

Building a New Order of Water Circulation: Toward an Affluent Society Utilizing Water

I. Basic problems of the water issue

In order to build an affluent society utilizing water, two problems must be tackled.

A. Restoration of soundness in water circulation

While in circulation, water forms land, maintains ecological systems, supports human life and production activities, and nourishes culture. However, the circulation of water is now faced with major crises. These crises must be dealt with to restore soundness in water circulation.

Two major crises exist. The first is instability in water circulation caused by climatic variation. Climatic variation is accompanied by changes such as a decrease in snowfall, an increase in the annual rainfall fluctuation range, and an increase in short-term intense rainfalls. These changes affect the shape of water circulation, destroy the stability of water circulation, and increase the danger of disaster. The other crisis is a disturbance in the soundness of water circulation caused by devastation of land, including forested land and farmland. Unsound water circulation further accelerates the devastation of land.

B. Enhancement of the diverse values of water

Water fulfils various functions in nature and society. In addition to using water, we should utilize and enhance the diverse values of water, such as cultivation and maintenance of characteristic ecosystems on waterfronts and damp ground, reduction of urban heat-island effects, regeneration of water streams in cities, and activation of urban functions by utilizing water surfaces. The existence of water itself enhances the quality of the environment.

Building a new order of water circulation

To tackle the two problems, we should focus attention on circulation, which is a feature of water, and

build a new order of circulation instead of adhering to the existing order of water utilization.

According to the existing order of water utilization, the quantitative aspect of water utilization based on the right to use water and the qualitative aspect focused on the control of the drainage-water pollution load are separate. As these aspects are regulated under different rules, it should be emphasized that regulation does not perform the role of maintaining the order of water utilization, in view of the diverse functions of water from a comprehensive viewpoint.

II. Toward a new order of water circulation: five suggestions

1. Creation of a watershed-based order of water circulation

In order to create and maintain sound water circulation, a watershed-based order of circulation should be built. For this purpose, the following measures should be implemented.

(1) Establishment of a foundation respecting watershed water circulation

Water circulates in a watershed as a unit. A watershed has natural and social features. Efforts to restore the soundness of water circulation should be deployed for individual watersheds, respecting their own features.

As the foundation of restoring watershed water circulation, two schemes should be established.

One of the schemes is to set up rules of water circulation for each individual watershed. Under this scheme, watershed communities linked by water circulation should create the rules concerning water circulation, incorporating the features of the watershed, and policies and measures related to water circulation should be deployed under these rules. The rules should cover conservation of forests, replenishing of water resources, distribution of water resources, conservation of water quality, construction and maintenance of water supply facilities, and effluent treatment such as sewerage.

The other scheme is to create a system to control water intake and discharge in an integrated manner.

The water-related order is presently operated separately for individual categories—water intake is regulated by rights to use water, conservation of water quality is controlled by regulation of water discharge, and water-use service is regulated by agricultural water control and water supply along with sewerage control. Comprehensive control of water circulation will be made possible with watershed-based integrated operation of the water-related order.

(2) Creation of a scheme for controlling water-circulation impacts for individual watersheds

A scheme should be created to ascertain and regulate the impact on water circulation of various actions taken within a watershed. The scheme is to consist of:

- (i) A system for predicting and assessing actions in a watershed that may have impact on water circulation, proposing necessary improvements, giving advice to cope with impacts, and providing consulting services.
- (ii) A watershed-based organization for assessing and controlling impacts on water circulation and for managing drought.
- (iii) Rules for adjusting the impact of groundwater use, based on the principle that groundwater should fundamentally be publicly managed.

(3) Incorporation of water circulation views into land utilization planning

Water-circulation points of view should be incorporated into planning and operating various land utilization programs. For this purpose, urban planning, land utilization planning, agricultural land improvement and consolidation planning, forestry preservation planning, etc. should be reviewed for each watershed and adjusted comprehensively. In order to make it clear that local communities are obliged to respect water circulation, this obligation to respect water circulation should be clarified in urban, rural, and other regional arrangement plans. In addition, water-circulation soundness restoration planning should be established for each watershed as required.

2. Order formation utilizing economic approaches

Economic approaches should be applied to water utilization to enhance rationality in water

utilization and to form and maintain a good order. The following measures should be implemented for this purpose.

(1) Creation of a water rights trading institution

An institution should be created to allow rights to use of water to be traded as economic goods.

This will allow the price mechanism to work to rationalize water utilization, and trading of water will promote proper distribution of water resources. In this case, burden-sharing in connection with external diseconomies will be made clear and the public nature of water supply will be secured, which will complement the market function. A market should be operated for each individual watershed.

(2) Beneficiaries-pay principle

The beneficiaries-pay principle in water utilization should be followed in order to ensure the rationality of the economic approach. In particular, sharing of responsibility for the pollution load and sharing of water resource conservation, which is important for sound water circulation, should be reconsidered. It is also important to operate effectively the regulation and adjustment of land utilization for conserving water resources.

(3) Rational operation of water resource development facilities

Water distribution should be more rationalized by revising the operation rules for water resource development facilities. For example, it will be effective to pool the capacities of water service dams in the same water system and to accumulate and supply water covering the entire system. This will enhance the efficiency of facility operation and also facilitate water-rights transactions and promote effective utilization of water resources. At the same time, demand for securing the normal functions of flowing water can be met to increase the value of the water environment.

3. Securing of environmental functions of water

Efforts should be made to enhance the multiphase values of water, particularly the environmental functions. For this purpose, the following measures should be implemented.

(1) Recognition of the public nature of the environmental functions of water

The public value of waterfronts and water surfaces should be recognized and valued to form a social consensus. For this purpose, indexes to evaluate the water environment should be developed. It is a basis of recognizing the water environment to ascertain the environmental functions of water in a comprehensive manner, instead of resorting only to water quality index data obtained from chemical analysis, and to evaluate the soundness.

Furthermore, in urban planning, the water environment should be clearly positioned as a component of the city, and efforts should be made to preserve and improve the water environment. This means that the viewpoints of the water environment and water circulation are to be incorporated into the formation of the land utilization order, which has been developed as a core task in urban planning.

(2) Utilization of the water environment as public property

A scheme to handle the water environment itself as public property should be established. Enjoying the water environment should be recognized as a right that should be shared by communities in order to maintain the value of the water environment. This will make it clear that conservation of the water environment is a public responsibility.

(3) Improvement of infrastructure supporting the water environment

Improvement of facilities that support a rich water environment should be promoted. In particular, water-source forests and riverside woodlands, which are important as facilities promoting the soundness of water circulation, should be well maintained and improved. It is also important to form rules to enjoy the water environment, such as rules for ship transportation and waterfront utilization.

4. Building and integration of a water information system

A system should be built up to ascertain information about water systematically and analyze the information accurately. The system will allow a variety of complicated information about water to be operated in an integrated manner. For this purpose, the following measures should be implemented.

(1) Formation of a water information system and public operation of the system

A water information system should be built that allows data on multiple hydraulic, hydrological, and biological phenomena to be ascertained comprehensively and systematically and the data to be analyzed as required by various parties concerned. It is necessary to operate the system publicly and to open collected and accumulated information.

This will make it possible to ensure the integration of data related to water, to form common consent through sharing of the data, and to ascertain water circulation in each watershed; this will promote establishment of the effectiveness and adequateness of water policy. This will also largely contribute to prediction and verification of the impact of climatic variations.

(2) Improvement of water management accuracy

It is necessary to ensure accuracy of judgment and actions in water management by utilizing the water information system. Implementation of coordination for rational and effective water use in drought periods, improvement of accuracy and optimized water flow control using dams, and the establishment of an early warning system against flood damage and drought damage should be tackled as promptly as possible.

5. Securing and strengthening water-related human foundation

The water-related human foundation should be secured and strengthened, involving people who have water-related technologies, who are engaged in water policies such as operating water systems, and who contribute to the affluence of society through water-related businesses. For this purpose, the following measures should be implemented.

(1) Mobilization of capabilities toward the integration of water technologies and water policies

Capabilities should be mobilized to integrate water technologies and water policies, which are operated separately and individually. Effective measures for this purpose include the following:

- (i) Water-related technologies that have been organized for specific objectives such as flood control, agricultural water use, power resources, water supply and sewerage, and the water ecosystem, are systematized, fused, and reorganized to meet water circulation requirements.
- (ii) Integrated operation of the water system and the land system are promoted in order to maintain the water-related order for each watershed and to improve water environment policy.

(2) Promotion of water-related businesses

Water-related businesses should be promoted more than before. Not only governments but also industries, nonprofit organizations, and citizens using water deploy activities related to water use and the water environment and should bear roles in managing and maintaining water circulation. This will largely promote development of water-related technologies and concretization of the multiphase values of water.

In particular, promotion of the soundness of water circulation through water businesses will contribute to the preservation of national land in the face of ongoing deterioration by means of industrial activities. Water-related industries, which are capable of performing management and operation of water businesses as a whole, are capable of contributing to solving the water problems facing international society.

III. Toward implementation of the proposal: time to take action

We have proposed five suggestions toward building a new order of water circulation, which is necessary for forming an affluent society utilizing water.

Various proposals regarding water have been advanced in the past. As it was difficult to obtain approval from different individuals concerned, however, most of these proposals have not been

implemented. Materializing a policy concerning water in particular normally required a large amount of labor spent on policy coordination among government ministries and agencies.

However, now that sound water circulation is disturbed by land devastation caused by climatic variations and there is strong social demand for enhancing the multiphase values of water that include the water environment, we should take necessary action to form an affluent society utilizing water. Since there is no time to be spent on coordination and forming consensus, the government should take the initiative in making efforts to organize an administrative setup that can powerfully promote policies. It should be kept in mind, in this case, that methods of land-utilization planning should also be reexamined.

The present proposal sets up a major target—building a new order of water circulation. The proposal includes specific measures that can be implemented experimentally, measures that can be implemented under local government decisions, and measures that can be implemented by private enterprises, nonprofits, water users, etc. in a pioneering way. Such a pioneering approach will form socially persuasive power and promote agreement and coordination in government, leading to the establishment of a new order of water circulation.

We strongly anticipate that the parties concerned will take action toward an affluent society utilizing water, sharing the major target and referring to this proposal.