

Summary

Background and process of the study

With the "National Water Resources Study" in Malaysia in 1982 as its pioneering attempt, Japan International Cooperation Agency (JICA) has been developing National Water Resources Development and/or Water Resources Management Master Plans (hereinafter referred to as "NWR-M/Ps") for nine developing countries through the scheme of development study programs. Of the recommendations raised in these M/Ps, those related to structural development have been partially realized, but recommendations concerning nonstructural measures such as policy and institutional aspects have not been sufficiently reviewed in terms of their utilization.

Now that JICA is expected to challenge the following issues;

- a) Whether common concept of "Integrated Water Resources Management (IWRM)" which was widely accepted have been sufficiently reflected in NWR-M/Ps or not,
- b) How future "NWR-M/Ps" should be directed under the expected condition of the increase of water resource vulnerability caused by climate change.

Based on these issues concerned, JICA reviewed the NWR-M/Ps of nine countries where JICA had previously investigated (Malaysia, Kenya, Nigeria, Zambia, the Philippines, Macedonia, Cote d'Ivoire, Vietnam, and Bulgaria) and made recommendations on the approaches for the IWRM for the future study.

Questionnaire surveys were conducted in nine countries. Field surveys and interviews were conducted in Malaysia, Kenya, and Vietnam. The questionnaire was distributed among the former counterpart agencies and water-related governmental institutions (e.g., ministries or agencies in charge of hydropower generation, irrigation, water supply, industrial water) of the recipient countries, along with the JICA staff in charge of water sanitation in the countries surveyed. The field survey covered not only to ask interviewees but also to observe the realized infrastructures and confirm their management that were recommended in the M/Ps.

JICA held three examination committees to obtain expert advice regarding the survey contents and how recommendation of this report should be headed. The principles of the survey were discussed at the first committee. How summary of recommendation should be headed, as based on field survey reports in the three countries, was discussed at the second committee. And matters regarding a general summary based on a review of the nine countries were discussed at the third committee.

The following gives an overview of the highlights of the NWR-M/P for each country and describes how the recommendations raised in each M/P are implemented. The affairs of Cote d'Ivoire, however, could not be surveyed due to its deteriorating security situation.

Results of studies by country

Malaysia: As a pioneering NWR-M/P, JICA provided a cooperation program where Japanese consultants, related government ministries and agencies joined forces as one unit. By formulating M/P and capacity development for water resources management through the dispatch of experts, JICA has achieved well-balanced results. After the NWR-M/P of 1982, Malaysia reviewed its water resources M/P twice based on its own national budget.

Kenya: Although some progress was made in organizational and legal institutions, the progress in water resources management and capacity development has been slow. JICA conducted an NWR-M/P follow-up in 1998 with a focus on water supply, and is now reviewing the NWR-M/P for Kenya.

Nigeria: Although some progress was made in organizational institutions concerning water resources management, no progress has been seen in legal institutions that should accompany such management. The progress in implementing recommendations regarding water resources management has also been slow. JICA will start reviewing the NWR-M/P for Nigeria in 2011.

Zambia: Steady and gradual progress has been made regarding both organizational and legal institutions. Recommendations in the development program have emphasized water supply, industrial water and irrigation, but without progress being achieved in irrigation. Some progress was made in water supply and industrial water—mainly in underground water development—but the pace of progress is slow.

The Philippines: The study aimed to address water shortages in the major cities, and placed emphasis on the water supply and industrial water, but the recommendations have largely not been implemented. Some reorganization has been achieved for water resources management, but without much progress being seen in legal institutions.

Macedonia: The NWR-M/P was implemented in an attempt to establish a water resources management system necessary for joining the EU, and realized the legal institutions for that purpose. However, the implementation of recommendations concerning water resources development is limited.

Vietnam: The M/P was centered on water resources development by constructing dams to combat droughts and floods, and differed considerably in content compared to the other M/Ps. Since the M/P took an approach to position the existing construction programs and similar projects of dam in the basin development and management programs, many projects were conducted in a short time after the M/P was formulated. However, hardly any recommendations were made concerning organizational institutions.

Bulgaria: The M/P was mainly intended to develop a draft basin management program that could satisfy requirements under the EU's water framework directive. As the study was only recently completed, little progress has been made, although some recommendations have been made for a water resources development program and for improving the organizational and legal institutions.

Recommendations

Recommendations concerning NWR-M/Ps based on a review of these countries are as follows:

1. Significance of NWR-M/Ps for the future

The NWR-M/P can be considered as a unique form of cooperation not seen in any other cooperation partners. The water resources M/Ps designed for the entire territory of each country, not only for particular basins, propose an image of well-balanced water resources development and management on a nationwide level, so that M/Ps can help to effectively distribute funds under a limited development budget, by such means as identifying prioritized basins and development projects.

In this way, NWR-M/Ps provide a blueprint for the entire sector related to water resources, then visualize the cooperative relationship between Japan and the other cooperation partners, thereby enabling Japan to establish its own cooperation policy. Now that "program approach" has been strongly called for, NWR-M/Ps that provide basis of program can be considered as an important form of cooperation. Moreover, since M/Ps make comprehensive recommendation, such M/Ps can be called a form of cooperation suited for developing countries, in terms of various policies concerning the water resources development and management, which have yet to be sufficiently organized in each country's implementation system.

The water supply- demand balance on a nationwide level requires adjustment with changes in the natural environment and socioeconomic environment on a mid-to-long-term basis, so that NWR-M/Ps should be reviewed over the course of about

a decade. Even today many developing countries have their own relatively mature programs for water resources development and management, NWR-M/Ps have not lost significance.

2. Emphasis on water resources management

Most former NWR-M/Ps emphasized "water resources development" centered on structural development, and "water resources management" that entails organizations, institutions, human resources, technology and other matters was limited to conceptual recommendations. The recommendations were not paid attention to because no detailed process had been presented to make water resources management become a reality. As a result, the NWR-M/Ps prioritized "water resources development" with inadequate attention given to "water resources management."

In NWR-M/Ps, flexible recommendations based on the situation of recipient country are important. The condition of recipient country is exemplified as follows; a) to grasp the appropriate situation of the water resource management of recipient country for proper recommendation on water resource management, b) to consider the definitions of Integrated Water Resources Management (IWRM) generally cited as "the holistic approaches to the water resources development and management in various water-related sectors", "the multi-stakeholder engagement and involvement into all stages and key processes of the plan formulation", "the adaptive approaches to the dynamic changes of the natural and social environment related to the water resources" and "a broader focus on the fairness, economic affairs, and environmental and social consideration". Furthermore, it is necessary to attach importance to the efficient utilization of the finite water resources.

The recommendations for "water resources management" should be considered in a comprehensive manner based on the following viewpoints: (1) strengthening of the organization/institutional setup, (2) how water resources management is to be implemented and (3) capacity development (CD) to support the items (1) and (2). The additional explanations for each viewpoint are shown as follows:

1) Organization and Institutional Setup for Water Resources Management

As part of the cooperation, JICA should consider the framework for organizations and/or institutions first. Following the consideration, JICA formulates a roadmap showing the establishment of organization/institution or their reorganization. The roadmap should also include the detailed process of capacity development due to the necessity of capacity development to function organizations properly.

2) Measures for Water Resources Management

In general, the basics of water resources management are to monitor the quality and quantity of water resources through continuous observation. For achieving water resource management, it is necessary to step up the following process such as to set up a data network at the field level, to share the information and then to manage the information progressively. To follow the general step, a realistic roadmap that shows the process from an overview of the policy on water resources management to the progressive implementation of policy should be recommended in NWR-M/Ps. At that time, it is absolutely necessary to include concrete capacity development in the roadmap for adding technology and know-how relative to the various approaches.

3) Capacity development for water resources management

"Water resources management" is accompanied with know-how and technology in general. If such know-how and technology are lacking and capacity is not properly developed, water resources management cannot become a reality. Therefore, measures of capacity development should be elaborated in the NWR-M/Ps to achieve the water resources management. JICA must follow the measures of capacity development with technical cooperation in the coordination with other cooperating partners as necessary.

3. Formulation of NWR-M/P based on the Fundamental Data

Advantage of the NWR-M/Ps are to analyze the water resources potential based on actual data and to calculate precisely the water resources potential that is the base of water balance. JICA has steadily adopted the methods that are to improve the preciseness of the plan based on actual data taken. The recipient countries and the cooperating partners concerned positively evaluate such notable advantage of NWR-M/Ps as well. Thus, highly precise planning on the basis of actually measured data should be continued.

In the future, the various analyzing approach should be combined in the process of planning such as to incorporate the satellite data in the planning process complementarily for the region where actual on-the-ground data is difficult to collect.

4. Use of Japanese Knowledge

The "Water Plan" for the whole country and the "Full Plan" for the separate river basins have been formulated in Japan as the blue prints for the water resources development after the Second World War. The concept on "formulation of the NWR-M/P" itself is regarded as the application of the "Water Plan" and/or the "Full Plan" to the developing countries.

Under such circumstances, it is important to increase the value of NWR-M/Ps to use the

following technology and knowledge Japan has advantage of and useful to the developing countries.

- 1) Formulating highly precise plans based on hydrological observation data and managing water resources based on the data collected (e.g., flood control, water control in the drought)
- 2) Japanese legal system concerning comprehensive water resources management under the River Act
- 3) Basin runoff simulation model based on the technology for estimating rainfall and groundwater storage potential by the use of satellite data, and the prediction of climate change.

5. Formulation of Viable Water Resources Development Plan

The main issues derived from the findings of the review on the ten NWR-M/Ps from the nine countries are that many recommended structural development projects have yet to become a reality. There are various reasons for that. Conceivable one is that the goal of the plan is too ambitious. The NWR-M/Ps showed the case where a development plan was prepared according to very ambitious mid-to-long-term development plan that was prepared by the recipient country.

In such case, it is necessary to prioritize the proposed projects in view of several scenarios, considering the impact of the projects and the ability of the project implementing agencies; and to provide a margin of selection to the recipient country based on the country's financial situation.

It was also reported that some countries lacked the funding necessary to carry out their plans. Therefore, reports should show the perspective to utilize private sector funding for profitable projects.

6. Use of private funding and technology

In recent years, the water resources sector has experienced rapid progress in the use of private funding and technology through what is called Public-Private Partnership (PPP), in order to develop an infrastructure and increase efficiency in project operation and management that cannot be fully covered by public funding alone. Under such circumstances, NWR-M/Ps in the future will need to include recommendations on such issues as to prepare the conditions for promoting PPP and to provide the possible use of private funding and technology based on a study of trends in PPP in the recipient country.

7. Capacity development (CD)

CD concerning "water resources management" is important as discussed before.

By experiencing and understanding the formulation of NWR-M/Ps, the counterparts (C/Ps) in recipient country should hopefully improve their planning abilities and become able to revise their M/Ps without the aid of another country. Conducting such CD in formulating the M/Ps will help the recipient countries to better understand and appreciate the recommendations made in the NWR-M/Ps, and then implement those recommendations securely.

Former NWR-M/Ps achieved little improvement in the planning ability of the C/P, except in Malaysia. In Malaysia as well, it is considered that CD has been accomplished through continuous follow up cooperation such as the dispatch of experts after the study.

In view of the above, it is desirable to conduct follow-up technical cooperation, including recommendations on improving the planning abilities of C/Ps of the recipient country in future NWR-M/Ps.

8. Program approach

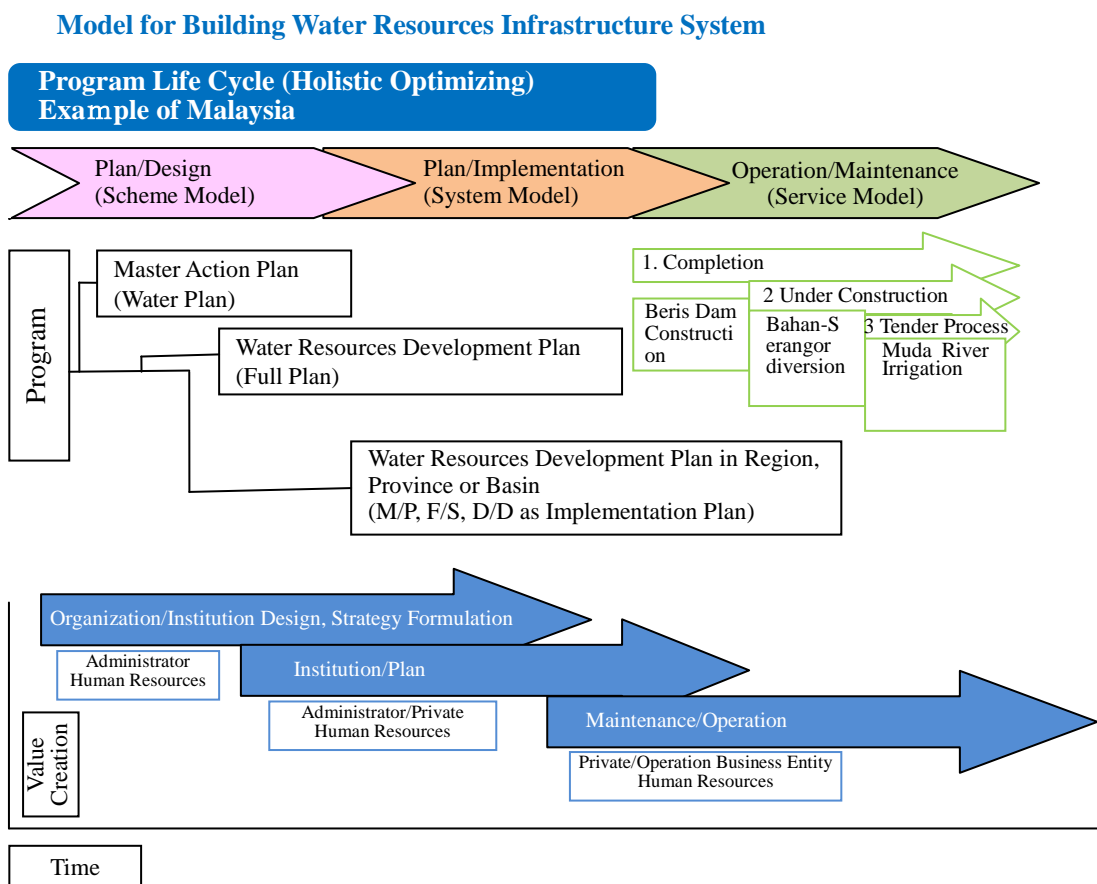
The major problem of the former NWR-M/Ps is that many recommendations have not become a reality. We must admit that one important reason is that JICA—who developed the M/Ps—failed to conduct a follow-up on recommendations made in the M/Ps, except for Malaysia.

The NWR-M/Ps envisage the future image of an entire sector, and then visualize the relationship between Japanese cooperation and that of other cooperating partners, thereby providing Japan with principles of cooperation. The NWR-M/Ps should be the basis of the program, and follow-up of the NWR-M/Ps should be imperatively conducted along with capacity development (technical cooperation) and infrastructure development (financial assistance), in collaboration with other cooperating partners.

On the other hand, the M/P itself in Malaysia consists of (1) a master action plan (equivalent to a 'Water Plan' in Japan) and (2) a water resources development/use plan (a basic development plan equivalent to a 'Full Plan' in Japan and a water resources development plan designed for each basin). To follow the M/P, JICA supported to formulate the basic water resource plans for four regions (with the scheme of development study), dispatch the experts, and then develop the infrastructures with the scheme of yen loans. Moreover, development strategies and organizational designs recommended in the M/P were embodied as institutions or development plans and such institutions or development plan finally prepare the realization of every project. The

process in which many stakeholders ranging from administrators to private business entities have come to be involved are regarded as the model of a ‘water resources development program’. The following gives an overview.

Overview of composition of Malaysia’s national water resources development plan



(Conceptual diagram prepared by Okazaki and Nakamura)

9. Involvement of stakeholders

Insufficient consideration of various stakeholders is pointed out as another reason why many recommendations made in the NWR-M/Rs have not yet realized. Although various stakeholders intervene in water resources development and management, including several government ministries and agencies in charge of water supply, irrigation, river water control, hydropower generation and so on, they did nothing but interact with their counterpart organizations and failed to give sufficient consideration to relating stakeholders. In order to adjust the water resources coordinately and implement the water resource development plans smoothly, it is important to involve these stakeholders in the development of NWR-M/Ps from an early stage. To that end,

consultants/JICA of NWR-M/P should obtain the understanding of main stakeholders such as related ministries and agencies in the process of development of M/Ps. For example, the consultants/JICA sets up a steering committee and encourages the main stakeholders to participate the committee for their well understanding.

It is also extremely important for JICA to position NWR-M/Ps as the basis for program approach and to share the information of the M/Ps with the main donors in order to collaborate with other donors.

Countries where international rivers cross and countries that take underground water from aquifer spreading out over several countries should position the surrounding countries as stakeholders. It is also possible to hold workshops to involve those nearby nations to share information on river/water if necessary.

10. Others

Impact by Climate Change: For countries having water resources that are presumably highly vulnerable to climate change, the effects of climate change must be predicted as much as possible in NWR-M/Ps, and the effects must be reflected in water resources development and management plans.

Sufficient Consideration to Locality: In implementing an NWR-M/P in Africa or other distant region, it is necessary to consider sufficiently the peculiarities of the region and to avoid from Asiatic bias, although Japan base oneself on the knowledge and experience of us.

Approach to International Trans-boundary Rivers and Aquifers: For the countries where international rivers cross and the countries that take underground water from aquifer spreading out over several countries, it is becoming increasingly important to coordinate the interests on international rivers such as water utilization, water improvement, and the water environment with the surrounding nations. For these countries, the nearby nations should be positioned as stakeholders and, for example, informal meetings should be held with those nations, thereby sharing information as early as the formulating stage of NWR-M/Ps. In addition, more efforts must be made to monitor the international trans-boundary underground water.

Environmental and Social Consideration: Of the NWR-M/Ps for the nine countries surveyed, only four were subjected to Initial Environmental Examination (IEE) for the prioritized projects in each NWR-M/P. The NWR-M/Ps of two countries did nothing but identify the need to the environmental and social considerations. The NWR-M/Ps of three countries made no mention whatsoever of any environmental and social

consideration.

In the prioritized projects of NWR-M/Ps in the future, it will be necessary to address the JICA guidelines for environmental and social considerations.

NWR-M/Ps, on the other hand, are intended to formulate a long-term policy on water resources development and management for the entire nation, and are thus placed as high-level plans integrating every structure measure. Consequently, regarding NWR-M/Ps, it would be recommended to conduct the strategic environmental assessment (SEA) that suggest the alternative development goals or the entire strategy of program implementation rather than the IEE for specific projects.