

# Position Paper on Water Environment Management

July 2018

## 1. Overview

### **(1). Present Situations and Problems of Water Environment Management in Developing Countries (Including Their Needs)**

Developing countries, mainly in Asia, have seen rapid urbanization and population increases as their economies have grown. In the meantime, however, household and industrial wastewater, especially in urban areas, has been discharged without proper treatment, causing serious deterioration in the water quality of rivers, seas, groundwater, and enclosed water area, such as lakes and marshes. This water pollution has driven some aquatic life to extinction, dramatically changed local ecosystems, caused contamination of fish and shellfish with toxic substances, damaged local fisheries with red tides, and harmed the health of local people taking in contaminated water and food. Across the world, mostly in developing countries, 500,000 people die annually from waterborne diseases, such as diarrhea, dysentery, and cholera, many of whom are babies and infants (315,000 babies and infants are said to die from such waterborne diseases every year). In addition, it is estimated that as of 2015, about 660 million people had no access to safe drinking water, 2.4 billion people had no access to basic sanitation (toilets), and 1 billion people did open defecation.

To solve these problems, it is necessary to build infrastructures and sanitary facilities that can control household and industrial wastewater and other pollution sources, such as sewerage, purification tanks, septic tanks, and clean toilets, as well as to establish legal frameworks and formulate and implement measures and plans. However, the limited experience, knowledge, human resources, and funds of developing countries have kept them from building sufficient capacity to address such problems and taking necessary action.



River polluted with wastewater and garbage  
(the Philippines)

### **(2). Characteristics of Problems with Water Environment Management**

Water, critical to sustaining human life, is public property that everyone should have the right to access. Water has several characteristics. Once water is polluted, it needs time to recover (the "long-term impact"), and is impossible to restore a damaged water environment to its original state no matter what actions are taken ("irreversibility"). Local pollution has the potential to spread via water and have a transnational impact ("diffusivity" and "extensivity"). In addition, as a pollution source, pollution victim, or target of anti-pollution measures, water is closely linked with various sectors of social and economic activities ("cross-sectorality").

Despite the fact that these characteristics mean that water should be maintained and used as public property, water is used like a consumer good due to problems of modern society (such as population growth, mass production and mass consumption, and expanding economic activities). This consumption of water has highlighted the irreversibility of the environment, increasing environmental pollution and health problems.

In many developed countries, governments have intervened in the market in various ways and taken regulatory, economic, and preventive measures against the discharge of pollutants. In developing countries, on the other hand, responsible government agencies are often incapable

of adequately taking such measures. Furthermore, the insufficient capacity of society to manage the water environment, including corporate management of pollutants and public monitoring, has made it more difficult to address problems with water environment management.

### **(3). Domestic and International Assistance**

#### **1) International Assistance**

##### **(1) United Nations Conference on Human Environment (Stockholm Conference)**

In June 1972, 113 nations participated in the world's first high-level intergovernmental conference on environmental problems "United Nations Conference on Human Environment" (Stockholm Conference). This Conference adopted the Declaration of the United Nations Conference on Human Environment and the Action Plan for the Human Environment. With respect to the water environment management, the second principle of the Declaration regarding the protection of natural resources mentioned the importance of safeguarding water "through careful planning or management."

##### **(2) Mar del Plata United Nations Water Conference**

In 1977, the United Nations Water Conference took place in Mar del Plata, Argentina, designating the years from 1981 to 1990 as the International Drinking Water Supply and Sanitation Decade. The Mar del Plata Declaration stated that "all peoples have the right to have access to drinking water in quantities and of a quality equal to their basic needs." After that, the United Nations took the initiative in recognizing that the access to water and sanitation is a human right. The International Drinking Water Supply and Sanitation Decade focused on the spread of low-cost, affordable technology and encouraged actions involving local residents, while the donor community stressed the importance of spreading appropriate technology. Since then, international efforts had been made to promote the development of water-supply and sanitary facilities in developing countries, help the population that had lacked access to water and sanitary services, and develop technology usable in developing countries. These efforts increased the population with access to improved supply of drinking water to 4.1 billion (79 percent of the world population) and the population with access to defecation facilities to 2.9 billion (55 percent of the world population) by 1990, the last year of the Decade.

##### **(3) Rio Earth Summit (United Nations Conference on Environment and Development)**

In June 1992, the United Nations Conference on Environment and Development (UNCED) (also known as the Earth Summit) took place in Rio de Janeiro, Brazil, adopting the action plan "Agenda 21." Regarding water environment management challenges to tackle, Section II "Conservation and Management of Resources for Development" of Agenda 21 listed "protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas, and coastal areas" (Chapter 17), "protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources" (Chapter 18), and "environmentally sound management of solid wastes and sewage-related issues" (Chapter 21).

##### **(4) World Water Forum**

In 1996, international organizations and academic associations established the World Water Council (WWC). The first World Water Forum (WWF) held by the WWC in Marrakesh, Morocco, in 1997 agreed to develop the "World Water Vision" with an eye toward the 21st century and established the World Commission on Water for the 21st Century for this purpose.

The second WWF (WWF-2) took place in The Hague, the Netherlands, in 2000. This forum announced the World Water Vision, which emphasized the importance of including all stakeholders in decision-making processes to solve water problems, and adopted the Hague Ministerial Declaration. This Declaration presented water issues for international ministerial meetings and an international framework for action.

The third WWF (WWF-3) took place in Japan (Kyoto, Shiga, and Osaka) in 2003. The ministerial conference announced the “Portfolio of Water Actions”, a compilation of about 400 voluntary projects to solve water problems. The conference also discussed with general participants five themes in sub-groups, including "safe drinking water and sanitation" and "water-pollution prevention and ecosystem conservation," and compiled the discussions into the "Ministerial Declaration—Message from the Lake Biwa and Yodo River Basin."

The fourth WWF (WWF-4) held in Mexico City, Mexico, in 2006 established the Asia-Pacific Water Forum (APWF) to contribute to sustainable water management in the Asia and Pacific region. Since then, the World Water Forum has been held every 3 years: the fifth forum in Istanbul, Turkey, in 2009, the sixth forum in Marseilles, France, in 2012, and the seventh forum in Daegu, South Korea, in 2015. The latest forum took place in Brasilia, Brazil, in March 2018.

#### (5) United Nations Millennium Summit and MDGs

In September 2000, the leaders of 189 nations gathered in New York to participate in the United Nations Millennium Summit, where they adopted the “Millennium Declaration”, which set the goals to be achieved by the international community in the 21st century. This Declaration, an agreement of the international community to work together in seven fields, set the Millennium Development Goals (MDGs) as specific goals that the international community should share under the agreement. The MDGs, consisting of eight goals, 21 targets, and 59 indicators, provided concrete numerical targets to be achieved by the international community by 2015. The goal related to water environment management is Goal 7, "Ensure Environmental Sustainability," while the related target is Target 7-C: "Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation." However, the target for access to basic sanitation was not achieved by 2015; as mentioned above, it is estimated that as of 2015, 2.4 billion people had no access to basic sanitation (toilets), while 1 billion people did open defecation.

#### (6) World Summit on Sustainable Development (WSSD)

In September 2002, the World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa, reaffirmed the international commitment to sustainable development. The Johannesburg Declaration adopted on this occasion mentioned air, water, and marine pollution affecting the global environment as challenges faced by the world. The Declaration also showed the international commitment to increasing access to such basic needs as clean water and sanitation through partnerships, ensuring capacity-building with access to appropriate financial resources, using the latest technology, and ensuring technology transfer, human resource development, education, and training.

#### (7) United Nations Conference on Sustainable Development (Rio+20)

In 2012, the 20th anniversary of the Rio Earth Summit, the United Nations Conference on Sustainable Development (Rio+20) took place and adopted a consensus document titled "The Future We Want". This document confirmed an agreement to realize green economies in the context of sustainable development and poverty reduction, and set Sustainable Development Goals (SDGs) as indicators for the effort.

#### (8) United Nations Sustainable Development Summit and SDGs

In September 2015, the leaders of 193 UN member nations gathered at the UN headquarters in New York and participated in the United Nations Sustainable Development Summit,

where they adopted “the 2030 Agenda for Sustainable Development”, including the SDGs. The SDGs cover three dimensions of sustainable development (economic, social, and environmental) and consist of 17 goals, 169 targets, and 232 indicators as the universal goals and targets that involve the entire world, including developed countries. Each UN member country is required to set its own SDGs according to its development level and situation. While the MDGs targeted only access to safe water and sanitation, the SDGs include additional targets related to the water environment management: (1) the quality of access to safe water, such as the quality and availability of and access to drinking water; (2) hygienic practices, such as hand-washing; (3) appropriate management of fecal waste and septage isolated at sanitary facilities (toilets) (fecal waste management); and (4) improvement of water quality through measures against illegal dumping, sewage treatment, and reuse of wastewater. These issues are what the international community has focused on in recent years.

The goal related to water environment management is Goal 6, "Ensure availability and sustainable management of water and sanitation for all." This goal has two targets directly related to water environment management: "6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations," and "6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally."

## 2) Domestic Assistance

### (1) ODA Charter and Development Cooperation Charter

Japan's ODA Charter approved by the Cabinet in 1992 considered "environmental conservation as a universal issue that both developed and developing countries should address together," mentioning "environmental conservation and development should be pursued in tandem" as one of four principles of ODA implementation and "addressing global issues," such as environmental and population problems, as one of five priority issues. The ODA Charter revised in 2003 still considered "addressing global issues such as environmental problems" as one of the priority issues of ODA. In 2015, the ODA Charter was revised again to reflect changes in the roles of ODA as well as discussions about development in the international community, and was approved by the Cabinet as the Development Cooperation Charter. The Development Cooperation Charter recognizes in the preamble that "water-related issues could have a direct negative impact on the peace, stability, and prosperity of the world" and pledges as a priority the issue of "quality growth' and poverty eradication through such growth" for which Japan will provide assistance necessary to promote people-centered development that supports basic human life, such as safe water and sanitation.

### (2) ISD and Eco-ISD

At the United Nations General Assembly Special Session on Environment and Development in 1997, Japan announced the Initiatives for Sustainable Development toward the 21st Century (ISD), which showed the philosophy and action plans of Japan's environmental cooperation. At the Johannesburg Summit in 2002, Japan also announced the Environmental Conservation Initiative for Sustainable Development (Eco-ISD) as a revised version of the ISD. The Eco-ISD set forth the philosophy of (1) human security, (2) ownership and partnership, and (3) pursuit of environmental conservation and development. Under this philosophy, the Eco-ISD pledged to provide environmental cooperation, including the development of the capacity to address environmental problems and the application of Japanese experience and scientific knowledge, and showed action plans that prioritize (1) efforts to address global warming, (2) pollution control, (3) fresh water issues, and (4) conservation of natural environment.

### (3) Japan's Initiative in the World Water Forum and Other International Conferences

Japan has contributed to major international conferences as it hosted WWF-3 and the first Asia-Pacific Water Summit (APWS) in Beppu in December 2007. At WWF-3, Japan announced the Initiative for Japan's ODA on Water. This Initiative showed Japan's commitment to: (1) providing drinking water and sanitation to poor countries and regions; (2) addressing the needs to provide large-scale financing to urban areas; (3) assisting in capacity building, its policy of establishing and strengthening international partnerships, and the six pillars of its actions (providing safe drinking water supply and sanitation, improving the water productivity, addressing the problem of water pollution and ecosystem conservation, disaster mitigation, water resource management, and strengthening of partnerships with NGOs). Japan also proposed an initiative called the Water Environment Partnership in Asia (WEPA), which aims to promote good governance and capacity building in water environment management by providing information and knowledge necessary for water environment management in Asia through a database, and the relevant countries agreed on the initiative (13 Asian countries constitute the WEPA). At WWF-4, Japan announced the Water and Sanitation Broad Partnership Initiative (WASABI). This Initiative highlighted Japan's commitment to supporting the self-help efforts of developing countries on water and sanitation in cooperation with international organizations, other donor countries, and other interested parties under five basic policies (such as emphasizing the human security perspective and emphasizing capacity development) and through five concrete measures (such as promoting integrated water resource management and providing safe drinking water and sanitation). All the initiatives pledge comprehensive cooperation based on Japan's strengths.

## 2. JICA's Assistance Policy

### (1). Significance and Purposes of Water Environment Management Projects

As described in "(2) Characteristics of Problems with Water Environment Management" in "1. Overview," water is critical to sustaining human life, and water conservation and management lead to the protection of our lives, living environments, and dignity as well as contribute to the "human security" of both current and future generations. Environmental problems, including water pollution, need to be immediately tackled by developing countries as they have "long-term" and "irreversible" impacts. In many developing countries, however, administrative agencies responsible for such problems are not competent enough and the entire society, including citizens, businesses, and research institutions, is not mature enough. There is a fear that environmental problems will deteriorate further, with a growing perception that they will pose a risk to social stability and economic development.

Since environmental problems relate to each other in many fields (cross-sectoral), cooperation in water environment management for developing countries should aim "to create a sustainable society by properly managing interactions between our economic/social systems and the environment and keeping a balance between the protection and use of water resources." More specifically, it is important to establish a series of processes of adequately identifying, analyzing, and projecting the current or expected imbalance between the protection and use of the water environment, formulating actions and plans from both hard and soft perspectives, and ensuring the implementation of such actions and plans, as well as to help developing countries build the capacity to sustainably implement such processes on their own.

### (2). Contribution to the SDGs

As described in "(3) Domestic and International Assistance" of "1. Overview," the SDG most related to water environment management is Goal 6, "Ensure availability and sustainable

management of water and sanitation for all." For water environment management, it is especially important for Japan to contribute to Targets 6.2 and 6.3 of the goal.

- 1) 6.2: By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.

→ It is important to contribute to increased access to adequate sanitation (including toilets) by continuing sewerage development through financial assistance as well as striving to introduce and improve so-called on-site wastewater treatment facilities. These efforts include promoting the use of Johkaso, improving the structure of septic tanks, and promoting the adequate maintenance and management of septic tanks.

- 2) 6.3: By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.

→ Japan has conducted many cooperative projects through technical cooperation (such as formulating master plans for wastewater and effluent treatment, establishing legal frameworks, establishing project implementation frameworks, and helping to develop the capacity of executing agencies) and financial assistance (such as building sewage treatment plants, sewers, and septage treatment facilities). This target focuses on water pollution in rivers and other waters that is expected to worsen with population growth, economic development, and urbanization in developing countries. It will be increasingly important to cooperate in and contribute to the sustainable operation, maintenance, and management of such facilities.

Target 6.3 relates indirectly to "3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases" and "3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination" in Goal 3, "Ensure healthy lives and promote wellbeing for all at all ages," as well as "12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment" in Goal 12, "Ensure sustainable consumption and production patterns."

### **(3). JICA's Strengths**

In tackling challenges related to water environment management, it is necessary to develop sewerage and other infrastructures after fully understanding the realities related to such challenges. It is also essential to promote the comprehensive capacity development of individuals, organizations, institutions, and social systems to operate, maintain, and manage facilities, establish legal frameworks, formulate plans, strengthen plan implementation frameworks, and achieve other purposes. To promote infrastructure development and capacity development, JICA has provided technical cooperation that includes formulating master plans and financial assistance based on preparatory surveys, attaching importance to cooperation based on data and technical considerations and long-term viewpoints.

Japan is overcoming its own water pollution problems that have been serious since the 1960s as it has successfully covered about 90 percent of its population with wastewater treatment facilities, mainly sewerage, and taken measures against industrial wastewater. In addition, Japan has an excellent achievement and technical levels in advanced treatment of wastewater, control of flooding in urban areas, use of recycled water, and reuse of septage generated in sewage treatment processes. JICA can mobilize the knowledge, experience, and technology accumulated by Japan because it has established an extensive network of ministries and agencies, local governments, public organizations, universities, research institutions, private

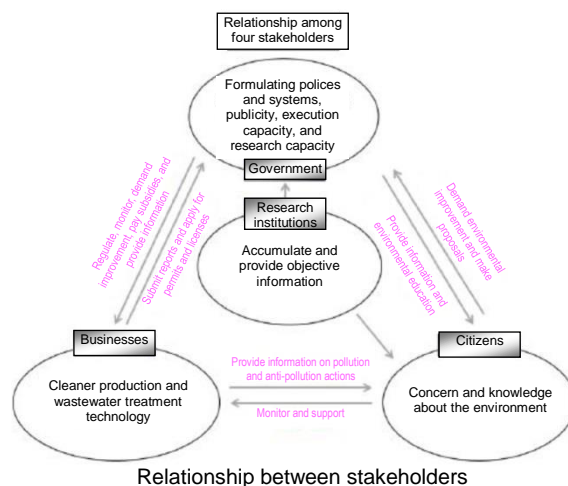
enterprises, and others through cooperation with the domestic private sector, the Science and Technology Research Partnership for Sustainable Development (SATREPS), grassroots technical cooperation, and other cooperative schemes.

#### **(4). Cooperation Approaches**

To achieve "(1) the Significance and Purposes of Water Environment Management Projects" in "2. JICA's Assistance Policy," it is necessary to develop policies for maintaining a balance between the protection and use of water resources, establish laws and systems including environmental standards and effluent regulations, formulate and implement plans and measures, conduct monitoring and analysis, and improve and strengthen policies, plans, and measures based on monitoring and analysis. Although these efforts should be made at the initiative of central and local governments, it is essential to cooperate with businesses, encourage citizens' participation, be provided scientific knowledge and analysis from universities and research institutions, and work with other actors in society to adequately maintain and manage these efforts and make them effective. This is because water pollution and other environmental problems are closely related to general social and economic activities. As its cooperation approaches to achieve the above purposes, JICA will: 1) Strengthen the comprehensive water environment management capacity of actors (governments, businesses, citizens, and research institutions) through technical cooperation, financial assistance, and other schemes; 2) Strengthen water environment management capacity needed for target watersheds from the viewpoint of watershed management; and 3) Promote the comprehensive introduction of off-site and on-site wastewater treatment measures and technology.

- 1) Strengthen the comprehensive water environment management capacity of actors (governments, businesses, citizens, and research institutions) through technical cooperation, financial assistance, and other schemes

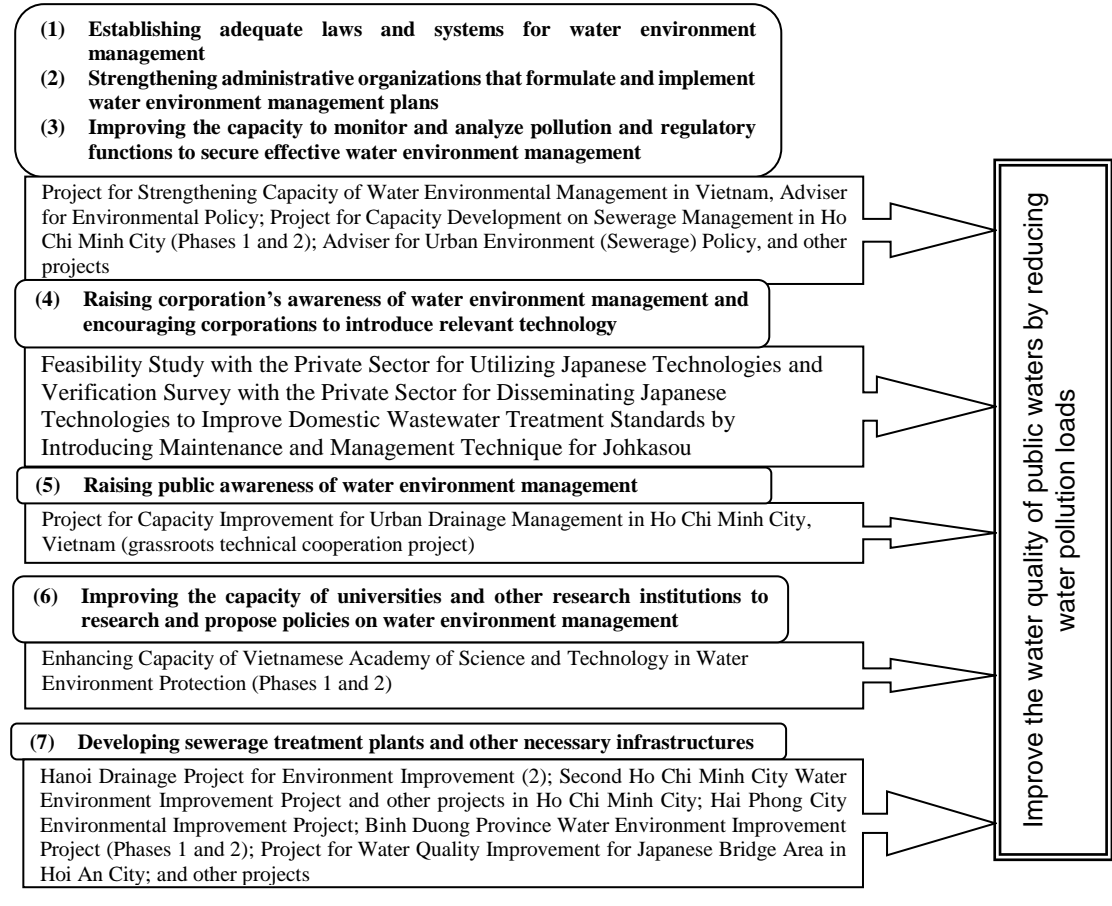
This cooperative approach aims to improve the water environment management capacity of the entire society by upgrading the capacity of "four actors"—governments, businesses, citizens, and universities and other research institutions—of the target country and enabling them to work together effectively. This approach consists of seven activities: (1) Establishing adequate laws and systems for water environment management; (2) Strengthening administrative organizations that formulate and implement water environment management plans; (3) Improving the capacity to monitor and analyze pollution and regulatory functions to secure effective water environment management; (4) Raising corporation's awareness of water environment management and encouraging corporation to introduce relevant technology; (5) Raising public awareness of water environment management; (6) Improving the capacity of universities and other research institutions to research and propose policies on water environment management; and (7) Developing sewerage treatment plants and other necessary infrastructures. With this approach, JICA aims to strengthen government functions through technical cooperation, financial assistance, and other schemes and to raise the awareness and capacity of businesses, citizens, and universities and other research institutions through Partnership with the private sector, Grassroots technical cooperation, SATREPS, and other cooperation schemes.





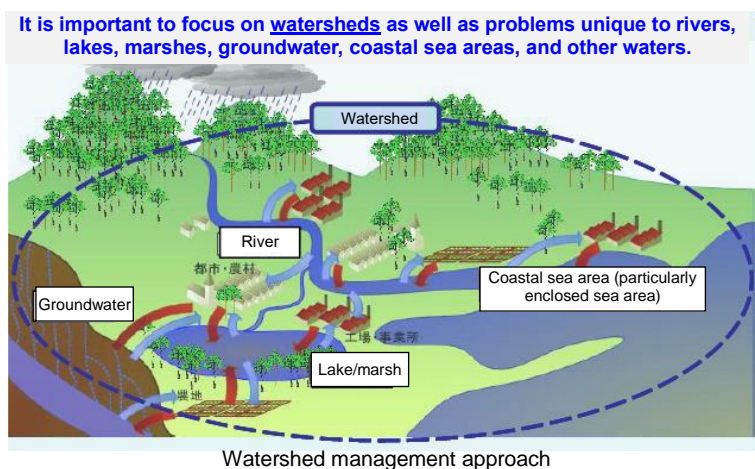
<Case Study> Comprehensive Approach to Strengthening Water Environment Management Capacity in Vietnam

In Vietnam, JICA has strengthened the capacity of local authorities, businesses, research institutions, and other parties concerned as “Water environment improvement cooperation program” and reduced water pollution loads to improve the water quality of public waters.



2) Strengthen water environment management capacity needed for target watersheds from the viewpoint of watershed management

Watersheds targeted for water environment management can be classified into two categories depending on the characteristics of waters to which they are connected: (1) enclosed waters (lakes, marshes, and inner bays that have no or little connection to the open sea and rivers flowing into these waters); and (2) non-enclosed waters (marine areas that have substantial connection to the open sea and rivers flowing into these waters).



Since these two types of waters are different in the characteristics of water pollution and purposes of use, it is necessary to consider the characteristics in setting water quality control standards and taking action. When discussing the causes of water pollution and action to



take, it is important to pursue good water environment management from the viewpoint of watershed management by specifying watersheds that contain pollution sources and affected areas, as in the case of Japan's comprehensive sewerage development plans by watershed. The aim of this approach is to develop the capacity of relevant organs (such as central and local governments) considering the conditions unique to each watershed. This is because water areas to which a watershed is connected have different characteristics and plans, for example, about whether they are used as sources of water supply, as sources of irrigation water, and for recreation purposes. For areas using groundwater for their water supply, measures against groundwater contamination should also be taken. Under this approach, it is also necessary to strengthen and improve watershed management with the comprehensive use of technical cooperation, financial assistance, and other schemes.

<Case Study> Cooperative Watershed Management for the Santa Lucia River, Uruguay  
Uruguay used to suffer degradation of the water quality environment of the Santa Lucia River basin, which covers Montevideo, the country's capital, and its surrounding areas. The basin, which accounts for less than 10 percent of the national land, accommodated more than 60 percent of the national population. While major pollution sources comprise urban wastewater, industrial wastewater, and farmland as non-point sources, heavy-metal pollution caused by wastewater from leather factories was also observed. Measures including the construction of sewage treatment plants, the regulation of industrial wastewater, and measures to control pollution sources were taken individually, but not under national policies or plans. The principal factor affecting this situation was that the Ministry of Housing, Spatial Planning and Environment's (MVOTMA) National Directorate of the Environment (DINAMA), a governmental organ responsible for conserving the country's water quality, lacked sufficient execution and coordination ability and failed to fulfill its roles required by law.  
To solve this problem and improve the water quality of the basin, JICA carried out a development study titled the "Project on Capacity Development for Water Quality Management in Montevideo and Metropolitan Area (2003–2007)" and a technical cooperation project titled the "Project on Water Pollution Control and Management of Water Quality in the Santa Lucia River Basin (2008–2011)."  
The development study formulated an integrated master plan for strengthening water quality management. This master plan comprised three basic policies—watershed-based water quality management, systematic water quality management, and integrated water quality management—and consisted of four components: (1) strategy formulation; (2) pollution source control; (3) ambient water quality monitoring; and (4) promoting the understanding of the basic policies, education, and residents' participation. Under the master plan, JICA implemented a pilot project to establish a framework for watershed-based water quality management, promote understanding of the basic policies, strengthen cooperation between DINAMA and related organizations, and make other efforts.  
The technical cooperation project provided cooperation to strengthen DINAMA's capacity to realize the proposals of the master plan. The project included: strengthening DINAMA's system for pollution source control and water quality management; establishing a framework for cooperation among relevant organizations in pollution source control and water quality management; strengthening the ability of DINAMA and relevant organizations to monitor the water quality of rivers and effluents; strengthening DINAMA's and relevant organizations' information gathering and data analysis and assessment functions related to pollution source control; strengthening DINAMA's inspection, assessment, and regulatory functions related to pollution source control; and establishing a total information management system for pollution sources and water quality.

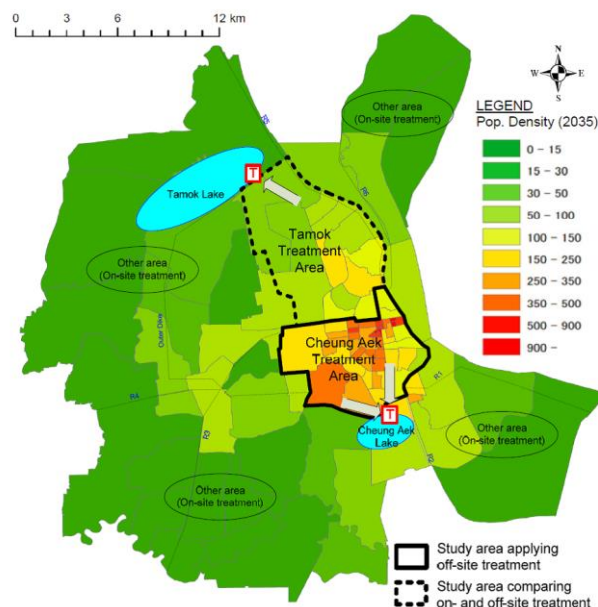
3) Promote the comprehensive introduction of off-site and on-site wastewater treatment measures and technology

Target 6.3 of SDG 6 has two indicators of progress: "6.3.1 Proportion of wastewater safely treated" and "6.3.2 Proportion of bodies of water with good ambient water quality." Both indicators (unlike the MDGs) require the international community not only to increase basic sanitary facilities (such as toilets), but also to improve water quality through adequate wastewater treatment using sewerage and sanitary facilities. Developing countries have set up pit latrines and other portable toilets and introduced septic tanks and other on-site wastewater treatment facilities at their own cost. However, poor operation, maintenance, and management of such facilities have often allowed insufficiently treated wastewater to flow into rivers and other waters and seep into the ground.

Many past technical cooperation and financial assistance projects in the field of water environment management aimed to meet requests for cooperation in development, operation, maintenance, and management of sewerage, an off-site wastewater treatment system. Now that the indicators of the SDGs demand "safe treatment" and "good water quality," JICA will see not only increasing needs for such cooperation, but also increasing needs for cooperation in on-site wastewater treatment. Japan's ministries and agencies are also working actively to promote its sewerage (off-site) and Johkasou (on-site) technology overseas in an integrated manner. Following these developments, JICA will provide cooperation for both off-site and on-site wastewater treatment through financial assistance, Partnership with the private sector, and other schemes.

<Case Study> The Study on Drainage and Sewerage Improvement Project in Phnom Penh Metropolitan Area, Cambodia

In master plans of previous technical cooperation for development planning, it was mainly master plans for "sewerage development" that were formulated. The master plan for wastewater control formulated in this project, however, classified the project area into off-site treatment areas and on-site treatment areas based on future population density and other projections.



## **(5). Priorities for Cooperation**

Cooperation in the field of water environment management are necessary to be based on capacity development suitable for the realities and needs of developing countries. These projects need to firstly identify the most urgent pollution problems, areas, and waters for preferential attention, giving priority to: 1) formulating and establishing policies, laws, systems, and plans based on scientific knowledge and data; 2) developing the capacity of society, organizations, and individuals related to the water environment management and needed to implement such policies etc. formulated and established in 1); 3) developing infrastructure according to the economic development stages of developing countries; and 4) cooperating with domestic stakeholders.

### **1) Formulating and establishing policies, laws, systems, plans, and measures based on scientific knowledge and data**

Developing countries have insufficient policy-making functions due to their lack of capacity, including human resources and experience, and other constraints. Although some developing countries have basic law to prevent water pollution, many are yet to develop supporting laws and systems, including detailed regulations for implementing countermeasures based on the basic law, or laws and regulations on the development, operation, maintenance, and management of sewerage. In addition, many developing countries have not formulated concrete plans and measures to treat wastewater, including sewer system development plans. For this reason, JICA will focus on strengthening policy-making functions, establishing necessary laws and systems, and formulating wastewater treatment plans and measures through technical cooperation and other schemes.

Supervisory and regulatory roles of governments in on-site wastewater treatment are often unclear. Individual on-site wastewater treatment facilities, whose locations are widely dispersed, need a government's supervisory, regulatory, and supporting systems to keep performing necessary functions. It is therefore necessary to define the roles of various stakeholders, including governments, businesses, and citizens, in facility planning, development, maintenance, management, septage removal, and treatment. For this reason, JICA will support to establish laws and systems that meet local needs, using Japan's Johkasou as a good example, through technical cooperation and other schemes.

Many developing countries have established environmental and effluent standards, which lay the foundations for wastewater treatment. Most of these standards, however, adopt standard values directly set by international organizations or developed countries and do not adequately take into account environmental monitoring for domestic pollution situations or domestic regulations aimed at improving water quality. For this reason, JICA will strengthen environmental monitoring capacity and other capabilities through technical cooperation (including SATREPS) and other schemes. It will also establish a system that ensures scientific data and knowledge obtained through environmental monitoring and other activities are used in plans and measures to improve the water environment.

### **2) Developing the capacity of society, organizations, and individuals related to the water environment management and needed to implement policies, plans, and measures formulated and established based on scientific knowledge and data**

Through technical cooperation and other schemes, JICA will focus on establishing the organizational frameworks of governments and strengthening individual capacity to help developing countries implement policies, plans, and measures formulated and established based on scientific knowledge and data. This assistance will cover enforcement of laws and systems, implementation of measures, sustainable operation, maintenance, and management of wastewater treatment facilities including sewer systems and on-site wastewater treatment facilities, establishment of financial systems related to wastewater treatment (including adequate charge collection), establishment of cooperation among related ministries and agencies of the central government, promotion of cooperation between the central

government and local governments, and promotion of cooperation between governments and businesses/citizens. As described in "(4) Cooperation Approaches" in "2. JICA's Assistance Policy," government authorities should take the initiative in managing the water environment. Since this initiative requires corporation's cooperation and public participation and understanding, JICA will also provide cooperation through Partnership with the private sector, Grassroots technical cooperation, and other schemes.

3) Providing cooperation focused on infrastructure development according to the economic development stages of developing countries

Development of wastewater treatment infrastructure, primarily sewerage, is not always a priority in national infrastructure development (In fact, Japan started full-scale sewerage development after railway, road, and waterworks development. The approved yen-loan amount [the total amount up to FY 2015] in the field of waterworks, sewerage, and sanitation accounted for only 9.3 percent of the total yen loan). Developing countries (with some exceptions) are said to become able to develop sewer systems only after their GDP per capita reaches about 2,000 to 4,000 US dollars (They need to make financial arrangements for facility development, maintenance, and management, have necessary legal frameworks, and be able to maintain and manage facilities in a sustainable manner). On the other hand, on-site wastewater treatment facilities are often developed in both urban and rural areas as excreta treatment facilities, irrespective of the countries' stage of development.

Development of wastewater treatment facilities according to the stages of economic development can be classified into three phases as described below.

	Description	Relevant Targets of the SDGs
First phase	Development of on-site wastewater treatment facilities mainly aimed at excreta treatment (such as septic tanks and pit latrines)	MDGs and Target 6.2
Second phase	Facility development combining on-site wastewater treatment with off-site wastewater treatment (sewerage)	Targets 6.2 and 6.3
Third phase	Expansion of the development of off-site wastewater treatment facilities (sewerage)	Target 6.3

In the first phase, the phase of providing basic sanitary services, on-site wastewater treatment facilities (septic tanks and pit latrines) are developed, aimed mainly at treating excreta. Since the development of these facilities is often financed by developing countries on their own, JICA's cooperation in this phase needs to focus on formulating master plans for wastewater treatment (including plans to introduce off-site wastewater treatment systems) and providing technical cooperation related to adequate facility maintenance and management. For "adequate facility maintenance and management," it is particularly important to provide cooperation for adequate treatment of septage generated from treatment facilities.

In the second phase, JICA needs to cooperate not only on excreta treatment through providing basic sanitary services, but also on both on-site and off-site wastewater treatment aimed at treating untreated wastewater (such as household wastewater) and water quality improvement. Both are required by SDG 6.3. More specifically, JICA's projects will include developing sewerage systems through financial assistance, formulating master plans for wastewater treatment (including more concrete sewerage development plans and plans to introduce off-site and on-site wastewater treatment systems in specific cities or areas) and operating, maintaining, and managing sewage treatment plants through technical cooperation, and providing technical assistance concerning laws, systems, implementation frameworks, and fiscal frameworks related to sewerage development. In this phase, JICA will still need to provide technical cooperation for adequately maintaining and managing on-site wastewater treatment facilities.

In the third phase, JICA will need to cooperate in further sewerage development through financial assistance as well as provide technical cooperation concerning sewerage development similarly to the second phase. This is because projects to construct sewage treatment plants will proceed in earnest, particularly in urban areas.

Since many projects have been recently proposed and implemented through Public–Private Partnership, grassroots technical cooperation, and other schemes related to on-site and off-site wastewater treatment, JICA will provide cooperation through such schemes as well as financial assistance and technical cooperation, including promoting the overseas use of Johkasou, Japan's unique on-site wastewater treatment technology.

#### 4) Cooperating with domestic stakeholders

The roles of ODA are clarified in the Infrastructure System Export Strategy adopted by the Council on Overseas Economic Cooperation and Infrastructure Export Strategies in 2013, the Partnership for Quality Infrastructure: Investment for Asia's Future announced in 2015, and the Expanded Partnership for Quality Infrastructure announced in 2016. Water supply and sewerage systems are also included in these export strategies.

Japanese ministries and agencies in charge of water environment management have deepened the relationships with execution agencies and other organizations in developing countries and promoted the overseas use of Japan's sewerage and wastewater treatment technology through cooperative agreements with wastewater treatment authorities of developing countries and bilateral negotiations. Local governments have also made the same efforts through JICA projects, such as grassroots technical cooperation and Partnership with the private sector (local businesses), and cooperative agreements with other local governments. Working through such endeavors, JICA will be able to further improve the capacity of governments, businesses, and citizens to manage the water environment through technical cooperation and financial assistance. For example, Kitakyushu City has conducted a grassroots technical cooperation project in Cambodia since 2016. This project, titled "Project for Capacity Building of the Operation and Maintenance of Sewerage and Drainage System in Phnom Penh Capital City," aims to improve the maintenance and management of wastewater and effluent treatment facilities, and raise public awareness of wastewater treatment in Phnom Penh. In February 2017, the Ministry of Land, Infrastructure, Transport and Tourism concluded a Memorandum of Cooperation on Cambodia Sewage Treatment System Development with the Ministry of Public Works and Transport of Cambodia. In addition, Kitakyushu City concluded a memorandum of technical cooperation and exchanges in the field of sewerage with the Department of Public Works and Transport of Phnom Penh. In the meantime, pre-treated trickling filtration (PTF), a proprietary technology of a Japanese company, was adopted for some of the wastewater treatment plants. These plants were proposed in a facility development plan as part of a master plan for wastewater treatment formulated in a technical cooperation project for development study titled "The Study on Drainage and Sewerage Improvement Project in Phnom Penh Metropolitan Area," which has been conducted since 2014. Given this example, JICA will also attach importance to cooperation with domestic stakeholders in future cooperation projects.

#### **(6). Expected Cooperation with Other Organizations (Domestic and Overseas)**

Regarding cooperation with overseas organizations, JICA may co-finance sewerage development with the World Bank, the Asian Development Bank (ADB), and other organizations in financial assistance (yen-loan) projects. In terms of technical cooperation, JICA may work with other donors such as GIZ, and international NGOs such as Water Aid. JICA may also work with the United Nations Water (UN-Water), the WHO, and other

international organizations in activities to achieve SDG 6 and monitor the progress of the activities.

As for cooperation with domestic organizations, JICA may work with ministries, agencies, and local governments as in the case of the above cooperation project in Cambodia. JICA may also collaborate with businesses through partnership schemes with the private sector (projects assisting in the overseas operations of small and medium-sized companies [e.g. Project to Demonstrate and Promote the Use of the Jacking Method and Technology in Construction of Sewage Pipes in Indonesia] and projects promoting the use of private-sector technology [e.g. Project to Promote Use of the Trenchless Sewage Pipe Renewal Method in Vietnam]). Like the international market for water supply systems, the international market for sewerage systems is also dominated by "water majors" represented by Suez (France), Veolia (France), and Thames Water (the UK). These are gigantic corporations capable of providing total services from the design and construction of water infrastructure to its operation, maintenance, and management. JICA will therefore watch the movements of these water majors closely to promote cooperation with the private sector. At the same time, JICA will consider urging government authorities to establish adequate standards for construction and treatment technology.

As described in "(5) Priorities for Cooperation" in "2. JICA's Assistance Policy," it is important to combine financial assistance with technical cooperation as necessary in both off-site and on-site wastewater treatment. JICA will attach importance to cooperation with local governments and relevant organizations that have know-how about sewage treatment services, on-site wastewater treatment services, environmental monitoring, and other related activities.

### **(7). Sewerage Development through Other Schemes (PPP – Public-Private Partnerships)**

Developing countries are seeking infrastructure development through Public-Private Partnerships (PPP), including Private Finance Initiatives (PFI), primarily to minimize public spending on infrastructure development. JICA is ready to assist developing countries in developing PPP infrastructure through various schemes, such as feasibility study assistance in preparatory surveys (for PPP infrastructure projects), private-sector investment finance, Viability-Gap Funding (VGF) yen loans, Equity Back Finance (EBF) yen loans, and Standby yen loans for credit enhancement for PPP infrastructure.

However, many developing countries are yet to have sufficient systems necessary for PPPs and not fully aware of the need for appropriate public participation and intervention. In addition, in comparison to trains, roads, water supply, and other services and infrastructure, citizens are generally unwilling to pay for sewerage services. Many developing countries do not even charge users for sewerage services. While sewerage development through PPPs has some successful projects like the privatization of Manila Water in the Philippines, it is still desirable to clarify the conditions necessary for sewerage development through PPPs and make adequate arrangements before starting such projects, even if developing countries are in great need of sewerage development through PPPs.