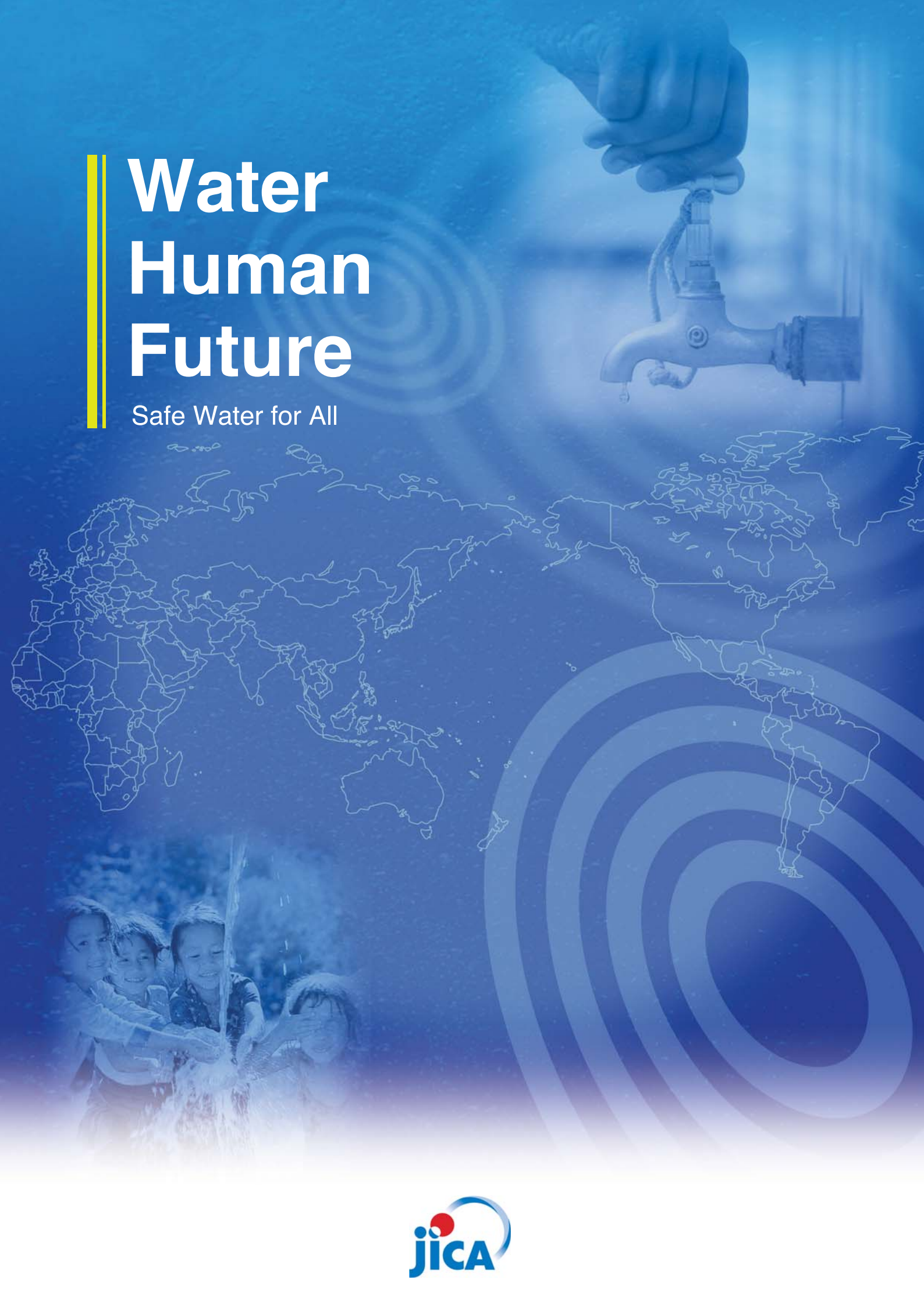


Water Human Future

Safe Water for All

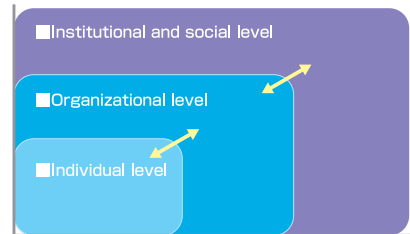


Capacity Development in the Water Sector for the Enhancement of Human Security

Lack of access to safe water is an impediment to the progress of public health, education and poverty reduction for many people in the world. Contaminated water exposes people in developing countries to the risk of waterborne diseases. In addition, natural disasters, such as floods and droughts, have become increasingly serious threats in recent years.

Solving such water-related issues is essential for allowing people to escape the poverty trap and for enhancing “**Human Security**”. In order to develop a system to effectively manage water resources and to ensure access to stable, equitable and safe water for people, using “**the Capacity Development (CD) approach**” is an important strategy. With the CD-approach, JICA has been cooperating with partner countries and their communities to strengthen the capacity of individuals, organizations, institutions and societies.

JICA places importance on the sharing of experiences and information gained in the field. We take into account the needs on the ground of each individual country while cooperating with institutions that include government agencies and other public entities. This knowledge sharing comes not only from Japan but also from neighboring countries.



Three layers of capacity development

Source: JICA (2004) *Capacity Development Handbook for JICA staff*
<http://www.jica.go.jp/english/publications/reports/study/capacity/200403/pdf/200403.pdf>

Given that many developing countries are situated in areas vulnerable to climate change, JICA supports the following water-related measures:

- (1) Introduce integrated water resources management in the region, reduce climate risks, and promote sustainable water resources management.
- (2) In areas with a higher risk of floods and other disasters, consider prevention measures according to local conditions.
- (3) In areas where the risk of drought is expected to increase, accelerate implementation of water supply measures.
- (4) Design projects/programs in view of climate risks and introduce measures that are expected to reduce greenhouse gas emissions and prevent or mitigate pollution.

JICA's approach

As water resource problems are becoming more critical, JICA has established a development strategy with four objectives in taking the initiative to solve global water problems. These objectives are (1) to provide a safe and stable water supply, (2) to enhance flood control to protect lives and property, (3) to conserve the water environment and (4) to promote integrated water resources management.

Presented here are case studies of JICA's contributions to capacity development of institutional systems, organizations and individuals in relation to the four objectives of the development strategy mentioned above.



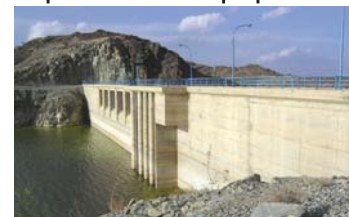
Safe and stable water supply



Enhancement of flood control to protect lives and properties



Conservation of water environment



Promotion of comprehensive water resources management

Safe and Stable Water Supply

Supplying water through community participation (Rural water supply)



People in many villages in developing countries have been trying hard to meet their daily water needs, but without proper water supply facilities.

They are often faced with a choice of whether to carry clean water from a source far from their communities or to fetch water available near at hand which might possibly be contaminated. Residents have little knowledge about hygiene and sanitation and are frequently affected by waterborne diseases.

In addition, children lose opportunities to go to school because of water-fetching responsibilities. Water scarcity in the dry season brings a great financial burden to poor households because they have to purchase drinking water. Access to safe water is one of the most critical issues to ensure escaping from the poverty trap.

JICA provides assistance in improving the water supply and sanitation in rural areas through community participation making communities the main players in development.

JICA places great importance in conducting social surveys to grasp the real needs of communities, establishing water-user groups, building the capacity of communities to maintain water facilities and providing education on hygiene.

JICA also develops the capacity of central and local governments involved in rural water supply in preparing for serious breakdowns that communities cannot cope with, and thereby ensures the sustainability of projects.



Safe and Stable Water Supply

Supplying water through community participation (Rural water supply)

Cambodia

Waterborne diseases used to be rampant in rural areas of Cambodia because of polluted water sources such as rivers, lakes, ponds and shallow wells. Water sources sometimes disappeared in the dry season, therefore safe and stable water sources were required.

The government of Cambodia constructed deep wells with hand pumps in 60 villages in Kandal Province in 2004 using grant aid from Japan. This construction was based on a water supply plan in southern Cambodia prepared by JICA in 2002.

A plan to improve the rural water supply was also prepared for Kampong Cham Province with the assistance of JICA in 2002. JICA, with the Ministry of Rural Development (MRD), considered a community-based participatory approach for this plan. Since 2007, with Japan's grant aid, MRD has completed the construction of deep wells for 115 villages and provided support to strengthen the capacity of communities to maintain the facilities.

Public ownership of the facilities has been enhanced through community participation, such as land grading and fence building around the wells at the expense of the community.

Members of the water users' group are selected through consultation by the villagers from among themselves, and they collect maintenance funds and open a bank account for such funds. They participate in the installation of hand pumps and learn how to repair them. Then, the water supply facilities are handed over to the members with tools for repairs and maintenance manuals.

The capacity of the provincial government is also strengthened to handle more complicated defects.

The officials of the MRD implement hygiene education for the communities. They use illustrations to show illiterate villagers and children the importance of keeping water containers clean and of washing hands with clean water.



Laos

The northwestern provinces of Laos, located in a remote mountainous area bordered by Myanmar, Thailand and China, are some of the poorest areas of the country. Villagers there used to have difficulty obtaining safe drinking water.

JICA, in an effort to rectify this severe situation, conducted a study from 1999 through 2001 to improve the rural water supply and sanitation. To establish a model for a community-based participatory approach, water supply and sanitation facilities were constructed in 50 villages. The study looked at hygiene education and issues of gender and ethnic minorities in the villages.

Each local government maintained close dialogues with the villages to grasp the real needs of water and sanitation. In each village, the residents themselves decided the type and the location of water facilities (a gravity flow system with stand-pipes or a tube well with a hand pump) getting relevant technical information from the government staff.

To encourage voluntary participation, the communities were responsible for the procurement of building materials available in the villages, such as sand, wood and other materials. The construction was done during the farmers' off-season encouraging villagers to be involved in the project. Women's and youths' groups from each village also actively provided support. Women accounted for more than 40% of all the participants.

As a result, communities enhanced their ownership of the water and sanitation activities through active participation in the project.

As for hygiene education activities, Information, Education and Communication (IEC) materials were prepared, making use of visual examples from neighboring villages, that helped ethnic minorities, with different languages and life-styles, easily understand the information. The project encouraged more villagers to install sanitary toilets using their new awareness of sanitation.

The standpipes and hand pumps constructed in the project have been properly maintained by the communities, providing the villagers with access to safe and clean water. The installation of sanitary toilets is becoming increasingly widespread in the northwestern provinces. The local governments are continuing efforts, by getting the support of donors, to improve the rural water supply and sanitation based on the experience obtained in the project.



Groundwater development and water supply project in Ethiopia

Ethiopia is one of the countries with the lowest percentage of safe water supply. More than 40-million people who do not have access to safe water are using surface water which is not safe in terms of health and hygiene. In Ethiopia, only 24% of the population has access to safe water, whereas the average of sub-Saharan countries is 57%.

Groundwater is the most important source of water for people in both the rural and urban areas of the country. Developing the capacity of engineers who deal with groundwater development and water supply is one of the most important challenges to be addressed by the government.

Along with other services, the Ethiopian government is decentralizing its groundwater development and water supply services to local governments. However, the local governments do not have sufficient capacity to conduct the projects properly due to the lack of skilled engineers.

Against this backdrop, Japan cooperated with the Ethiopian government in establishing the Ethiopia Water Technology Center (EWTEC) in Addis Ababa to enhance the capacity of groundwater development and water supply system maintenance. Since 1998, JICA has been involved in human resource development in the fields of groundwater development and water supply system maintenance at EWTEC. The following are some of the features of EWTEC's activities:

● Implementation of various training courses

EWTEC conducts basic and advanced courses to train municipal engineers. The courses also cover a wide range of issues to suit the needs of local governments, including water supply planning, groundwater modeling, maintenance of wells and equipment, and guidance on the operation of water supply systems at the community level.



● Emphasis on Ethiopian ownership and the dissemination of technologies to surrounding countries

Basic training courses (e.g. drilling technologies) are conducted by local Ethiopian trainers on the basis of Ethiopian ownership. Moreover, with the goal of disseminating technologies and sharing experience with neighboring countries around Ethiopia, engineers from 15 other African countries have completed training courses at EWTEC.



● Utilization of adequate local technologies

Appropriate technologies are utilized to develop rope pumps that are cost efficient and easy to maintain. Also, studies are conducted to develop plans for groundwater resources management.



Safe and Stable Water Supply

Sharing experiences from the field for reliable services (Urban water supply)

Strong organizations with proper facilities are essential to ensure a safe and stable water supply to an urban population.

JICA has been providing support in planning improvements to water supply facilities and in developing the human resources of organizations in order to increase the coverage of water supply systems and improve services. JICA has dispatched experts from public water operators in Japan to developing countries, who have supported local engineers to develop their potential to solve problems under their own initiatives. Capacity development, through on-the-job training, has led to service improvements such as a stable water supply, improved water quality and the reduction of non-revenue water.

JICA also provided opportunities for officials and engineers from developing countries to learn about relevant technologies and expertise in Japan to solve water supply problems.

Some water operators, which have developed their capacity through cooperation with JICA, are now active in supporting other water operators in their own country and neighboring countries.



■ National Waterworks Technology Training Institute Project in Thailand

In the 1980s, the government of Thailand (GOT) rapidly expanded water supply facilities nationwide. There was an urgent need to develop human resources to operate and maintain these systems. GOT established the National Waterworks Technology Training Institutes (NWTTI) in Bangkok, Chiangmai and Khonkaen with the support of Japan's grant aid.

Through capacity building of NWTTI from 1985 to 1999, JICA supported the development of human resources at the Metropolitan Water Authority (MWA) and the Provincial Water Authority (PWA). JICA dispatched experts from water operators of the municipalities of Sapporo, Yokohama, Tokyo, Osaka and Nagoya to NWTTI. In addition, NWTTI officials visited several water operators in Japan to participate in training programs to become core engineers, who will train other operators, disseminating their knowledge and experience throughout Thailand.

Japanese and Thai engineers have worked together on the ground to find appropriate remedies to improve the maintenance of facilities, to reduce non-revenue water

and to enhance customer service. Through such exercises, knowledge and experience were shared amongst MWA, PWA and Japanese water operators. This on-the-job approach was applied nationwide as a model to solve the problems of water supply systems in Thailand.

NWTTI, in cooperation with JICA, is regarded as the key organization to support capacity building of water operators in Cambodia, Laos and other neighboring countries.





■ Capacity Development for water supply systems in Cambodia

In 1993, JICA drew up a master plan for the water supply system of Phnom Penh in order to restore the water supply facilities devastated during its civil war. The Phnom Penh Water Supply Authority (PPWSA) had been renovating facilities based on the master plan accessing necessary financial resources from donors including Japan's grant aid. In addition to the physical recovery, capacity development of operation and maintenance also became the key issue for securing sustainability. In response, JICA implemented the technical cooperation project for capacity building of PPWSA from 2003 to 2006.

In the project, JICA dispatched experts from the water bureaus of several cities including Kitakyushu and Yokohama to transfer technologies to operate and maintain water treatment plants, to manage water distribution and to control water quality.

The problem-solving approach of Japanese water operators was introduced through on-the-job training that involved the concerted efforts of all members of related divisions. Operational manuals were prepared by the PPWSA itself with the facilitation of JICA experts. Since the project, the manuals have taken root with PPWSA

staff, who continue to make modifications applicable to their daily operations. The training program in Japan provided opportunities for participants to learn not only technological skills, but also the processes water operators in Japan use to improve their daily operations.

The phase-2 project, launched in 2007, aims to enhance the capacity of public water operators in eight provincial cities in Cambodia, where the water supply systems have been improved with the assistance of Japan's grant aid and assistance from other donors. In cooperation with the Ministry of Industry, Mines and Energy, PPWSA serves as the core resource center of the country to disseminate knowledge and know-how to other public water operators. The objective is to raise the level of water supply throughout the country.

■ Capacity Development of urban water supply authorities in Lao People's Democratic Republic

The government of Laos has been improving water supply systems in major cities such as Vientiane and Savannakhet with the assistance of Japan's grant aid. To meet the urgent need to strengthen services in provincial cities nationwide, JICA implemented a three-year project for developing the capacity of urban water supply authorities from 2003.

In the project, JICA dispatched experts from water bureaus of several cities including Saitama, Kanagawa, Sapporo and Tokyo. The experts supported the preparation of textbooks and operational manuals for three levels, the director level, the engineer level and the technician level and also conducted training programs to disseminate knowledge to all water operators.

JICA volunteers, working at water treatment plants in Vientiane, gave valuable feedback during the preparation of textbooks and manuals in the project. Because they worked with Laotian technicians on the ground and understood the problems of daily operations, the volunteers assumed an important role in the project. The volunteers also provided on-the-job training to the staff of the water operator of Vientiane (NPV), using the training materials and supporting them in acquiring knowledge and strengthening their capacity.

NPV continues to train the staff of provincial water operators using the techniques and knowledge obtained in the project.

NWTTI of neighboring Thailand also cooperated in the project. The training provided by NWTTI proved effective because of good communication due to the similarity of their languages.



Improvement of flood control to protect lives and properties

Disasters such as floods and landslides are increasing throughout the world because of rapid changes in land use associated with urbanization and deforestation. In coastal areas, many problems such as tsunamis, high tides, and coastal erosion are emerging.

Traditionally, structural measures such as the construction of dikes and check dams have been taken to protect lives and properties from these disasters.

However, structural measures alone will not be sufficient, because structural measures are effective only to their design capacity, while expanding their capacity may be expensive in terms of environmental and social costs.

An integrated approach, which includes non-structural measures such as warning systems and hazard maps in addition to conventional structural measures, is therefore required.

JICA aims to develop an effective approach that combines structural and non-structural disaster prevention/mitigation measures. The approach will include the development of structures, reinforcement of organizations and systems to cope with disaster, and community-based disaster prevention measures.

■ Support of integrated flood control in the Nyando River Basin

The Nyando River Basin (catchment area of 3,625km²) is situated in Nyanza Province, Western Kenya. The lower plain area is constantly hit by floods in the rainy season, and its economy and people are seriously affected. The persistent floods are among the reasons for economic stagnation in the area. Nevertheless, there is no single national organization in Kenya that has been specifically designated to cope with floods. Consequently, it has been difficult to pursue flood control measures in the Nyando River Basin, because urgent issues other than floods have been given higher priority.

To improve this situation, JICA has been conducting the "Study on Integrated Flood Control Plans in the Nyando River Basin" since July 2006. The study addresses the following issues:

● Establishment of a scheme to support implementation of flood control measures in the basin

JICA supports the formation of the Nyando River Forum, an organization composed of administrative agencies, academic institutions, NGOs, private companies, and community associations. It also supports implementation of flood control measures through information sharing and consensus building among the stakeholders in the forum.

● Incorporation of flood control measures into community development programs

Five villages in the Nyando River Basin have been selected as model communities, and the following flood control activities have been implemented in the villages with public involvement:

- using churches and nurseries, which are activity bases in the communities, as shelters
- securing escape channels by raising access roads that lead to arterial roads
- implementing evacuation drills, disaster prevention awareness programs at school, and training on sand-bag piling.



● Preparation of a master plan for integrated flood control in the basin

JICA is preparing a master plan to promote flood control in the Nyando River Basin on the basis of lessons learned in the above activities.

The Nyando River Forum was highly appreciated by the Water Resources Management Authority of Kenya for the effective and important role of the forum in supporting flood control measures in communities. Continued operation of the forum on a regular basis as an association of water resources users is being considered.



Environmental preservation

Many developing countries are facing serious water pollution because of the increase of household and industrial waste water associated with rapid economic growth as well as the concentration of population and industries in urban areas. These problems lead to adverse effects on local people's health, the pollution of lakes and the destruction of ecosystems. Improvement of water quality and promotion of adequate water use according to the entire area's water circulation are therefore required.

JICA aims to preserve the water environment by: strengthening schemes and legal systems for water quality and environmental monitoring, supplying small-scale water treatment technologies, disseminating sewerage technologies, and promoting environmental education.

■ Project to improve environmental management capacity in Nakuru area, Kenya

Nakuru, situated about 160 km northwest of Kenya's capital Nairobi, is the fourth largest city in Kenya with a population of about 360,000. Since becoming an independent nation in 1963, Kenya has been facing chronic water shortages and the pollution of water by untreated household and industrial waste water along with economic growth.

In the southern part of Nakuru City, there is a national park that includes Lake Nakuru, a famous Flamingo habitat protected under the Ramsar Convention. Because the lake is hydrologically closed and situated at the lowest elevation within the catchment area, the effect of inflow and accumulation of pollutant from Nakuru and the catchment area is a matter of concern.



By providing grant aid, Japan has assisted the development of a sewerage system in the area around Lake Nakuru. JICA is now involved in a project to improve the environmental management capacity in the Nakuru area, at the request of the Kenyan Government. The project, led by the Nakuru Municipality, focuses mainly on water-related environmental management in Nakuru City and addresses the following issues:

- **development and implementation of adequate water quality monitoring programs to obtain reliable data**
- **development and use of environmental management tools (environmental status reports, manuals, etc.) and mechanisms**
- **arrangement of a joint research and implementation scheme for water quality control in the Lake Nakuru catchment area**
- **arrangement of seminars and the creation of a collaboration platform for basin management**
- **promotion of government-business cooperation and environmental education for community based environmental management.**

Regarding the arrangement of a joint research and implementation scheme for water quality control in the catchment area, an agreement on cooperation in water quality monitoring and control was reached between Nakuru Municipality, Nakuru Water and Sanitation Services Company (NAWASSCO), and Kenya Wildlife Service (KWS). Accordingly, a scheme to control the water quality of Lake Nakuru and the catchment area through the cooperation of the main parties was established. The project also aims to heighten regional awareness of environmental issues by preparing instruction materials on environmental management at the Nakuru branch of Kenya National Library Service. Enhancement of the capacity of environmental management in the entire Nakuru area is in progress.



Integrated Water Resources Management

Establishing a legal framework and coordination mechanism

In order to solve water-related problems such as water shortages, flood damage and water contamination, it is important for stakeholders such as various sectors, local municipalities and community-based organizations, to work within an appropriate framework called Integrated Water Resources Management (IWRM).

According to the definition of IWRM, it is essential to develop a legal framework and to prepare medium to long-term master plans and project implementation plans for each river basin. It also involves capacity strengthening of river basin organizations to implement these plans using a hands-on approach. In order to ensure IWRM, it is required to develop capacities at various levels including at the individual, organization and social-institutional system levels. For that purpose, it is effective to conduct on-the-job training and to share the knowledge and experience gained from good practices in other countries.

JICA has been supporting water resources infrastructure development and the enhancement of water resources management capacity of individuals and organizations for the realization of IWRM. In addition, JICA is willing to support the enhancement of water resources management capacity of social-institutional systems.

■ Cooperation for establishing a water rights system in China

China has been facing serious water shortages because of its small per-capita water resources, unstable supply of fresh water at different times and locations, and frequent floods and droughts. Problems are becoming more and more serious; such as land subsidence due to over-pumping of groundwater, drying up due to excessive exploitation of river water, and the deterioration of water quality in rivers and lakes as a result of discharging untreated industrial and domestic wastewater.

The government of China (PRC) has recognized that the sustainable use of water resources is essential for socioeconomic development and thus has designated solving the water shortage issue as a major goal. For this aim, PRC has requested technical cooperation from the Government of Japan for establishing a water rights system as a basis for the efficient use of water resources.

JICA has provided policy recommendations for developing a basic framework of a water rights system and has assisted in reinforcing water resources management systems for three years since 2004. Policymakers, academic sectors and research institutes of both countries have participated in this process. This cooperation was aimed at efficient water use through appropriate water allocation as



well as the improvement of water quality.

The cooperation project contributed to the capacity development of water resources management in China as described below.

● Sharing good practices

Japan and China have much in common with respect to the history and culture of water use. As a result of exchanges between experts of both countries, the process of establishing a water rights system in Japan and the lessons learned were shared. Multidisciplinary and comprehensive discussions were held to establish a water rights system in China where natural conditions and traditional water use are particularly diverse.

● Practical study based on theory

By conducting a case study of the Taizihe river basin in Liaoning Province, a practical approach was taken based on the leading theoretical studies about water rights systems.

● Collaboration among government organizations, research institutes and universities

Key Chinese researchers at the Development Research Center of the Ministry of Water Resources, Tsinghua University, the Chinese Academy of Agricultural Sciences and other organizations conducted joint studies under the authority of the Ministry of Water Resources. As a result, these organizations have developed collaborative efforts and shared their understanding of water rights systems closer and deeper than ever.



Managing river basins



©CTII

Indonesia

JICA has developed river basin management master plans for 22 major river basins in Indonesia to support integrated water resources management (IWRM). As a result, the government of Indonesia has established water resources infrastructure in 14 river basins with the assistance of the Japanese yen loans. JICA contributed to the strengthening of organizations to operate and maintain water resources infrastructure in the Citarum River Basin, and has been successful in implementing comprehensive flood control measures suited to the environment and climate of the region.

However, in Indonesia, the issue of water resources management has become more complex because of water shortages resulting in rapid population growth and urbanization, increasing cases of flood damage due to population concentration in the lower river basins and the deterioration of river water quality caused by the discharge of urban wastewater.

These problems will undoubtedly have a negative effect on the sustainable economic development and food security of the country. Enhancement of IWRM is hence considered crucial to solve these problems.

The government of Indonesia revised their laws on managing water resources and established river basin organizations (RBOs) in major river basins to strengthen IWRM in each basin. The government also took actions to strengthen the capacity of RBOs to accumulate and disseminate knowledge and experience about water resources management throughout the country.

JICA, together with the Japan Water Agency and the government of Japan, launched a technical cooperation project in 2008 making good use of Indonesia's own technology to enhance the operational capacity of RBOs in Indonesia.



Integrated Water Resources Management

Managing river basins

Assistance in IWRM in the Brantas River Basin

The Brantas River flowing in the eastern part of Java is the second largest river on Java Island with a length of 320 km and a catchment area of 12,000 km². It has been a valuable source of water for the farmlands in the basin and to Surabaya, Indonesia's second largest city. On the contrary, the river has frequently been the cause of significant flood damage.

JICA developed and revised the river basin management master plans in 1973, 1984 and 1998. Based on the master plan, the government of Indonesia implemented projects for water resources development, river improvement, sediment control and irrigation, acquiring assistance from Japanese yen loans.

As a result, flood damage was estimated to be reduced by 13.5 billion yen annually and agricultural production increased significantly by 80%.

In addition, more than 200 MW, developed by hydroelectric generators in the basin, contributed to industrial growth and the creation of a significant number of jobs in the region.

In the process of project implementation, there were numerous cases of significant human resources development, producing experts who are expected to maintain and further develop technical skills in the country.



Support in integrated flood management in the Citarum River Basin

The Citarum River is one of the most important rivers in Indonesia, its water resources are used for hydroelectric power generation, irrigation and as the drinking water supply to Jakarta.

Bandung, the capital city of West Java Province, is located in the upper river basin, is known as an academic city and a production center for textiles.

Bandung had frequently suffered substantial flood damage in the 1980s because of (1) increased flood discharge due to rapid population growth and uncontrolled urbanization and (2) the reduction of river capacity to carry the flood discharge due to sediment inflow and (3) the illegal dumping of household waste. Urbanization is expected to continue in Bandung, and there have been concerns about increased flood damage.

Therefore, the government of Indonesia requested the government of Japan to develop flood protection plans in the upper Citarum River Basin.

JICA conducted the "Study on the Flood Control Plan of the Upper Citarum River Basin" in 1988 and prepared a river basin management master plan. It also developed a floodplain management plan, considered an urgent priority, that included an emergency river improvement project, land use control in flood risk areas and a flood forecasting and warning system.

The government of Indonesia then developed a river flow system, implemented the flood forecasting and warning system and protected headwater forests and farmland in the upper river basin using a yen loan based on the above master plan. As a result, flood damage in the region was greatly reduced.

In projects implemented in the Citarum River Basin, the following advanced measures were implemented:

● Implementation of integrated flood management combining structural and non-structural measures

Integrated flood management measures were implemented which allowed inundation in the area by increasing the width of the river channel and taking floodplain management measures such as land use management, and flood forecasting, warning and evacuation systems.

● Involvement and coordination of residents and other stakeholders

Local residents and farmers were involved in decision making regarding land use management and inundation.

● Multi-sector approach covering the entire river basin

Forests and farmlands in the upper river basin, having great influence on the flood discharge in the lower reaches of the river, were preserved to control the river flow of the entire river basin.

● Implementation of advanced methods and their application throughout the country

Policy makers involved in the project were able to acquire advanced integrated flood management methods from their experience in the Citarum River Basin and applied them as a case model to the other river basins nationwide.



■ Support of integrated water resources management in the Medjerda River Basin in Northern Africa

The Medjerda River, which flows through the northern part of Tunisia to the Mediterranean Sea, has a catchment area of 23,700km². It has a population of 2,100,000 within its basin. Although water resources development/management plans have been prepared and implemented, the focus was on the development and use of water resources rather than flood control.



Under these circumstances, a large-scale flood occurred in the Medjerda River Basin in 2003. The lower plain area was flooded for a month, and crops, houses, and properties were damaged. The resultant obstruction of traffic also caused severe socio-economic damage.



To address drought and flood problems, JICA has been conducting the "Study on Integrated Water Management Plans in the Medjerda River Basin" since November 2006. The following are some of the features of the study:

● Consideration of various aspects of water

The study takes into account various aspects, such as water/land resources, quantity/quality of water, and surface water/groundwater.

● Establishment of a collaboration mechanism between various water related organizations

Flood control in rivers, water use (water supply and sewerage systems, agricultural water and industrial water use) and environmental conservation (water for maintaining ecosystems) have been managed by different organizations such as the Ministry of Agriculture and Water, Ministry of Environment and Sustainable Development and Ministry of Equipment, Housing and Territory Development. A forum was created to discuss and implement comprehensive measures.

● Participation of all stakeholders

JICA intends to promote the participation of all stakeholders including the central and local governments, the private sector, NGOs, and local residents. The aim is to maximize the benefits of water fairly by managing water comprehensively without compromising the sustainability of ecosystems.

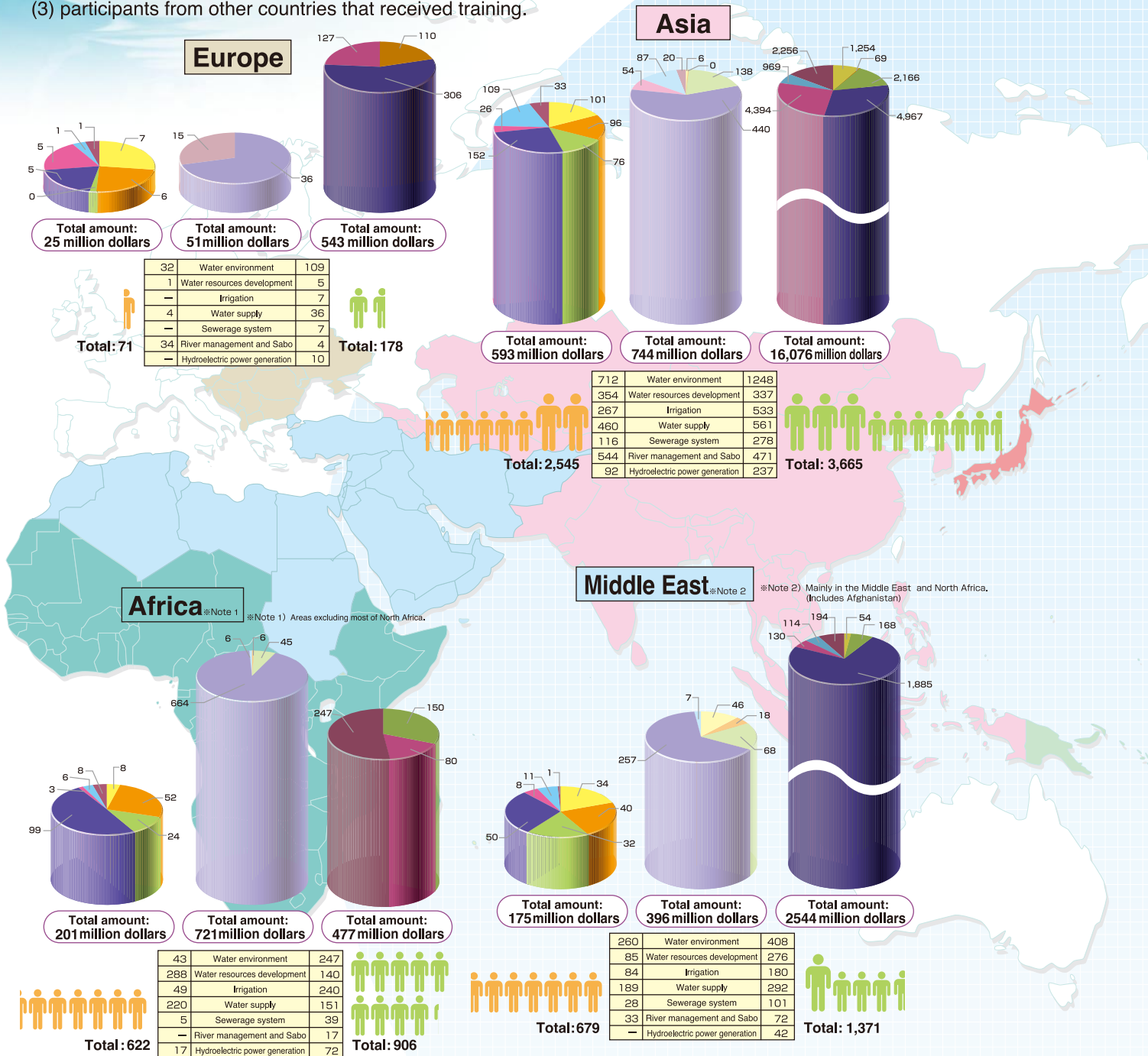


The discussed items regarding infrastructure includes the development of reservoirs and flood control basins as well as the improvement of river channels. A survey of the residents was also conducted to find out the tolerable limits of flood and crop damage, with the aim of preventing excessive expenditures on infrastructure and minimizing environmental loads. Preservation of historic buildings was also taken into account.

The main focus of the study is flood control, but given that water is a valuable resource, the study also pursues ideas to make the most of the water stored during a flood.

JICA's Assistance to Water Issues Worldwide (FY 2001-2010)

Shown here are the cumulative totals of (1) expenditures on water-related projects (JICA's investments for technical assistance, Japan's grant aid projects facilitated by JICA and yen loans), (2) number of JICA experts dispatched and (3) participants from other countries that received training.



JICA's Expenditures

(1) Expenditures on technical assistance

JICA invested 1,182 million dollars worldwide for technical assistance in the water sector. A total of 593 million dollars was invested in Asia, accounting for 50% of the total investment, followed by 201 million dollars (17%) in Africa, 175 million dollars (15%) in the Middle East and 164 million dollars (14%) in Central and South America.

In terms of sub-sector expenditures, 363 million dollars (31%) were invested in the water supply sub-sector, 217 million dollars (18%) in the water resources development sub-sector and 206 million dollars (17%) in the water environment sub-sector.

(2) Expenditures on grant aid projects

JICA facilitated the implementation of Japan's grant aid projects, whose total amount was 2,207 million dollars. The largest investment was in

Asia, totaling 744 million dollars (34%), followed by 721 million dollars (33%) in Africa and 396 million dollars (18%) in the Middle East.

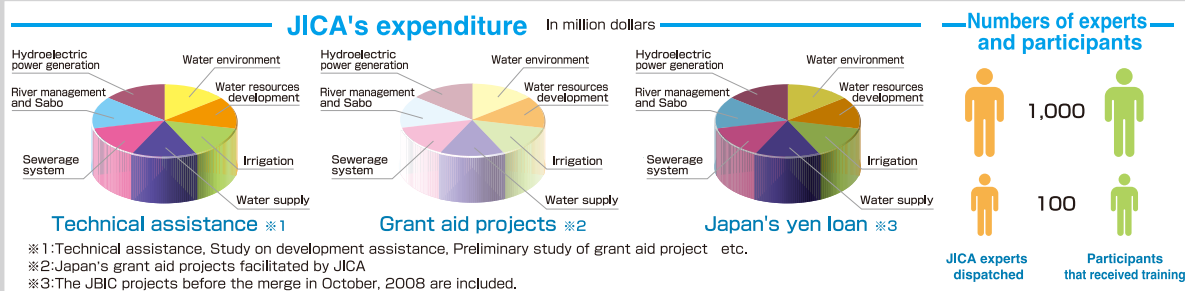
In terms of sub-sector expenditures, significant amount of the investment, 1,667 million dollars (76%), went to the water supply sub-sector, followed by the irrigation sub-sector, 259 million dollars (12%).

(3) Expenditures on yen loans

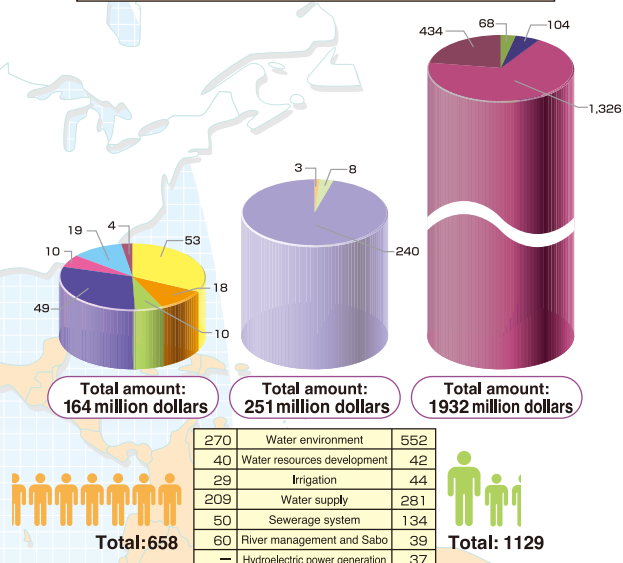
JICA invested 21,719 million dollars worldwide for yen loans in the water sector. The largest investment was in Asia, totaling 16,076 million dollars (74%), followed by 2,544 million dollars (12%) in the Middle East and 1,697 million dollars (9%) in Central and South America.

In terms of sub-sector expenditures, a significant amount of the investment, 7,263 million dollars (33%), went to the water supply sub-sector, followed by the sewerage system sub-sector, 6,151 million dollars (28%), and the hydroelectric power generation sub-sector, 3,183 million dollars (15%).

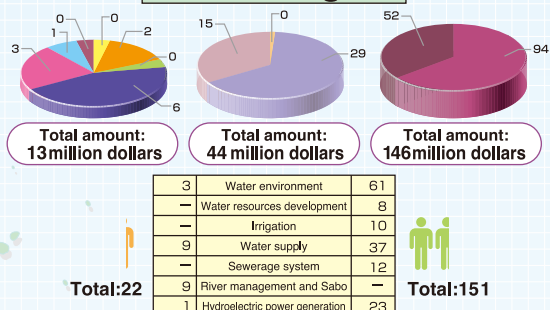
Legend



Central and South America



Pacific Region



※ The area classifications mentioned above are based on the classifications of the newly merged JICA.

Experts Dispatched

JICA dispatched 4,597 experts to other countries, of which 2,545 were assigned to Asia (55%), 679 to the Middle East (15%), 658 to the Central and South America (14%).

1,320 experts (29%) were assigned to the water environment sub-sector. 1,091 experts (24%) were assigned to the water supply sub-sector, 768 experts (17%) to the water resources development sub-sector and 680 experts (15%) to the river management and Sabo sub-sector.

Participants Trained

7,400 participants from other countries received training, 3,665 (50%) from Asia, 1,371 (19%) from Central and South America and 1,129 (15%) from the Middle East.

2,625 participants received training in the water environment sub-sector, accounting for 35%, 1,358 participants (18%) in the water supply sub-sector and 1,014 participants (14%) in the irrigation sub-sector.

Notes : As amounts and percentages are rounded off, they may not match their total.

Expenditures in dollars are calculated by converting the yen amount at the exchange rate of US\$ = 87.8 yen as designated by DAC for 2010

