

WATER RESOURCES POLICY AND CONFLICT RESOLUTION IN SOUTH KOREA: WIN-WIN STRATEGY

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Abstract: Since South Korea has uneven rainfall and deteriorating water quality, it is imperative to create a comprehensive water resources policy and management. This paper is to adopt a win-win policy for upstream-downstream local governments that have been in water rights-related disputes or conflicts in the process of allocating water and maintaining water quality. The Win-Win Policy can be an integrated river-basin approach. We define the win-win policy, introduce the win-win case of Delaware River and Colorado River in the United States, and suggest the win-win policy for Nakdong River in South Korea. Nakdong River is chosen for this paper because it has more serious problems in preserving water quantity and maintaining water quality.

Key Words: win-win strategy, zero-sum game, water conflicts, Nakdong River

1. INTRODUCTION

Water shortage is a serious issue to many nations, and will be so in the future. Conflicts among the nations along the river may lead to war for scarce resources. South Korea has more than the world average rainfall, but that is not sufficient due to the dense population. See Figure 1. Less than the world average by per person is an indicator of future uncertainty. Even worse situation is due to the uneven rainfall, long dry months in spring, fall, and winter, and flooding summer. Flooding has been regularly visiting the river basin communities every summer. The damages have been increasing. The mountainous land on the East Coast make the flooding rapid and powerful onto the West Coast plains.

Flood control and multipurpose dams on major rivers have reduced the flood damage and stored water for the drought seasons.

This paper is to present South Korea's water problems and issues, and our win-win strategy to resolve these problems. Conflicts between and among local governments along the river are becoming serious in allocating water resources and in sharing the cost of maintaining acceptable water quality. See Table 1.

Upstream-downstream conflicts have been erupting since the local autonomy law was promulgated in 1995. Regional cooperation or river basin management is relatively new, and has been lacking in Korean history that has shown the dominance of the central government over 1,000 years. Water rights have not been

established by written laws, agreements, and customs or by unwritten laws.

Conflict resolution requires new legislation for water rights and mutually beneficial water use agreements. The foundation of new legislation and agreement will be a win-win strategy for all political actors confronting water quantity and water quality problems.

Conflicts have emerged in between the central and local government or between one local government and another, and in between the government and residents in the process of making a decision or a set of decisions on the wastewater plant construction, metropolitan drinking water plant construction, dam construction, or water quality maintenance. Some conflicts have been resolved, and some are not.

New Local Autonomous Government Act has encouraged the conflict as if the legitimate conflicts were natural products of democratic society. "Not in my backyard" is often angry local people's protest movement against the government site selection decision or policy decision. Conflicts between one government and its neighboring government are often un-resolvable, even though conflicts between the central government and local government are more easily

resolvable, because the central government still maintains upper hand over the local government. Korean scholars opined the following three points on the causes of conflicts;

First, there is no clean-cut concept of water rights. There are no law-written or unwritten-governing water rights, because abundant clean water has been available for all people. Urbanization and industrialization process in the past three decades seriously polluted water and scarcity of clean water became apparent in Korea.

Second, complexity of governmental set-up managing water quantity and water quality itself is a serious problem to be solved. We do not agree with this point, because the complexity itself may not be the cause of the conflicts. In the U.S., the Environmental Protection Agency is dealing with water quality, and the Department of Interior's Bureau of Reclamation and the Army Corps of Engineers are harmfully dealing with water quantity. However, no one seriously argues that such an arrangement is causing the water-related conflicts. Rather we point out the lack of cooperation and coordination among the government agencies or between the government and citizens.

Table 1. Water Conflicts in South Korea

Subject of conflicts Content of conflicts	Government-government			Government-civilian			Total
	Re-solved	Unres.	Sum	Re-solved	Unres.	Sum	
Sewage	9	2	11	11	0	11	22
Water Supply	2	8	10	3	1	4	14
Dam Construction and Management	8	4	12	2	5	7	19
Water Conservation	8	10	18	2	2	4	22
Total	27	24	51	18	8	26	77

Source; Ministry of Government Administration Dispute Examples in Local Autonomy Period, 1995-1999

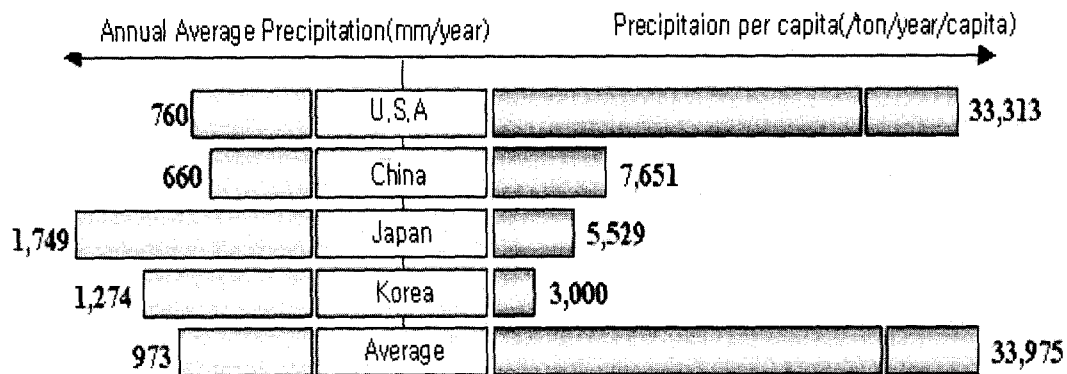


Fig. 1. Comparative Precipitation of the World

Source: Yeom Hong Choi, Korean Environmental Policy and Administration, Seoul, Shirkwang, 2001.

Third, lack of coordination is at the serious level. Distrust and mistrust between and among the authoritarian government and innocent citizens were prevailing in the Korean society that is the cause of conflict. Lack of coordination may contribute to the cause of conflict, though. (Korea Water Resources Cooperation, 1998)

We have pointed out uneven distribution of rainfall, dense population, and lack of adequate dam construction site for South Korea's water problems. We want to add lack of resources/money to be invested into water research and development projects. Irresponsible defense budget and corrupted financial management made the nation in one crisis after another. The public wants the environmental care above the national security, but the government leaders do not place water and environment in setting-up national priority and budget preparation.

2. WIN-WIN STRATEGY

The Win-Win strategy is a new mode of decision-making and policy making – good for political actors or interest groups.

In this sense, Win-Win Policy is contrasted

with Zero-Sum Game, and has more than the meaning of simple optimization. Win-win policy analysis in water resources and environmental management is needed to solve the complicated problems presented to the Korean society described above. The sequence of five questions is basic to win-win policy analysis. (Nagel, 2000)

1. What are the major goals of the two sides?
2. What are the major alternatives of the two groups?
3. What are the relations between each major alternative and each major goal?
4. What new alternatives is there that can achieve the two sides of goals?
5. Is the proposed win-win alternative capable of getting over various obstacles?
6. There are various ways of facilitating ideas for win-win solutions.

In the situations the two of above concepts are in conflicting with each other, there are some suggestions as followings;

1. Expand the resources available so that the goals of both sides can be achieved.
2. Modify the one side of alternatives so they also achieve the other side of goals.
3. Re-define the problem to emphasize goals,

rather than alternatives.

4. Fully combine alternatives that are not mutually exclusive.
5. Make use of a mind-stimulating matrix that shows goals on the columns, alternatives on the rows, and scores or directions of relations in the cells. Have an empty row at the bottom

of the matrix for inserting words and data on possible win-win solutions.

Fig. 2 shows a win-win solution for conflicting goals of economic development and environmental protection---environmentally sustainable development.

Table 2. is a matrix which is represented by

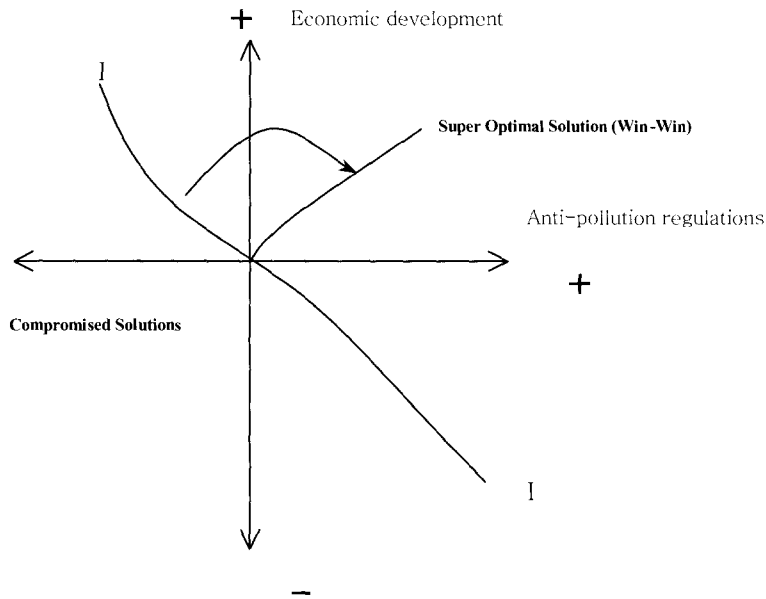


Fig. 2. Graphical Representation of Win-Win Solution

Table 2. Win-Win Strategy Matrix

ALTERNATIVES \ GOALS	Rapid economic development	Clean environment
Unregulated economic development	+	-
Anti-pollution regulations	-	+
Comprised regulations	0	0
Win-Win - Improved manufacturing - Agricultural processes	++	++

the procedure of resolving the confrontational situation between economic development and clean environment in policy-making on processes.

In this matrix, if the economic development policy is executed without considering the environmental conservation, then the economic development will be getting worse even if the economic development can be possibly achievable. On the other hand, if anti-pollution regulations are executed, then the economic development will be on plateau. With the compromised policy, it may be hard to make both an economic development and environmental conservation. In this situation one of the alternatives that is based on win-win policy is the adoption of the acceleration of highly effective fuel on cars. With this policy, the automobile company will make the relatively remarkable improvement with the reduction of fuel-energy efficiency and will make the reduction of air pollution from automobiles.

The win-win strategy policy will be highly effective in between two conflicting goals; the conservation and equitable distribution of water resources.

3. WIN-WIN WATER RESOURCES POLICY: TWO EXAMPLES IN US

3.1 Delaware River

Since the early 20th century, the conflicts for water rights in Delaware River has been aggravated especially among New York, New Jersey, and Pennsylvania, since the New York city tried to take water more according to developing industry, and thus the New Jersey and Pennsylvania worried about the reduction of supplying water. To take more water in New York would make the security of stable water supply to the two states unreliable. One of the two sides had to be sacrificed. So, it was so hard to bring a compromise. In 1931, the U.S. Supreme Court decided that New York could take the quantity of water that kept the minimum sustainable water prescribed with applying the riparian law and reasonable use. But, in solving the equity problem, the Court could not figure out the information data. After trial and error with various ways, the basin states and the cities of New York and Philadelphia proposed to the Congress the creation of the Delaware River Basin Commission

Table 3. Win-Win Strategy for Delaware River Problem

Goals \ ALTERNATIVES	Water supplying for New York City's industrial Development	To take stable supplying water
To apply the riparian law	+	-
To apply the prior appropriation doctrine	-	+
Ruling according to riparian law and Reasonable use	0	0
Win-Win Strategy - To create DBRC - Level B study	++	++

(DRBC) in 1961. That was to find the solution that is to convert zero-sum game to a positive-sum game. The Commission was authorized in the 1961 Delaware River Basin Compact and soon had assembled an organization with the technical expertise to find the positive-sum solutions. The DRBC dealt with the information problem by initiating the research named as Level B study under the provisions of the Water Resources Planning Act. It required money and time consuming, but could provide the hydrologic database to solve the information problem consequently. (William B. Lord and Douglas S. Kinney, 1996)

Table 3 shows a win-win strategy for Delaware River conflicts.

3.2 The Colorado River

The Colorado River gets through spacious area including six states and Mexico. In 1921, following the Supreme Court's ruling on the prior appropriation doctrine that could extend across state boundaries, the seven states decided that they should reach their own agreement. And in late that year, they created Colorado River Commission that consisted of seven state representatives and government agencies. The Commission enacted the Colorado River Compact. They separated the river into two parts – upper and lower at Ferry and distributed the water into the states. They formed the organization for the operation of the Colorado River worked with USBR (United States Bureau of Reclamation). The

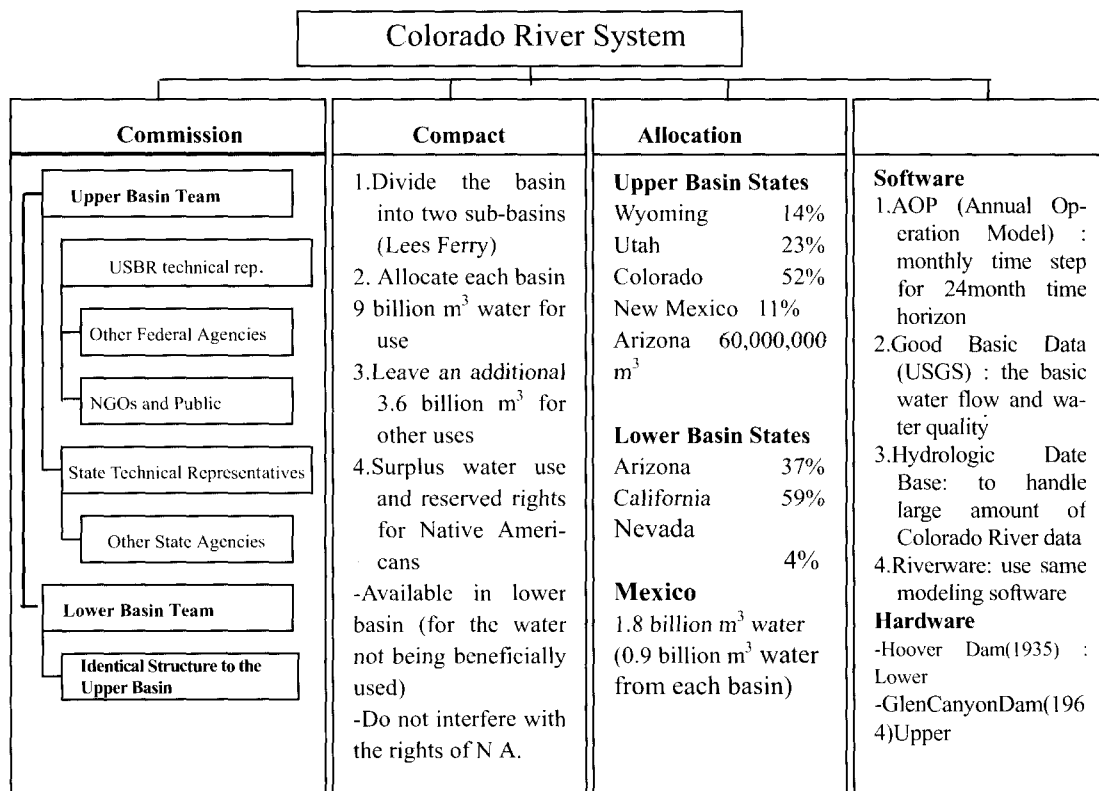


Fig. 3. Colorado River System

Annual Operation Plan(AOP) model and Hydrologic Data Base(HDB) is used to analyze the data of this river hydraulics, hydrology... They make the water allocation more reliable and precise. In AOP model, three forecasted estimates of potential inflows are used; most probable, probable, and minimum. An international treaty was signed with Mexico in 1945 that provided for an annual supply to Mexico of 1.8 billion cubic meter water. They set a scenario for the quantity of precipitation. (Darrell G. Fontane, 2000)

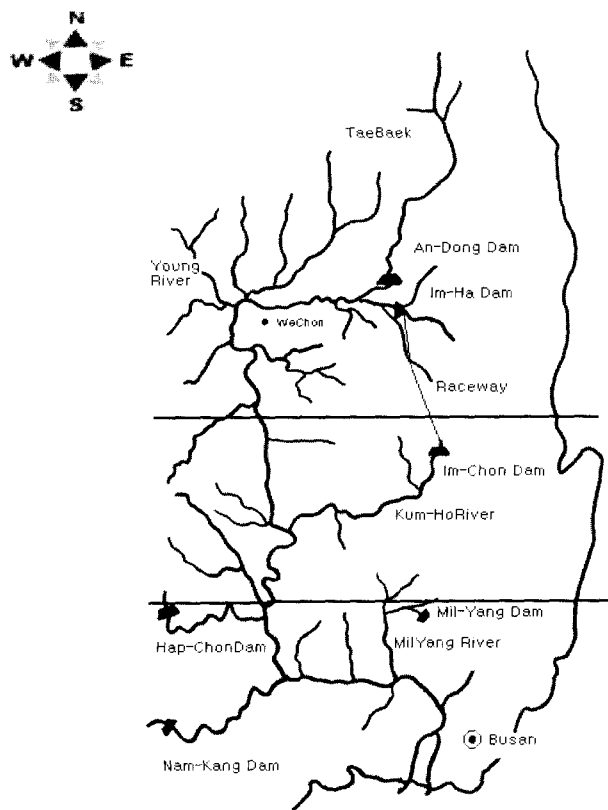
Fig. 3 shows the Colorado River system ---commission, compact, allocation and control.

4. APPLICATION TO NAKDONG RIVER

4.1 The Nakdong River

The Nakdong River, most serious river in Korea with river pollution and scarcity of clean water in the downstream metropolis named Busan, during the dry season, is just chosen for a win-win strategy. The win-win strategy is applicable to all rivers in Korea

The Nakdong River originated from Whyangji in mountain Taebeek flows through Andong, Sangju, meet Kumho River at Koomi and Daegu, passes through Busan, and exit into the South Sea. Total length is 525km and the River



Map 1. Nakdong River (Scale : 1 / 2,000,000)

basin area is 23,860km², 13million people live densely in the basin. And 52 local governments exist in the basin. See Map 1.

As the Andong Dam was built in upstream of the river and the Nakdong river estuary levee was constructed in 1987 at the bottom of the river, the Nakdong River became a kind of lake

For this nature destruction and the industrial complexes at the mid-stream of the River, the River is extremely polluted.

Two million people reside in upstream area. They drink and the first quality, and do not expect any serious problem of water quantity and water quality. The mid-stream of the river on 3.5million people reside in and drink and use lots of water. Industrial complexes especially in Gumi and Daegu are consuming a large quantity of water. As a result of industrial development in this area, water pollution has become serious. 8 million Busan residents receive the polluted water .

The river water quality has been deteriorating from the second-class water to the third class, and available clean water is becoming scarce. Local governments providing drinking water and industrial use are bound to create conflict over the available clean water.

Busan requested the central government to enforce Total Maximum Daily Load (TMDL) for its survival. The Ministry of Environment has been studying the best available technology for wastewater treatment in upstream and mid-stream areas and the maximum water conservation. President Kim Dae-Jung's government has been trying to appease industrial development in the midstream area Daegu, and to please people in downstream area with new water supply from the Nam River and Whang River in the western part of the Kyungsan province. But the people in the Nam and the Whang River basin are resisting this plan. If the drought happens onto this

area, they will be suffered.

Scarcity of clean water is due to the limited rainfall and population density in this area, and extremely poor treatment of wastewater and farm animal waste in the upstream and mid-stream area. What makes the situation worse is non-existing environmental cooperation or among local governments in this river basin due to non-existing water rights.

There are many organizations governing water quantity and quality; the Nakdong River Flood Control Office, the Busan Korea Water Resources Cooperation, the Nakdong River Water Shed Environmental Management Office (WSEMO) and the Busan Regional Construction Management. These organizations are not necessarily working harmoniously for the Nakdong River and people in the basin.

4.2 Win-Win Solution for the Nakdong River

Following five steps are the win-win strategy for the Nakdong River.

1. The goals of two sides would be "Sustainable economic development on the Nakdong River Basin " and "stable water supply at the lower part of the River and the conservation of water resources ".
2. Sustainable economic development can be pursued by appropriate amount of water and relaxation of strict environmental regulations. The clean water supply would be the strengthening of environmental regulations, especially wastewater treatments, and water conservation.
3. The above two goals are contradictory.
4. The "++" alternative for the win-win strategy is that;
 - a. Compose the Nakdong River Joint Committee or the Nakdong River Water Resources Corporation.

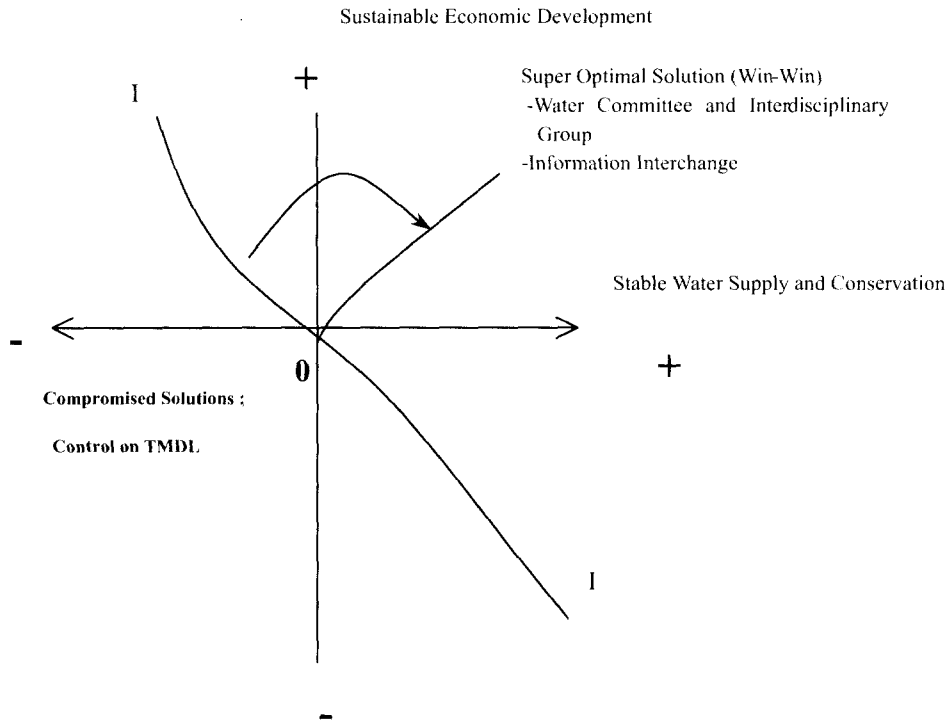


Fig. 4. Win-Win Solution for Nakdong River Conflicts

Table 4. The Win-Win Strategy for the Nakdong River

ALTERNATIVES \ Goals	Sustainable Economic Development	Stable water supply and Conservation
Riparian Doctrine for water allocation	+	-
Strict Law on Water Quality	-	+
Control on TMDL and Compensation	0	0
Win-Win Solution - Compose Water Committee and Water Interdisciplinary Group - Information exchange - Water Rights Law based on equitable apportionment	++	++

b. Divide the River into three areas – the upstream, midstream, downstream and provide strict environmental conservation and regula-

tions, e.g. point and non-point sources of pollutants.

c. Make up the interdisciplinary water re-

sources group.

5. The water will be distributed through the consultation of the committee, and the appropriate method will be introduced into three areas. The scientific study will hold at the Interdisciplinary group and it will give accurate information about the River.

Table 4 and Fig. 4 are the presentations of the win-win strategy for the Nakdong River conflicts.

The Nakdong River system creating a commission, writing a compact for rational allocation and control of water resources is necessary. A new law should stipulate equitable distribution of water to all local governments in the

river basin, and an organization or mechanism to implement the law should be institutionalized.

First, the appropriate legal basis should be designed for an equitable distribution of water. The law based on equitable apportionment must be common for promoting the local governments' collective efforts to solve their common problems.

Second, an organization such as Nakdong Korea Water Resources Cooperation or Nakdong Joint Committee should be created. It must integrate the Nakdong River Flood Control Office, the Busan Korea Water Resources Corporation, the Nakdong River Water Shed Environmental Management Office, and Busan Re-

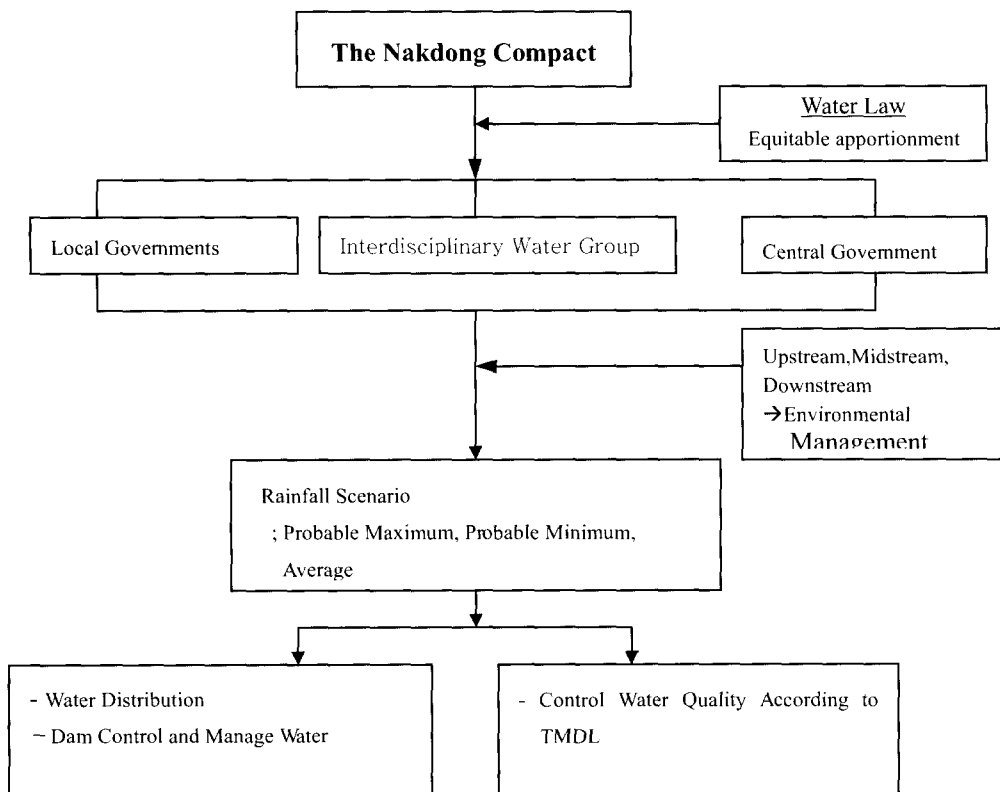


Fig. 5. Win-Win Strategy System

gional Construction Management Office. That organization should include all local governments that are situated along the Nakdong River. It will bring up the total problems of the Nakdong River and discuss solutions collectively. The central government should charge of a leadership role and financial aid. Three areas along the Nakdong River Basin should be equipped with the best care of their riparian environment

Third, an institution to carry out the compact and the agreement with scientific expertise should be created. It should have sufficient power and authority to make authoritative decisions on water quality and quantity with revenues. A research institute, which can be part of the Institution, must be consisted of various research fields such as social, sciences, management sciences environmental sciences, hydraulics and hydrology.

5. SUMMING UP

Water resources management requires more than hydrologists, civil engineers, lawyers and public administrators. It requires orchestrated efforts by all--including citizens, the interest groups, politicians, and computer programmers in addition to the traditional actors mentioned above.

There is a need to create a mechanism that calls for everyone's participation on equal footing, while rejecting authoritarian rule by the government. Decisions coming from the mechanism will be binding all people in the river basin in allocating available water and cost-sharing of water quality. The win-win strategy or policy is a good device for water resources management for the Nakdong River basin and other major river basins such as Han River, Gum River and Youngsan River.

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