, Conservation plan for water quality and natural environment (eco-system) around the

dam in operation stage.

In the Rural Development Forum held in China in November 2018, Professor Taejong Kim emphasized that for small and medium-sized rural areas, the consensus formed by the local community is more important than the policy development plan for sustainable development. There have been many conflicts about the values and goals that are difficult to reconcile such as the development and preservation between governor and stakeholders. It is necessary to build the consensus on the programs and plans, and to solve problems through sound debates and discussions.

C. Findings and Lessons Learned

Considering these factors, it is desirable to develop the area around the dam through participatory governance to be able to determine effects within a short period of time, and actively utilize the existing infrastructure and cultural contexts. A project like this is prone to conflicts of interest that is why it would be beneficial not to hasten its implementation. A feedback mechanism should also be in place to generate the effects of the small-scale pilot projects.

Government should be transparent with the projects' aims to all residents and implement such goals by building consensus. For instance, defining the goals by picking indicators from the SDGs, as what happened in the case of Shimokawa Town, can help in the evaluation of the project.

VI. PILOT PROJECT

K-water (2017) selected the Chungju Dam, Andong Dam, Miryang Dam and Daecheong Dam as pilot projects after analyzing the current status and conditions in the "basic concept on eco-friendly and revitalization project of the dam." This study will discuss the basic concept of Daecheong dam (or which we call, sometimes, as lake) as among the pilot projects.

A. Status and Basic Concept

1. Analysis SWOT on status and conditions

The following is a summary of analysis on various status and conditions.

Table 8. Comprehensive analysis on Daecheong dam

	Characteristics of Daecheong lake
Strength	· Located in the center of the country, easy accessibility · Adjacent to major cities such as Daejeon, Cheongju, and Sejong, visitors are abundant · Easy development of circulation-type visit course due to existing roads, sidewalks and bicycle roads around Daecheong lake · Easy use of excellent cultural and artistic resources (e.g. Jung poet-literature center) · The beautiful natural scenery around Daecheong lake and Cheongnam-dae (previous presidential villa)
Weakness	· Difficulties in development and utilization due to many regulations · Difficulties in walking tour due to the large scale · Difficulties in installing additional facilities due to existing facilities in developable area
Opportunity	· Social consensus on useful values for dams and activities within the waterfront · Sharing culture among families or generations · Increase in tourism demand and preference of eco-tourism
Threat	· Occurrence algae in areas with severe bends in the lake · Duplicate regulation of various protected areas · Aging of migrants and local residents

2. Basic concept for the development

Basic concept

The area of this project has been selected as a tourist attraction in the Okcheon area, which is easy to access and has a connection with existing facilities. The basic concept is a sustainable garden where people can enjoy reading poetry and literature based on the traditional style. The development of the garden in Daecheong Lake is intended to follow this basic concept. The development aims to create eco-friendly tourism features that can allow tourists experience the ecological superiority of water resources directly on the field and to create a new type of tourism called literary ecotourism. The development plan is to establish a linkage strategy that will actively utilize the existing tourism resources (Janggye park in Okcheon), and to encourage visitors to tour. Events such as the International Book Fair, the Korean Literature Tour will attract tourists through the specialized tourism features combined with the garden design.

Status	Basic Concept

Source: K-water (2017)

Figure 14. Status and basic concept of the development around Daecheong Lake

Environmental effects of the development

A nonpoint pollution abatement facility and a LID management technique must be installed to minimize pollutant outflow. Therefore, it is expected that there will be some improvement in water quality due to the hi-tech management in areas where the control of pollution is poor.

B. Comprehensive Analysis

1. Analysis on concept

It is appropriate to remodel existing facilities for constructing the World Garden (in Figure 14, right) in accordance to economic, environmental and regulatory standards. It does not require additional costs such as infrastructure (site and access roads) construction, and minimizes damage to the natural environment. It is also considered appropriate to develop the Korean Traditional Garden (in Figure 14, right) as a meditation tourism that provides accommodation for tourists. Creating a new area that combines the cultural and the literature aspect and the cleanliness of ecological resources is a challenge. It will be helpful to local residents that events, such as the International Book Fair, should be held in these areas.

Considering the different preference of tourists, the area must have a variety of tourist spots. Commercial facilities for tourists should be in place to help local residents in economic activities. In addition, if a sustainable garden will be made and be designated as national gardens, it will help elevate the image of Okcheon to the level of Folsom lake, Miyagase dam, and others. This will establish the area around the dam as garden tourism items like the Suncheonman Wetland Reserve and National Garden or the Chuncheon Nami Island (Naminara Republic).

		
Literature Hall	Eco-Museum	Korea Traditional Garden

Figure 15. Suncheonman National Garden (Source: http://garden.sc.go.kr/?r=ENG)

		
Citizen garden	Eco-School	Jeonggwanru (Hotel)

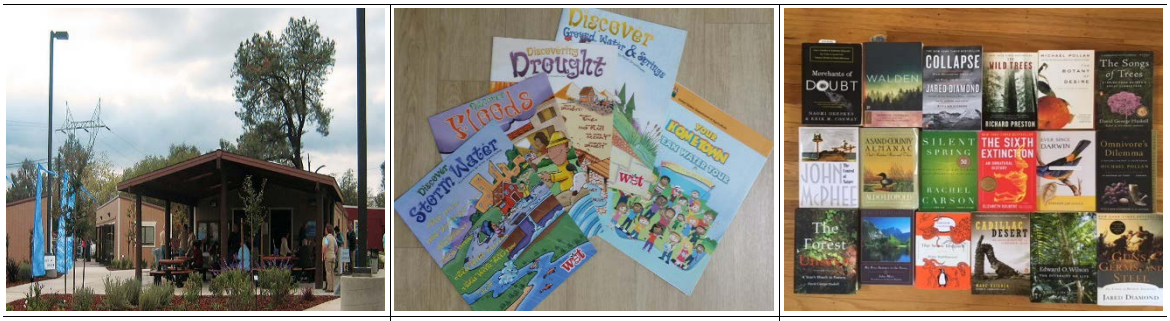
Figure 16. Garden and facilities of Nami Island (Source: https://namisum.com/en/)

2. Suggestion

Overall feasibility

The construction of the literature and traditional gardens in accordance with the needs of tourists who are looking for the area around the dam is considered desirable like the case of Suncheon Bay National Gardens. A facility plan including the education center is proposed to continuously improve the people's awareness for conservation and development of the water resources and natural environment. The operation of educational programs on conservation and development of environment and ecosystem is also useful as a way to pursue sustainable development as a pilot project apart from increasing visitor demand. These cases are also observed domestically, in the cases of Suncheonman National Garden and Nami Island and abroad, given the cases of Oroville Dam, Folsom Dam, Hoover Dam. In particular, the

American River Water Education Center near Folsom dam in Sacramento, U.S. is not big but it is a good example of benchmarking as it has a training program on sustainable conservation and development of water resources.



ARWEC	For children	For Adult

Figure 17. Education program on conservation and development for sustainability in ARWEC

Facilities

Providing thematic tourist attractions like poetry and literature reading is a priority. However, survey results show that tourists are also interested to see the “clear and abundant water in the lake.” Therefore, this study suggests the installation of a facility to maintain stable water level.

There are many controversies in terms of environmental and functional aspects of the installation of water level maintenance facility. However, the recent cases such as the Danyang weir within Chungju Dam, Inje weir within Soyang Dam and Andong weir in the downstream of Andong Dam show that they provide the attraction for tourists who are looking for a waterfront near the dam. If the optimal facility plan is established by reflecting the advantages and disadvantages of the water level maintenance facility implemented, it can satisfy the potential demand of tourists on seeing the clean water.

		
Danyang weir	Inje weir	Andong weir

Source: K-water report (2018)

Figure 18. Facilities for maintaining water level

Governance

The natural environment around the dam is becoming a major national resource to be enjoyed by the people. Therefore, it should be able to simultaneously achieve conservation and development, and revitalization of local economy through rational management of precious environmental assets. The purpose of this pilot project is to include the contents of regional development for the economic revitalization of the area around the dam. The participation of local residents in projects for those must be done together, and the form of governance that is discussed in the previous section is desirable. Local residents are users of garden and facilities, and on the other side, they are service producers as sale of local characteristics, local food and stay services, and tour guide. If the residents' needs for the facilities are reflected to the plan from the beginning through the deliberative governance, the participation and benefit of the residents can be increased. The case of sustainable development in Shimokawa Town, introduced in the previous chapter, is a good model of the participatory governance for the preservation and development of the environment and revitalization of the underdeveloped area. In addition, it is meaningful that the consensus of the local residents on the conservation and development of the area around the dam can be expanded to a consensus on the utilization of water resources, which is the resources of all the people.

VII. CONCLUSION

A. Implications

The purpose of this study is to empirically analyze how can the government balance conservation and development of the area around the dam in the process of revitalization.

Regulatory improvements should not be regarded as a hurdles to regulation but a plan to revitalize the region to reduce the total pollutant load in the upstream area of the dam. Periodic assessments should be made to determine if there are any water quality problems due to regulatory improvements. In order to prevent the occurrence of water quality problems caused by deregulation, management of pollutants should be thoroughly supervised. On the other hand, it should also be taken into account that the public's knowledge about the function of dams is changing from water supply and flood control to a resource of enjoyment, healing, and relaxation using the area around the dam as waterfront. Therefore, the area around the dam needs to reflect the demand for educational, cultural and recreational facilities. Government should back up a rational plan to develop the area around the dam with policy support.

Initiatives based on the contents of this study are as follows. Firstly, revitalize the area around the dam by improving regulations. These regulations must correspond to the changes in people's demand for the waterfront around the dam and technical progress of water treatment. In recent years, leisure and tourism activities using water have been expanded to various areas including the area around the dam. According to the Korea Culture & Tourism Research Institute (2011) survey, 93.8% of the respondents were willing to visit if there were waterfront facilities. Under these circumstances, the waterfront around the dam should create new values that satisfy the needs of the people and activate the local economy. On the other

hand, redundant regulation of the area around the dam should be improved, reflecting social change, technological development and tourism demand. Presently, the regulation around the dam plays a role to preserve the water source, but it inhibits the regional development by restricting the installation of the new facility. Therefore, it is important to improve regulations and to take into account the utilization aspect in accordance with the changing circumstance. It is necessary to improve the regulations and utilize the water resources in order to reflect the needs of tourists and residents and maximize the resource value of the lake formed by dam construction.

Secondly, enhance the value (environment, recreation, healing and education) of the area around the dam as a local hot attraction. As with the cases mentioned above, it is common to transform a dam into a national landmark rather than just a facility used only by local residents. Because the green mountains and clean water in South Korea are treasures, it is also necessary to utilize local natural and cultural tourism resources around dams and develop tourism programs. Recent legislation on the eco-friendly use of dams has created opportunities for waterfront development. With this opportunity, it is necessary to contribute to the sustainable development of the region, such as revitalizing local tourism and creating jobs.

Finally, activate the area around the dam by establishing a good governance framework that allows residents to participate. The function of the dam should not only supply water, but also be prepared to the locals' usage demands. These discussions should be based on public consent, comprehensive assessment, lake-ecosystem maintenance, benefit sharing, and existing laws. Government, residents, experts, related local governments and environmental organizations must equally participate in the planning and implementation of the project. This governance is important to achieve a common purpose. Discussions must include informing

the stakeholders about the process of development. Feedback on the pilot project should also be done through this participatory approach.

B. Limitations of the Study

Firstly, the case study obtained from the literature and field survey was crucial in conducting this paper. However, using overseas cases also caused some limitations in establishing more precise and detailed initiatives about regulation and revitalization due to different social, geographical circumstance and people's awareness.

Secondly, it is beyond the scope of this study to examine the economic, social effect of deregulation that could eventually bridge the incompatibility between conservation and development. Therefore, for a more rational understanding and accurate analysis, a study determining causes and consequences through a quantitative approach is required. Furthermore, this study should also consider the environment as a whole and not just on water resources.

Finally, this study is also broad. It can be pointed out that the focus of the debates is blurred, by applying several arguments in the context of three different topics - economic, policy and regional, governance. The revitalization of the area around the dam need to be solved using four lenses: environment, economy, living, and culture. It is needed to explore distributed, localized, resource-based, and balanced development solutions. All of these are different from each factors of environmental governance. In brief, it is highly recommended to conduct further research on the the revitalization of the area through the lens of conservation-development relationships.

References

Bae, M. (2017). *Direction on sustainable development of the area around the dam.* (In Korean).

Chang, H. & Kim, K. (2015). Bridging livable city development over local climate smart development under UN SDGs. *KEI.*

Cho, S., Son, H. & Kim, S. (2018). Direction of rural tourism development in response to sustainable development goals (SDGs): An application of healing type in rural tourism. *Journal East Asian Landscape Studies* 12(2) 73-79.

Choi, J. (2017). *Developed country cases of utilization around the dam.* K-water. (In Korean).

Hong, S. & Lee, J. (2009). The deliberation governance and consensus-building system: Focusing on the case of Sihwa regional sustainable development governance. *Journal of Administration Research* 47(1). (In Korean).

ISAN. (2011). Improvement project on river environment in Bupyeng: Inje submerged weir. *Inje-gun*. (In Korean).

Jeon, M. et al. (2016). Eco-friendly utilization of the waterfront around the dam. *Kangwon Development Institute.* (In Korean).

Jeon, T. (2011). *Pilot project on waterfront development around the lake.* Korea Rural Community Corporation. (In Korean).

K-water. (2015). *A study on environmental regulation improvement for revitalization of the area around the Dam*. (In Korean).

K-water. (2016). *Policy suggestion for revitalization of the area around the dam: Cases of conflict resolution.* (In Korean).

K-water. (2017). *Basic plan on cooperation project for eco-friendly utilization on the area around the dam*. (In Korean).

K-water. (2017). *Report on developed countries field trip in expert course*. (In Korean).

K-water. (2017). *Report on pilot project for utilization around the dam.* (In Korean).

K-water. (2018). *Improvement measure on Pyeonghwa dam's downstream wall: The door to peace*. (In Korean).

K-water. (2018). *Report on eco-friendly development and tourism attraction around the dam.* (In Korean).

Kataoka, Y. (2018). Progress and challenges in localization of SDGs in Japan: Cases of three leading cities (LSDGs Seminar, Dialogue 1-3, Institute for Global Environmental Strategies) [PDF document].

KDI. (2009). Re-study on feasibility: Danyang submerged weir project. *KDI.*

Kim, C. (2016). *Economic value as tourism and leisure of the dam.* K-water. (In Korean).

Kim, D., et.al. (2009). A study on system improvement for conflict of public institutional location and operation. *KDI and KDIS.*

Kim, H., et al. (2015). A study on water environment policy under changing water demand for environmental flow and recreation water. *KEI*.

Kim, I., et al. (2011). Environmental-friendly waterfront planning and development with regards to regional smart growth. *KEI.*

Kim, K., et.al. (2018). A study on the formation of dialogue governance for conflict resolution: Focusing on conflict resolution through consensual conversation Governance. *Korea Public Management Review* 32(2): 237-265.

Kim, T. (2018). Village forestation in South Korea: Forestry coops and mandatory revenue sharing (CNAG Policy Forum, Session 4-1) [PPT document].

KOSIS. (2016). *Ratio of Elderly Population: Over 65 olds, KOSTAT.*

Lee, B., et al. (2013). Future oriented water environment target and management. *KEI.*

Lee, J. (2017). Project appraisal for water resources projects (KDIS Water Policy and Management Lecture Note #2-1-3) [PPT document].

Lee, J. (2018). Foundations of cost-benefit analysis (KDIS CBA for Policy Decision Making Lecture Note #2) [PPT document].

Lee, J. (2018). Foundations of cost-benefit analysis (KDIS CBA for Policy Decision Making Lecture Note #2) [PPT document].

Lee, S. (2018). Basic understanding of regulation: Definition of regulation. *KDIS*. [PPT document].

MOGL. (2018). Special Law on Eco-friendly Conservation and Utilization of the Area around the Dam. *Ministry of Government Legislation*

Park, S. (2018). Pilot projects of Jeollabuk-Do designated energy self-sufficient village (Duration: 2015-2018) (LSDGs Seminar, Session 2-3, Jeollabuk-do Council for Sustainable Development). [PPT document].

Sung, B. (2016). Development of evaluation index for establishment of development direction of lakes as tourism resources. *Chungbuk Research Institute.*