4. Presentation and Outline of Discussion

This section describes the contents of presentations and points of discussion ,and the results of each session.

<Day 1 >

4-(1) Keynote Speech

"Modern and Post Modern Civilization From 1 to 10 Billion World"

Prof. Norihito Tambo, Professor Emeritus of Hokkaido University, Former President of International Water Association (IWA)

Our planet has remained unchanged in terms of its composition, but the global population has exploded in recent years. Until around the 18th century the global population lived in harmony with nature. Following the 18th century the human race started using fossil fuels and it was from this point that the population started to grow rapidly. Projections for global population vary, but they generally range up to 10 billion people. What is undisputed is that our current way of living may not be sustainable with a global population of 10 billion or greater. Our current way of life could be limited to until around the 22nd century.

Modern society is dependent upon simple but large-scale industry based on modern science, being supported by long-distance rapid bulk transportation. The growth of individual industries causes an increase in total social welfare as the summation of activities. However environmental limitations may result in an end to growth. As the global population has grown, so too has the volume of water used for human consumption purposes. Our water and energy consumption rates per capita are far larger than the volumes consumed by our ancestors. Population has increased four times, but water demand has expanded 10-fold, energy demand 10-11-fold and economic growth has expanded 17-fold. Per person income has increased four-fold, but resource efficiency has decreased.

The globalized world consists of two regions, namely the developing region, including BRICS, and the matured region, including the G7 countries. The population growth rate in matured countries is virtually static, but populations are still continuing to grow in developing regions. As development proceeds it is the case that GDP per person starts to increase and once higher levels have been reached it is natural that people and countries seek to maintain their GDP and standard of living.

Large scale urbanization is being supported by the industrialized agribusiness. Before modernization, in the 18th century agriculture was implemented on an intensive/subsistence basis, but in harmony with the natural environment. In the case of Japan, before industrialization and the use of fossil fuels the population was approximately 40 million, which would indicate that in a natural context Japan is only capable of supporting 40 million people, whereas the current population is 130 million. The characteristic pattern of the modern world is urbanization. Urbanization is progressing at a high pace in every region of the world. Urban areas could possibly be the only area where we can efficiently create material and economic wealth. For this reason it is difficult to control populations in urban areas as people tend to be drawn to urban areas in search of wealth. There is a tendency towards the creation of megalopolises, whereby metropolises are linked in a linear manner. Currently Japan has the largest concentration of metropolises along the Pacific Coast, all linked by the Shinkansen bullet train. Tokyo encompasses a huge area and the area from Tokyo along the Pacific Coast to Osaka creates tremendous wealth. However, despite this wealth, Japan imports 60% of its food from overseas. In the past it was the case that almost 50% of the population of Japan was

engaged in agriculture, as this percentage was required to provide food for the entire population. As imports have grown, the number of people engaged in agriculture has accordingly decreased.

Thomas Robert Malthus expounded that “the power of population is indefinitely greater than the power of the earth to produce subsistence for man,” and we are now moving towards that critical point. Although the Green Revolution has produced tremendous advances in agricultural productivity since 1980 the production of grain crops per capita has not risen. This would suggest that production cannot be further expanded. This limit to production is strongly linked to water supply. The impact of water on agricultural production is considerable.

Energy issues are of critical importance for considering the future of humankind. The earth receives approximately 177,000TW of energy from the sun, and yet the portion of this energy accounted for by fossil and atomic energy is only approximately 10TW. Therefore the population has expanded over the last few hundred years on the basis of this very small portion of energy received. However, the issue facing humanity now is the finite nature of energy sources that have been the basis for the explosive population growth of recent years. An era has now arrived in which it will be necessary to consider a world without fossil fuels. Although the usage of fossil fuels may account for only 10TW of energy, this has still contributed to increases in global temperature. Atomic energy does not provide a solution to energy needs either, although this would serve to ameliorate CO_2 emissions to a certain degree.

Water is a key to life for “urban metabolism” and food supply. The water cycle differs for inland and oceanic countries, and more and more regions around the world are starting to suffer from water shortages. Tokyo is one of the regions in the world that has a small volume of water resources per capita, which therefore requires efficient utilization of resources. In China issues are being faced of overuse of water resources. There are some occasions when the water in the Yellow River does not reach the river mouth as it is used for agriculture and other purposes along its course. Modern water systems are essential for maximizing water resources. Water and sewage works, irrigation works, and industrial water and waste water are all issues that require attention if water resources are to be effectively utilized into the future. Attention must be paid to the hydrological cycle, on the regional, community and individual levels and water works systems need to be mindful of local limitations. Modern water systems include water treatment systems, and iron pipes under pressure, but essentially the basic technology has remained unchanged since Roman times.

In Tokyo the per capita per day supply demand is more or less evenly distributed between bath and shower, wash/toilet, kitchen and laundry purposes. Tokyo’s water and sewage works system is the largest in the world, and energy costs to support the system are increasing, which could place a burden on system sustainability in the future. Consumption and transportation costs need to be controlled.

In the future it will be necessary to use water sparingly and in a local context without the need for excessive transportation. Discharge needs to be eliminated through the improvement of water treatment systems.

4-(2) Agenda 1: Policy on Urban Water Supply

Moderator: Prof. Yasumoto Magara, President, Tokiwamatsu Educational Foundation, Professor, Center for Environmental Nano & Bio Engineering in Hokkaido University

Purpose of the session

For urban water operators, achieving 24-hour water supply and universal access to safe drinking water are two of the most important goals. However, urban water operators in many of the developing countries are struggling to achieve these goals, due to various constraints.

In many countries, direct responsibility of urban water supply is decentralized from central governments to local governments and municipalities. However, central governments can play an important role, by introducing effective policy that supports the sector. In Japan, for example, the coverage rate of water supply in 1950 was as low as 30%. However, as a result of individual efforts by urban water operators under the central government's effective policy, universal access throughout the country has almost been achieved. Similarly, Phnom Penh, Cambodia, and eastern part of Manila, Philippines, have almost achieved universal access.

In this session, the participants examined urban water supply policies of other participating countries, and discussed effective roles that central governments can play in order to achieve 24-hour water supply and universal access to safe drinking water.

Greeting from Moderator

Prof. Magara thanked the many participants for attending the Forum. He noted that the Forum is being held very close to the Yokohama waterfront area. It was in this area that in 1870 a massive outbreak of cholera caused 30,000 deaths. The first epidemiological study was implemented on the relationship between cholera and water/sanitation. It was on the basis of this study that the first modern water supply system was developed in Japan in 1886. All parts of the first system were imported from the United Kingdom.

Access to safe drinking water is essential to health, a basic human right and component of effective policy for health protection. According to the World Health Organization (WHO) "Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" and the Japanese Constitution also states that the government shall improve public health and social welfare.

Water is used for a variety of purposes, including cooking, sanitary conditions, heat conditioning, and fire-fighting. The WHO says that "the demand of water quality and quantity relates with the population and lifestyle" of a country. It also states that "in developing standards and regulations, care should be taken to ensure that scarce resource are not unnecessarily delivered to the development of standards and the monitoring of substances of relatively minor importance to public health." National drinking water quality standards should be varied by the socio-cultural, economic and environmental circumstances.

In order to attain the sustainable development of water services, water supply needs to be charged. Water charges are the price of provision of a number of services, including the control of pathogenic disease and provision of sanitary facilities. The Japanese government is the largest donor in the water and sanitation sectors. Water is essential for life and is an extremely important element in achieving the MDGs. Although many countries have endeavored for the development of safe water and sanitation, there is still much that needs to be achieved. The tools to overcome water supply challenges include policy, operation and management,

non-revenue water management, financing, water safety plans, public and private partnership, human resource development, and JICA mechanisms for the water supply sector. The expected outcomes of the meeting are:
- Appropriate policy-making and its enforcement,
- Highly-skilled management of service body,
- Good operation and maintenance of facilities,
- Fair partnership between public and private sector, and
- Sustainability of willingness to pay water charges.

Presentation ①

"The role of Central Government in Japan's Development on Water-Supply SystemsResponsibilities of Central Government during Japan's development on Water-supply Systems "

by Mr. Sombo Yamamura, Counselor, Japan Water Forum

Japan has made continuous progress for 120 years since the commencement of the first modern water supply system in Yokohama. However, information needs to be provided in a well-organized manner. The system of water supply in Japan has spread steadily since its inception in 1887 and now covers 97.2% of the population. Unaccounted for water in Japan's water supply system has been decreasing each year.

In terms of strategic support for small-scale water supply systems, the example of the Nangkai Great Earthquake in 1952 serves as an example. The earthquake caused the wells to dry up and support measures from the central government for recovery of the disaster region were expanded to other areas later. A national subsidy for water supply systems was initiated for the enforcement of water supply system provision.

Besides financial support, central government also provides legislation for the supply of safe water. The Water Supply Law was established in 1890. The Water Works Law of 1957 improved the regulations of the 1890 law and the Ministry of Health, Labour and Welfare has responsibility for ensuring safe water supply. The Local Public Enterprise Law also functions to support investment needs for water works systems.

In addition, subsidiary aid for rural small scale systems enabled a number of rural towns and villages to launch water supply. A water-supply boom in rural and fishing villages stimulated urban peripherals, as they had also lacked water-supply systems. Consequently, this promoted expansion of systems in urban peripherals. Experiences in technology and management of city water enterprises were shared with rural water-supply systems.

Water enterprises are usually managed by cities and towns, whereas prefectures and national government play a role in supervision, according to the Water Works Law. The administration gives technical and management consultations to enterprises when they are licensed for initial foundation and expansion according to the Water Works Law. Consequently, national standards have spread to all water enterprises. Japan Water Works Association, established by water enterprises, has played an important role in sharing experience and developing new standards. It also acts as a bridge between water enterprises and administration.

The Water Works Law obligates a technical administrator of waterworks to be responsible for technical management. Technical administrators of waterworks are qualified through education and experience. Short courses are also prepared by the central government to certify

qualification. Central government organizes a training course once a year for technical administrators of waterworks to support their work.

Water-quality standards are prescribed by Ministerial Ordinance based on the Water Works Law. Based on the law, water suppliers have to conduct water-quality inspections on a regular basis and they are required to report their results to regulators. Water suppliers commission a registered laboratory to conduct water-quality tests or establish their own testing facilities. Central government is in charge of registration of water-quality laboratories, and conducts quality control and guidance.

Central and prefectural government administrations conduct and supervise water services, foster the development of facilities and guide the spread of water-supply systems and their smooth operation. The Japanese system's capability to serve potable water from the tap anywhere in the country was attained by water-quality standards set by the Water Works Law and the efforts to treat water-quality as a priority.

However, there are many small water-supply systems still left, whose capacities are very limited. Their early system development was left to voluntary efforts of cities and towns without sufficient coordination with a broader perspective. The Water Works Law played the necessary roles when the water-supply system was still in development. However, the current system does not sufficiently address modern issues such as reorganization and renewal of facilities.

In conclusion, the followings are recommendations based on Japan's experiences:
1. Whether public or private, guidance and supervision by the central government to build water enterprises with a broad perspective,
2. The Water Works Law and water-works administration with an emphasis on hygiene have supported the healthy development of water services, and
3. Limited subsidy was effectively introduced to unprofitable rural water supply, whereas urban water supply has been operated to ensure self-sufficiency. Local bonds combined with public funds and private funds have contributed to efficient development.

Presentation ②
"Urban Water Supply Policy in India"
by Ms. Nivedita Elapulli Parameswaran, Director, Water Supply Department, Ministry of Urban Development, India

India is a very large country and water supply is a very big issue. The overall issue of water supply is dealt with by the Ministry of Water Resources, which is responsibility for a macro view of water in India. In addition, the Ministry of Rural Development is concerned with water supply in rural areas, with the Ministry of Urban Development concentrating on water supply systems and services in urban areas.

Massive growth in the urban population is anticipated in India over the next 20 to 30 years. By the year 2050, it is expected that the urban population will exceed the rural population. The growth in urban populations has translated into a rapid rise in the demand for water in urban areas. The general experience in India is that sanitation has received less attention than water supply and efforts are being made to rebalance this focus.

In terms of the organizational structure for water supply the states of India enjoy a good deal of autonomy. In 1993 there was an important amendment to the national constitution, which

recognized the importance of city governments as the third tier of government. However, the third tier of government in India is still not strong and water supply tends to be organized by parastatal organizations, such as water supply boards, which are run by non-elected persons. The aim of the 1993 amendment is to bring water work under the control of elected members of government bodies as a means of boosting transparency.

Since 1981, India has successfully completed 16 projects in UWSS sector with World Bank assistance. In India water is seen mostly as a social and basic human need. There is an aversion to economic pricing and a reluctance to pay for water. Another issue is poor coverage of water supply. Intermittent supply is common. In addition there is no assurance for water supply quality, quantity and duration. Given the aversion to pricing there is a lack of funds and therefore a vicious cycle occurs where services cannot be improved and revenue therefore cannot be expanded.

The following are the sector issues to be addressed for achieving the goals of the 11th Plan of the Government of India and the Millennium Development Goals.
- Rapid urbanization and inadequate service coverage
- Decreased availability of fresh water sources
- High Unaccounted for Water (UfW/ NRW)
- Inappropriate pricing policies and inadequate tariff and cost recovery
- Lack of autonomy to water supply and sanitation utilities
- Lack of reliable information system and data base at State, Center and Local level
- Sizeable investment needs and inadequate central and state budget provisions
- Need for institutional and fiscal reforms
- Lack of private sector participation/involvement
- Lack of bankable projects to attract institutional financing and external funding

The reform-driven Jawaharlal Nehru National Urban Renewal Mission (JNNURM) was launched during December 2005 for providing infrastructure facilities including water supply, sanitation, solid waste management and drainage in a total of 65 cities. The expected outcomes of JNNURM are financially self-sustainable cities, universal access to basic services, citywide framework for planning and governance, among others.

Benchmarking is also being implemented and is a basic minimum standard set of performance parameters commonly understood and used by all stakeholders with methodological uniformity. Benchmarking allows the states and cities of India to assess their own performance and compile improvement plans.

Discussion

Commentator:

Mr. Kouki Azuma, Director, Water Supply Planning Guidance Office, Water Supply Division, Health Service Bureau, Ministry of Health, Labour and Welfare, Japan

Mr. Azuma noted Water supply in Japan has almost 100% coverage and our main concern is maintenance and rebuilding of existing infrastructure. The first role of national government is to establish a system in which government can monitor the water supply system and to provide subsidies.

The second role of government is to provide support for vulnerable groups from the perspective of hygiene and social welfare, although this is no longer applicable in Japan. In Japan training

is provided through the National Institute of Public Health to help expand knowledge about water supply services. JWWA also plays a critical role in this regard. In the future Japan needs to pay greater attention to Asian countries and infrastructure and international relations become ever more interdependent and infrastructure for development ever more important.

Mr. Hasan (Bangladesh) recalled the famous poem by Coleridge, “Water, water everywhere, nor any drop to drink.” He noted that Bangladesh has four major urban areas, or which the population is ever increasing. Bangladesh is prone to natural disasters including cyclones originating in the Bay of Bengal. Bangladesh therefore faces complex problems in maintaining the minimum standard of sanitation. Dhaka requires 1,000kL of water each day and various avenues for safe drinking water need to be sought. Chittagong requires 500kL of water each day, but only 200kL can be provided. With the cooperation of JICA a variety of projects are being implemented to boost water provision capacity and performance. Bangladesh is taking steps to use surface water, which is an expensive task. Bangladesh receives more rain than it actually needs and if excess water could be retained it could be used as a resource, possibly even for export.

Mr. Amin (Indonesia) stated that in Indonesia water supply coverage is currently approximately 46% and potable water provision has yet to be achieved. There is also a lack of community participation. Indonesia needs to work to increase coverage and boost quality of surface water as a means of meeting the MDG. The aim is to expand coverage to 80% by 2015. Another target is to engage in cooperation between policymakers, regulators and operators as a means of achieving good governance. It is to be hoped that JICA will continue its support for the water supply sector in Indonesia.

Ms. Nguyen (Vietnam) stated that Vietnam has an urban population of approximately 26 million people, out of a total population of 86 million people, making the national urbanization rate approximately 30%. Over 440 cities and towns have a water supply system. Investment in source development and pipeline networks are not complete. Capital sources in the society and community have not been brought into full play in investment and management of urban water supply development. The rapid pace of urbanization requires huge construction investment capital. There is still a discrepancy in operation capacity of water supply enterprises and there has not been a unified management model, due to a shortage of qualified and skilled human resources. Awareness of the government and community is still low.

It is important to socialize water supply and mobilize all economic sectors including all organizations, and individual participation in water supply development. Priority is given to regional and intercity water supply. The aim is to implement water supply service agreements between water providers and local governments. In each centrally managed province or city there must be a specialized water supply utility that is responsible for management and development of urban water supply. Challenges and difficulties will be faced in the future and Vietnam hopes to work together with Japan and other countries to develop the water supply system and infrastructure.

Summarization by Moderator

Prof. Magara thanked the presenters and commentators for their comments.

The importance of policy adjustments and regulation by the government, such as the Waterworks Law, design criteria, water quality standards, approval and license, and grant and local government bonds was presented.

It was recognized that even if responsibility for water supply services is transferred to a local government, the central government has important roles as stated above, and the recognition and execution of such roles are essential.

In relation to decentralization of authority, a presentation by India revealed that enforcement of policies won't work well without commitment and support from the central government. This point is similar to experiences in Japan.

Also, concerning actions to be taken for users, it was recognized that users need to find value in paying water charges in order to attain sustainable development of water supply services.

Water suppliers reduce water-drawing labor and supply safe water for clean living conditions by providing water services to users. Good services stimulate the payment of water charges. That is to say, the water supply system should be a service to be independently operated based on the principle of full cost recovery.

Lastly, the following are the issues to be discussed in the sessions ahead in the Forum as key issues to tackle for the development of water supply and sanitation.

- Sound management of water supply services
- Management of non-revenue water
- Financing and water charges
- Safe water and management of water quality
- PPP
- Human resource development

4-(3) Agenda 2: Sound Management of Urban Water Service

Moderator: Mr. Ikuo Mitake, International Director, International Division, Japan Water Works Association (JWWA)

Purpose of the session

In order to supply safe water for 24 hours, water treatment plants and distribution facilities must be properly designed and constructed. Moreover, facilities must be operated and maintained constantly for 24 hours, and occasionally upgraded. In order for sustainable management of these facilities, it is important to secure a stable funding base for operation, maintenance, and improvement independent from governmental subsidies. An effective approach for independent sustainable management is a self-supporting accounting system based on properly priced water tariff.

In order to make safe water accessible to all residents, water tariff must be properly priced, taking the poorest and the most vulnerable residents into account. On the other hand, in order to upgrade services and to adapt to social and economic changes, excess amount of fund besides the routine operation and management cost is necessary. Sound management, or management with a profit, is enabled by establishing a reasonable balance between two seemingly opposing approaches; proper pricing of water tariff for all residents, and pooling excess budget for upgrading.

However, only a few water operators have been able to achieve sound management in developing counties. A water operator often lapse into a vicious circle: the water tariff can not be collected; no fund can be secured for operation and maintenance; the facilities can not be operated and maintained; the quality of the service is degraded; and therefore residents do not pay the fees. At one point, it was considered that sound management could be achieved simply by privatizing services. However, cases have shown that not all privatized urban water operators are successful.

The participants heard successful cases of sound management from both public and private sectors, and discussed realistic measures for each country's context.

Greeting from Moderator

Mr. Mitake acknowledged the presence of many waterworks professionals at the Forum who have made a great contribution to development of water supply services. Water is essential for human life and everyone involved in the provision of water services should be aware of this fact. He invited the first speaker to make her presentation.

Presentation ①

"Soft Landing for the Era of Non Expansionary "

by Ms. Kaoru Kawana, Director for Business Planning, Yokohama Waterworks Bureau

Yokohama city is located in the central part of Japan, 20km south west of Tokyo Metropolitan. Yokohama is the second biggest city in Japan and is a part of the metropolitan area. The waterworks business of Yokohama City was established in 1887 as the first modern waterworks in Japan, and has a long history of 123 years. It supplies safe water to about 3.7 million citizens. The water supply area is 435 km^2 with a service rate of 100%. Daily supply is 1,192,000m^3, with a planned maximum daily supply of 1818700m^3.

During the period of expansion in the 20th century, Yokohama City experienced a big earthquake in the 1920s that devastated the metropolitan area, and World War II also damaged

many waterworks facilities through air attacks. However, with the period of high economic growth the population increased rapidly. We developed water sources and expanded and improved the facilities aiming for a stable water supply, meeting the water demands in line with economic development.

However, we faced stagnation in water demand at the same time when the mature waterworks system was completed. In the normal situation, the water supply should increase in proportion to the increase in the population. However, water supply started to decline despite the population increase peaking at the beginning of the 1990s. This could be considered as the turning point for Yokohama Waterworks. This is when the era of expansion ended, and the transition to a non-expansionary era began.

As you know, environmental awareness has been increasing rapidly in Japan now, and it is a global issue. Consumers try to save water and choose only water-saving appliances. In terms of water charge income, according to estimates from the predictions of future population and the trends in water consumption, income is set to decline in the future. The estimations for water charge income are severe, and it is difficult to increase the charges without careful thought about the economic circumstances in Japan.

Renovation is also very important and improvements to earthquake resistance are also important. About 2,400 km of distribution pipes were installed over 10 years between 1965 and 1974, all of which will require renovation at a similar timing. Yokohama Waterworks Bureau must renovate more than 240 km of pipes annually, based on the law (according to the local public enterprise act, the legal durable year of water pipes is defined as 40 years) and demands for renovation occur one after another. This is very difficult in terms of the financial conditions.

To respond these business surroundings, Yokohama Waterworks Bureau created a basic plan for the non-expansionary era in 2006. The Plan is called “Long Term Vision & the 10-year Plan.” Environmental awareness, population decrease, need for facilities renovation are all difficult problems. The concept of basic plan is sustainability.

Presentation ②

“A Good Practice of Urban Water Supply Service Management – The MANILA WATER STORY ”

by Mr. Virgilio C. Rivera, Jr. Group Director, Regulation and Corporate Development Group, Manila Water Company, INC., Philippines

In 1995 the government of the Philippines decided to enter into a public-private partnership for water supply services. Before that time there was an impending water crisis, with poor service, leaks, and many illegal connections. Less than three out of ten users received continuous 24-hour water supply. Sanitation was practically nonexistent at the time. At that time MWSS was in dire straits due to low coverage, poor collection of revenue, investment restrictions and others. The government then implemented regulatory reform which resulted in increased investment, service expansion, better water quality and others, which served to create a virtuous circle. In 1997 the MWSS was privatized under a 25-year concession framework. Metro Manila was divided into East and West Zones. Manila Water is responsible for the East Zone. The concessionaire is the agent and operator of MWSS. After 25 years Manila Water will retain ownership of the assets it has invested in.

The objectives of privatization were to expand service coverage, improve delivery of service and increase operating efficiency. A tariff adjustment mechanism has been implemented too, with a rate rebasing every five years and a mechanism for extraordinary price adjustments.

The second aspect of the contract between MWSS and Manila Water is the setting of performance indicators. In terms of non revenue water, Manila Water has consistently outperformed the targets set.

Manila Water is part of a conglomerate known as Ayala. It is 43.3% owned by Ayala, with the public also holding 43.0%. Mitsubishi Corporation also has a 7.0% stake in the company. Manila Water is profit-oriented as a private company, but it works to ensure that its social/environmental objectives are aligned with business goals. Over the course of 12 years there has been no increase in water resources, but water supply has increased in line with the elimination of leaks and non-revenue water. The success of the company has helped it gain further low cost funding from creditors and a virtuous cycle has been created. The government has extended the contract for Manila Water until 2037 on condition that US$4 billion will be invested over 20 years. The company is also seeking to engage in similar projects in other Asian countries.

Presentation ③
“Effort for Sound Management of Urban Water Supply Service in Phnom Penh”
by H.E. Ek Sonn Chan, General Director, Phnom Penh Water Supply Authority (PPWSA), Cambodia

Phnom Penh has a population of 1.44 million (2004 figures). PPWSA was faced with a variety of challenges in 1993 at the end of Khmer Rouge rule. Non-revenue water was at 72% and income covered less than 50% of operating costs. A total of US$208 million was provided for the water supply system in Phnom Penh. Prof. Magara played an instrumental role in international efforts to create a clean and safe drinking water supply in Phnom Penh.

Efforts to resurrect the organization included restructuring of management. Under this young and dynamic staff were promoted to the front line and management was given more direct responsibilities. Also important was a change of corporate culture and mindset. Of importance was leadership by example and a spirit of teamwork.

Of greatest importance were efforts for self-reliance, including training of human resources, efforts to reduce non-revenue water, efforts to improve bill collection, and tariff revisions.

The training of human resources included the provision of basic training to frontline staff. In addition PPWSA managers were trained to be trainers themselves. Staff quality assessments are implemented regularly.

In terms of efforts to reduce non-revenue water, efforts were made to eliminate illegal connections between staff and persons or bodies seeking a supply of water without paying. As a result of efforts to reduce non-revenue water the 72% level of 1993 has been reduced to 6.2% as of 2009.

Efforts to improve water bill collection include updating of customer files, training of staff, and the creation of incentive and penalty programs. In 1996 a computerized billing system was introduced and a customer satisfaction program was launched in 2000. As of 2009, 99.9% of

water bills are collected. In addition, service coverage has expanded to around 90% of Phnom Penh residents.

Water tariffs for households have remained unchanged since 2001. Over the course of 16 years all indicators have risen dramatically as PPWSA works to provide efficient and reliable service.

Factors for success include political will, external assistance to fill internal gaps, and management of the PPWSA with a spirit of ownership. Transparency, accountability and fairness are essential.

Discussion

Mr. Mitake thanked the three presenters for their presentations, noting the key importance of reducing non-revenue water and bill collection. Strong leadership is a critical factor in changing culture and achieving sound management in all of the cases presented today.

Commentator:

Ms. Keiko Yamamoto, Senior Advisor (Water Supply & Sanitation), Japan International Cooperation Agency (JICA)

All three speakers come from different countries with varied backgrounds, but all three reached the goal of sound management, which demonstrates that there is a possibility for any country to transform its practices and improve management. All three countries have reached almost 100% of tariff collection, which is a key indicator of management success. Changing staff attitudes and providing motivation is also essential. Mr. Rivera had noted that 80% of staff at Manila Water were public servants from MWSS, and it is likely that these staff had to transform their working mindset. A question arises as to what is the first step to achieving success?

Mr. Rivera responded that performance is attributable to people and what it is important to do is to set clear objectives at the outset and create motivation.

H.E Ek Sonn Chan stressed the importance of doing everything yourself that you ask your staff to do. Another issue is that of low salaries for government workers in comparison to the private sector. In Phnom Penh, H.E Ek Sonn Chan made a promise to employees that their salaries would rise to private sector levels within eight years. It is important to take care of staff and maintain their motivation. Another concept is the three “Fs,” namely “fairness,” “firmness,” and “faith.”

Mr. Handhayani (Indonesia) thanked the presenters for their presentations, noting how valuable they had been. With regard to sound management he commented that the support of government and stakeholders is essential as a means of ensuring sound management. He expressed his expectation that forums like this one would be held more frequently as a forum for exchanging information and opinions.

Mr. Jerngklinchan (Thailand) thanked the presenters for informative presentations. Bangkok currently has approximately 30 million inhabitants and shares the same challenges as other cities in Asia. From the outset it is important to work to enhance capacity and maximize coverage. Investment is also a crucial aspect and Bangkok has invested in total more than US$2.5 billion in the waterworks sector. Through various efforts to expand coverage and

reduce non-revenue water the Metropolitan Waterworks Authority of Bangkok has managed to increase its profitability considerably. Like Yokohama, Bangkok is entering a non-expansionary era.

Ms. Nivedita (India) asked a question about the regulatory structure in Manila.

Mr. Rivera responded that there would be a detailed presentation on that issue during the second day of the forum. He noted that in the PPP adopted for Manila Water puts in place a number of checks and the company is subject to regulation.

Mr. Gamini (Sri Lanka) asked a question about investment in Phnom Penh and the effect of reducing non-revenue water.

H.E Ek Sonn Chan responded that the investment required to maintain non-revenue water at the 6% level was still well within the bounds of corporate profitability.

Mr. Salam (Pakistan) asked H.E Ek Sonn Chan a question about performance in reducing non-revenue and tariffs, who responded that even after tariffs were raised PPWSA still found that it was possible to reduce non-revenue water.

Summarization by Moderator

In Asia, managers of all water supply utilities expect to conduct sound management, but only a small number of water supply utilities conduct sound management in developing nations as special cases.

The following are typical examples where water supply utilities fall into a vicious circle.
Since they cannot collect water charges, costs for maintenance cannot be secured, maintenance of facilities cannot be provided, and then, the quality of water supply services are deteriorated, and therefore, users don't pay water charges. In this session, three cases were presented by Yokohama Waterworks Bureau, Manila Water, and Phnom Penh Water Supply Authority (PPWSA). They introduced how transition from a vicious to a virtuous circle was achieved under the circumstances where a vicious circle is generally seen in developing nations.

Based on cases presented and discussion thereafter, several keywords were identified for sound management.

- For the first of al, settlement of problems of water charges for stable revenues
- Support for water supply financing for facility improvement
- Operation and maintenance of water supply services are based on organizations, human resources, motivations, and regulations.
- Good services link to residents' understanding and wage collection.

Also presentations introduced some tips for eliminating a vicious circle and moving to success.
Cases of "enthusiasm of H.E Ek Sonn Chan, top manager" and "methods of making community people involve by Manila Water" were presented.
Key factors presented in the session for sound management were organized into three categories, as follows.
In order to satisfy users, various factors are necessary in each aspect: human resources, facilities, and financing of water supply services. In other words, if users trust water supply services, they will appreciate and pay water charges.
Since we don't have enough time to discuss this point deeply today, we only point out some key words and leave the discussion for sub-sessions tomorrow.

4-(4)Agenda 3: Measures against Non-revenue Water

Moderator: Mr. Kenei Ishii, Technical Adviser, Japan Water Research Center (JWRC)

Purpose of the session

Non-revenue water is a serious management issue in many of the developing countries. Non-revenue water is caused by water leakage, water theft, un-installation of water meters, wrong measurement of water meters, incomplete billing systems, public use, etc.

The problem with non-revenue water is that not only the cost for water treatment and distribution is lost, but also the water resource is wasted. In this respect, non-revenue water is a serious problem for sound management. In addition, when water pressure decreases due to leakages and other reasons, contaminated water flow into pipes at leakage points and causes pollution in the distribution networks. Therefore, in order to reduce the amount of non-revenue water, measures must be taken in terms of both technology and business management.

In Japan, for example, the percentage of non-revenue water is 10% or less in large cities. Tokyo Metropolitan Waterworks Bureaus has succeeded in bringing down the percentage of water leakage to a low 3.3%. Urban water operators in Japan are persistently searching for ways to reduce the water leakage rate. There is an idea of *optimal water leakage rate*, which is determined by a point at which the fee income that is lost due to the water leakage and the cost for measures against it are both balanced. One of the most effective ways to reduce the amount of non-revenue water is to install meters at every connecting point, and to measure consumption of each house hold using precise meters.

In this session, participants discussed different measures against non-revenue water, learned from successful cases, and considered applications to their own country context.

Greeting from Moderator

Problem of non-revenue water is a big issue not only technically but also from a viewpoint of management of water services. Bureau of Waterworks, Tokyo Metropolitan Government has attained a leakage level of 3%, and in large cities water leakage is maintained at less than 10%. In Japan, most non-revenue water is attributable to water leakage, and no water theft has occurred. Therefore, the leakage level is used for non-revenue water.

Some developing nations show over 50% of non-revenue water, and it is said that 24-hour water supply is not provided. On the other hand, Phnom Penh Water Supply Authority (PPWSA) maintains non-revenue water at 6% through measures against water leakage and others. Efforts are also being made to improve the situation in Bangalore.

In this session, the importance of reduction of non-revenue water was discussed, success cases of non-revenue water were learnt, and consideration was given concerning appropriate measures to improve the status.

Three presenters from Bangalore, Phnom Penh, and Tokyo showed useful and constructive methods by focusing on the following points.

- ・Background and status of non-revenue water
- ・Recognition concerning importance of reduction of non-revenue water
- ・Planning and implementation of long-term and short-term plans
- ・Securing of costs for investment
- ・Measures to solve technical problems
- ・Training for water leakage prevention work
- ・Japan’s technical cooperation

Each water supply utility has its own conditions, and measures for solving problem are not necessarily appropriate for other water supply utilities. For example, water leakage in Tokyo

stood at about 30% 40 years ago. Later, concentration of population occurred in Tokyo due to remarkable economic development, and residents in Tokyo suffered a tremendous water supply shortage when the Tokyo Olympics were held. Also, recently, problems of seismic resistance of facilities have come up. Based on these experiences, water leakage at Bureau of Waterworks, Tokyo Metropolitan Government is to be maintained at 3%.
In this Session, we would like to find appropriate measures from a broader perspective.

Presentation ①
"NRW IMPROVEMENT WORK, Cauvery Water Supply Project Stage IV, Bangalore India "
by Mr. Koichi Suzuki, Deputy General Manager, Global Consulting H.Q. Strategic Business Unit, Oriental Consultant Co.,LTD.

When water demand increases, water providers must consider new water sources or reduction of non-revenue water (NRW). The Bangalore water provider is Bangalore Water Supply & Sewerage Board (BWSSB). BWSSB supplied 860,000m^3/day to 380,000 connections in 2003. Due to the rapid growth of the city, the supply-demand gap is projected at 209,000m^3/d by 2025. NRW is defined as water produced but without any income accruing from it. NRW is composed of real losses and apparent losses and six sub components. Among these, the pilot project picked up three sub components for the project. The methodology for NRW reduction was based on "Leakage Management and Control" of WHO.

As the first step, BWSSB decided to carry out active NRW control for a pilot area to assess its effects. The population of the pilot project area was about 400,000 people. The project launched from 2003 for three years. The three main activities conducted in the project were (i) establishment of district meter areas (DMAs), which are the key component for NRW reduction, (ii) reduction of non-physical loss by replacing customer meters, and (iii) reduction of physical loss.

Due to the DMA survey, 2,779 leakages were found and 2,558 were repaired. One of the main reasons for leakage was the age of the network, with many distribution mains being installed 60 previously. Furthermore, leaks from service pipes and stand pipes were also significant. The project shows that it is important to cover the whole water supply system (including reservoir) for NRW control project.

Accompanying the reduction in the leakage level, water supply duration and water pressure were also improved. In DMA1 and DMA3A, the water supply duration was improved from 12 hours/d to 24 hours/d. Furthermore, it is clear that water pressure was improved in all the DMAs. It was judged that if the project had not been conducted, the loss would have been about 4 million m^3 of water per year.

Through the pilot project, it was possible to learn the following essential lessons:
(1) Ratio of NRW: Before the pilot project, the NRW ratio was estimated to be about 35%. During the project, the ratio was shown to actually be 45% to 65%. Actual measurement is most effective for grasping NRW accurately.
(2) DMA Design: In areas where pipe density is 150 m/ha, it is convenient to limit the number of connections per DMA to 3,000.
(3) Measurement of Leakage: It takes a lot of time to grasp the amount of leaked water by measuring water flow during night or under conditions of water suspension. This kind of

monitoring requires automatic or remote recording by flow meters or pressure gauges.
(4) Leakage from Reservoirs: It is necessary to investigate water leaks not only through the pipes but also in the entire water supply system.
(5) Cost of NRW measures: NRW improvement cost for 1 m^3/day was US$367 where the cost of pilot project was US$2.26 million and the recovered water was 2,266,570 m^3/year. This cost is a little higher than the cost of constructing a new system. However, if no measures are carried out, the ratio of NRW would continue to increase.
(6) DMA after Pilot Project: DMA will continue to be used as an operational unit after the project for the purpose of maintenance and management.
(7) Secondary Effects: After measures against NRW, it is possible to engage in remote monitoring through district meters. At the same time, it becomes possible to reduce the personnel costs for dealing with complaints about water leak.
(8) Inhabitants' Understanding: If the inhabitants and the municipal assemblies are aware of measures against NRW it is therefore easier to gain their approval when it becomes necessary to revise water charges. NRW measures present a revenue opportunity and a valuable method of to sustain improvements and create a virtuous cycle.

Presentation ②
"BWSSB'S EXPERIENCE ON NON REVENUE WATER STUDIES "
by Mr. Ramamurthy Bangareshwar Padavagodu, Chairman, Bangalore Water Supply and Sewerage Board (BWSSB), India

Mr. Padavagodu continued the presentation begun by Mr. Suzuki, providing further details. He explained that the problems encountered in the project included non-availability of continuous water to conduct tests to determine leakage level, operation of boundary and internal valves and damage to water supply utilities by other utilities. In addition other issues such as system pressure and obtaining permission from other agencies were issues that presented a challenge.

BWSSB implemented the UFW project for 300,000 connections with financial aid provided by JICA. Initial UFW was 35% to 45% in different district meter areas (DMAs). At the end of the project the UFW was reduced to 22% to 35% in different DMAs. In the present project the UFW is targeted at 16 % irrespective of initial leakage level.

In conclusion, it can be determined that UFW reduction is a better investment than additional source exploitation. Comprehensive water audit at service level should be integrated with distribution. Immediate replacement of defective meters and systematic replacement of old meters is beneficial. Leak detection teams should inspect the entire zone weekly and address leaks immediately. Review and investigation of abnormal and subnormal consumption provides clues about the theft of water. Daily monitoring of district meter readings reveals weak lines immediately. Finally, a survey of all the properties in the area with/without water connection and regular updating on GIS helps in planning for future needs.

Presentation ③

"Experiences of PPWSA for reduction of NRW "

by Mr. Samreth Sovithia, Director, Plan and Project Department, Phnom Penh Water Supply Authority (PPWSA), Cambodia

In the course of PPWSA's efforts to enhance the water supply system in Phnom Penh, it was essential to reduce non-revenue water (NRW). One of the efforts in this regard was to replace old pipes. 280km of cast iron pipes were replaced by HDPE and DCI pipes. The second measure was to ensure that all connections are metered. From 1993 to 2001, metered connections rose from 12.6% to 100%.

A further measure was to create a 24/7 stand-by team who could engage in immediate leak repair work. Two teams were established, each consisting of eight members. A DMA program was established and a Distribution Control Office was launched with more than 60 staff.

Another important measure was the zoning of the distribution network (DMA). Between 2003 and 2005 a total of four districts and 29 sub-zones were established. These 29 sub-zones are managed by two teams of 30 staff.

The results achieved in reducing NRW are calculated to have saved approximately US$14 million in income each year. The NRW restored to metered connections is further calculated to be equivalent to the cost of constructing an entire new water treatment plant, equivalent to US$100 million.

Factors for success include: (1) Governance (keeping NRW reduction at the top of the agenda), (2) Appropriate measures (qualified, motivated workforce), and (3) Appropriate policies (combating corruption, reward and penalty system, 3 "Fs" (firmness, fairness, faith)).

Presentation ④

"Technical cooperation to PPWSA on leakage reduction ～ Block distribution system ～"

by Mr. Hiroshi Hirowatari, Assistant Manager, Construction Planning Division, Water Supply Department, Water Works Bureau, City of Kitakyushu

In case of Kitakyushu City, water supply service was started in 1911 and marks almost 100 years in operation. The characteristic of the system employed in Kitakyushu is the "Block Distribution System," which was established in the 1980s. Through this system we have divided the water supply area into 88 areas in order to engage in efficient management.

In 1975, our NRW was 21.79%. But by 2008 it had been reduced to 8.05%. The following four activities were important in achieving this reduction: (1) Change of pipe materials from lead-pipe to PE-pipe, (2) Control of water pressure appropriate for water supply, (3) Establishment of the block distribution system to manage efficiently, and (4) Establishment of a data monitoring system to collect data from the block distribution such as flow data and water pressure.

Employees of the Waterworks Bureau of Kitakyushu City have been dispatched to PPWSA since 1999. Eight staff were dispatched as JICA experts on a JICA partnership program to PPWSA from 2001 to 2002, in order to establish a telemeter system using telecommunication.

In 2003 we dispatched 25 staff as JICA experts to PPWSA on a JICA project on capacity building for water supply system in Cambodia Phase-1 for three years, in order to carry out on-the-job training. In 2007, we dispatched 22 staff as JICA experts to MIME on a JICA project on capacity building for water supply system in Cambodia Phase-2 for four years, in order to carry out technical transfer with provincial waterworks.

PPWSA has carried out many measures to reduce NRW. Flow meters were installed in the inflow point of each block, and they were used to identify high leakage blocks using the data from meter readings. There are 41 blocks in Phnom Penh. Daily management is necessary in order to estimate NRW easily and to carry out water leakage or illegal connection surveys on the worst NRW blocks only.

However, PPWSA staff were reading water meters once every each hour to collect water flow data and water pressure data. This monitoring method was hard work and it was impossible to conduct on a 24-hour basis. Bottom water flow is important data to estimate the daily physical leakage amount. Flow data measured by a block meter is transmitted to the local station. The local station saves the data once a minute in its memory after which it transmits the data in its memory to the central unit using telecommunications. This is done at six-hour intervals and takes only a few seconds.

On the establishment of the data monitoring system our biggest objective was to transfer technologies required for constructing and operating the system to PPWSA via implementation of this project. As a result of this project, the telemeter system in PPWSA was developed. The block distribution system in Phnom Penh city works well due to its combination with the data monitoring system.

The advantages of a block distribution system can be distilled into the following points: (1) Advancement in maintenance and management of pipe network, (2) Advancement in NRW measures, and (3) Advancement of emergency preparedness.

The data-monitoring system aims to manage the data of each distribution block efficiently by not man-power but using technology, in this case the telemeter. Water leaks can be effectively decreased by understanding the bottom water flow, through a combination of the block distribution system and the data monitoring system. We have been cooperating with PPWSA about leakage reduction that employs the block distribution system and the data-monitoring system as one measure against NRW. Through this project we were able to contribute to a dramatic success in measures against NRW at PPWSA. Kitakyushu City will continue to provide support to provincial cities in Cambodia in the future.

Presentation ⑤
“Leakage Prevention in Tokyo ”
by Mr. Hiroaki Sasaki, Director, Water Supply Section, Water Supply Division, Bureau of Waterworks, Tokyo Metropolitan Government

Water supply in Tokyo started on December 1, 1898, for the metropolitan area, initially for Kanda and Nihonbashi. There are high needs among Tokyo residents for water service, and the water-supply area has been gradually expanded. Currently 12.6 million people are served in the metropolitan area, including cities and towns in the Tama district. The capacity of drinking water purification plants is 6.86 million cubic meters per day, and total length of pipelines is 26,000km, which is longer than halfway around the globe. Our efforts to prevent water leakage

started in 1913 and have continued up to today. During World War II, water leakage prevention works were suspended. As a result, water leakage rate once reached 80%. Since then, the rate has gradually decreased year by year. But in 1972 and 1973, water supply restrictions were conducted during summer time two consecutive years. In order to address this issue, the bureau had series of discussions. As a result, the bureau recognized the importance of preventive measures to forestall water leakage as well as corrective measures to address water leakage.

As a result of the continued efforts the water leakage rate, which was 17% in 1972, was decreased to 3.1% in 2008. There are three aspects to this success. Firstly, there was shortage of water supply during the period from 1965 to 1975 because water resources were underdeveloped. Currently, the total volume of water resources owned by Tokyo Metropolitan Government is 6.3 million cubic meters per day. But 80% of those resources depend on reservoirs along the Tone River, which is vulnerable to drought. Secondly, water leakage will cause water flow problems, which lead to a risk of secondary disasters such as sagging roads and flooded building. Thirdly, water leakage wastes water resources and the energy used for water purification and distribution.

For leakage prevention measures, we need to collect basic data, concerning items such as degree of leakage occurrence. To this end, it is necessary to analyze the practical uses for distributed water. The Bureau of Waterworks of the Tokyo Metropolitan Government spends an appropriate amount so as to build facilities at right places. Thus the Bureau secures a system and a framework for continuously grasping water amount.

The Ministry of Health, Labour and Welfare published “Waterworks Vision” in June 2004 and set a mandated goal of effective water ratio of 98% and more for large-sized utilities, and 95% and more for small and middle-sized utilities.

There are three pillars to support water leakage rate reduction in Tokyo. The first pillar is well-planned replacement of pipes and improvement pipe material. The second pillar is leakage detection technology and early repair. The third pillar is ensuring high levels of technology. Based on these three pillars the Bureau of Waterworks, Tokyo Metropolitan Government is promoting comprehensive water leakage prevention measures.

With regard to the latest leakage detection techniques, one of these used to detect the point of leakage is a correlation type leakage detector, which includes a correlation leakage detector, sensor, amplifier, radio transmitter, etc. In this technique, we put sensors on both sides of a possible leakage point then calculate leakage noise propagation time difference to the both sensors using a correlation leakage detector. With the data showing time difference, distance between two sensors, and speed of leakage noise transmission inside the pipe, the location of the leaking point can be calculated exactly. One of the excellent features of a correlation type leakage detector is that it is less susceptible to traffic noise or the depth of the pipe.

The next technique is a time integral type leakage detector. In this technique, we place a sensor on the exposed part of a service pipe inside a meter box at each household and measure propagation noise for a certain period of time (10 seconds to 3 minutes). Then we detect if there is leakage by using an automatic leakage detector. The great feature of this device is that it is less susceptible to intermittent noise caused by tap water usage or vehicular sounds on the ground surface. However it cannot locate the exact point of leakage.

Looking at the effect of water leakage prevention measures from an environmental point of view, water leakage rates have decreased by 8.6% compared with the rate 20 years ago. Thanks to this result we have been able to cut electricity consumption by 75 million Kwh per year. These efforts enabled us to cut 30,000 tons of CO_2, which is equivalent to the CO_2 emissions of 13,000 cars. In this way, water leakage prevention is effective as a measure not only for the water works business, but also for environmental measures, including global warming prevention.

Another serious issue is to hand down the skills of experienced workers in methods of acoustic leakage sound detection. This is a pressing issue because many experienced workers are due to retire in the near future. We have established a Training and Technical Development Center to develop new research devices and to hand down knowledge about water leakage prevention techniques.

Discussion

Mr. Fazlullah (Bangladesh) agreed that measures to prevent non-revenue water, including leakage and illegal connections are vital for waterworks providers. If measures are not implemented it is inevitable that waterworks authorities will face a crisis in the future. It is important to develop awareness among the public and establish measures for the prompt replacement of water meters. Efficient management of waterworks authorities is another critical requirement. Surveys and zoning are also effective methods of gaining a true picture of water supply in urban regions.

Mr. Olapiriyakul (Thailand) noted that NRW is also the most critical issue facing the Metropolitan Waterworks Authority of Bangkok. Systematic measures to survey leaks and detect leakage are essential and dependent on the skill of those engaged in measuring and survey work. DMA schemes are also useful in efforts to identify areas of leakage. Everyone in this forum hopes to share experiences with other countries about leakage detection. It is to be hoped that with the technical assistance of JICA, Bangkok's leakage ratio can be reduced to a level similar to Tokyo.

Mr. Rivera (Philippines) stated that based on the experience of the Philippines, NRW is not purely a technical problem. If it were an engineering problem only it would have been resolved already, but it requires outreach and advocacy to communities, and awareness-raising activities about the importance of waterworks. Sooner or later it will be necessary to address the economic side of NRW measures. At some point it will not be economically feasible to reduce the NRW ratio further.

Mr. Gamini (Sri Lanka) asked a question about methods to estimate the lifetime of pipes and how to procure funds for replacement, etc.

Mr. Sasaki responded that in the case of Tokyo, the city is divided into patrolling regions. A concept of viewing infrastructure in terms of asset management has also been introduced in Tokyo.

Summarization by Moderator

In this Session, it was found out that efforts are exerted for the reduction of NRW in Bangalore in India, Phnom Penh in Cambodia, Tokyo in Japan, and in other countries.

Mr. Suzuki and a presenter from Bangalore in India demonstrated that measures against

non-revenue water would lead to protection of water resources and improvement of management. A participant from Bangladesh commented that consideration should be given to the balance between the reduction level and NRW and investment costs.

A participant from Bangladesh commented that consideration should be given on the balance between the NRW reduction level and investment costs.

Mr. Rivera of Manila Water Company also expressed a similar opinion and pointed out that measures against NRW should be carried out according to the intention of taxpayers.

H.E Ek Sonn Chan had an opinion that the lower the NRW, the better the management.

Profit will increase through measures against non-revenue water. The lower the level of non-revenue water the greater the improvement in management, which is linked to profit improvement and effective management.

There is an economical water leakage ratio (where costs for reducing water leakage are balanced with profit increase through reduction of water leakage). It is necessary to follow the intention of consumers in determining how much water leakage should be reduced. At the same time, improvement of morale toward sound management among workers and improvement of consciousness of residents are important.

Measures against NRW must be worked on from both management and technical aspects. Elimination of non-revenue water will secure water resources and prevent secondary contamination.

Lastly, the Moderator compiled the following points.

- For measures against NRW, it is important to collect water charges by installing meters to all users.
- Measures against NRW will lead to protection of water resources.
- Measures against NRW will lead to supply of safe drinking water.
- It is essential to provide 24-hour water supply services.

Moreover, measure against NRW will:

- prevent secondary disasters, such as subsidence of roads due to breakage of pipes and traffic accidents;
- lead to stability of social and economic activities; and
- lead to contribution to global environmental problems.

However, it is difficult to improve the current status of non-revenue water. There exist many problems to be solved, including:

- Financing problems and improvement of revenues;
- Balance between profit and cost;
- Technical problems; and
- Human resources and training

<Day 2>

4-(5)Group 1: Urban Water Service for the Poor

Moderator: Mr. Kazushi Hashimoto, Councilor, Japan Water Forum, (Executive Advisor, International Division, Yachiyo Engineering Co., Ltd.)

Purpose of the session

Universal access to safe water, including the most vulnerable population such as the population living in slums, must be achieved. However, city authorities and urban water operators face various challenges when attempting to connect water services to individual residents in the slums. Therefore, only a few cities have successfully connected to individual households. In this session, cases of tackling this complicated and difficult task in Asia were presented and discussed.

Greeting from Moderator

Urban populations are increasing rapidly around the world. The large population shift from rural to urban areas continues to advance, particularly in Asia. Currently 40% of the total population of Asia is based in urban centers and this is expected to rise each year.

According to World Health Organization (WHO) figures a large proportion of the population live in slum areas. Few utilities provide connections to slum areas. This is due to a variety of reasons: (1) legal issues – most slum dwellers do not have legal title on the land, (2) mentality of utilities – staff of water utilities are mostly engineers and not equipped to face other issues that exist in slum areas, and (3) connection costs – the cost of connection is a disincentive to connecting homes in slum areas.

In this session three countries will explain their activities in this area. The session will discuss about what can be done to provide water services to the poor and also what Japan can do to involve itself in urban water services to the poor in other countries.

Presentation ①

"Service Delivery to the Poor"

Presentation by Mr. Rangamani Vasudevan, Chief Engineer, Kaveri Zone, Bangalore Water Supply and Sewerage Board(BWSSB), India

A presenter from Bangalore Water Supply and Sewerage Board (BWSSB) introduced a success case of connecting to 10,000 slum residents to promote individual connections in slum areas by establishing Social Development Bureau within the BWSSB.

Bangalore Water Supply & Sewerage Board (BWSSB) is a State-owned public utility committed to extract, treat and supply potable water to citizens of Bangalore, and collect, convey, treat and dispose the sewage at an affordable cost to the consumer. It serves a total population of approximately seven million.

Ten to 15% of the population lives in slums, with a total of over 500 slums in the city. 70% of slums do not have satisfactory water and sanitation arrangements. The slum dwellers experience difficulty in gaining access to water due to inadequate supply and time spent waiting at taps. In order to gain a water connection a property document is required, which slum

dwellers are unable to provide. Applications for new connections are available from BWSSB only.

BWSSD engaged in a pilot project with AUSAUD. The objectives were to: (1) understand the problems in service to the urban poor, (2) explore potential for sustainable community-based WATSAN projects with NGO Community partnership, (3) improve service delivery to vulnerable groups, (4) increase slum households connected to metered network, and (5) empower the slum dweller as a rightful consumer.

In the pilot project three low-income settlements were selected. Water supply and sewer lines were provided, with the cost of street level infrastructure being borne by the project. Residents paid the cost of individual/shared connections and monthly tariffs. The pilot project enabled extension of services in an area where procedure have prevented extension in the past. Service provision has helped increase the consumer and revenue base of BWSSB.

The pilot project proved to be a success and was particularly well-appraised by women living in the slum. After the pilot project a number of further actions were taken. A Social Development Unit (SDU) was developed within BWSSB to concentrate on social issues relating to water supply. The pilot project was further expanded to 43 other slums and unauthorized connections in slums were regularized. Also, partnerships with NGOs have been expanded.

The key lessons of the pilot project are as follows: (1) Poor pay poses difficulties for accessing basic services, (2) there is a willingness to pay for regular and assured services, (3) empowerment of communities produces impressive results, (4) partnerships among governments, NGOs and communities is the key to sustainability. Bottlenecks have been identified as follows: (1) Slum beneficiaries are not treated on par with other customers, (2) NGOs and CBOs do not show sustained interest, having their own style of working, (3) there is a lack of incentive for staff working in slum areas, and (4) the SDU is understaffed and shown low priority.

The pilot project also showed that connection to slum areas could have the following benefits to the service provider: (1) Improved revenue: About 30,000 out of 550,000 connections now are slum dwellers, (2) reduction of water loss (illegal connections reduced), (3) run-off of sewage in drains is reduced resulting in an improved environment, (4) satisfying the objectives of BWSSB, and (5) sensitizing the staff towards responsible services.

The SDU aims to make water and sanitation services accessible to the urban poor. Other objectives include: (1) obtaining facts on availability of basic services in each slum, (2) developing mechanisms for interaction with the urban poor, (3) identifying advocate agencies/intermediaries, (4) exploring alternate technical and service level options, (5) advising households in funding arrangements, (6) facilitating participatory decision making, and (7) developing coordination with other civic agencies engaged in servicing the poor (for roads, housing, education, healthcare).

The SDU has extended services to 47 additional slums. The unit works to identify community leaders to facilitate intensive coverage and to encourage local contractors to engage in work in the slums. Issues faced by the SDU include discrimination against the slum dwellers and also against the people of the unit who work to provide service to the slum poor. Political hurdles and financial constraints also need to be overcome.

Presentation ②
“JBIC Project in Colombo”
by Mr. Balasuriya Weebaddage Ranjith, Additional General Manager, Northern & Central Division, Head Office, Ratmalana, National Water Supply & Drainage Board (NWSDB), Sri Lanka

A presenter National Water Supply & Drainage Board (NWSDB), Sri Lank introduced the case called the Randiya Project to promote individual connection program for the poor from perspective of measures againt NRW.

The Randiya Project (Golden Water Project) was implemented in Colombo to address the issue of non-metered connections. Colombo City has a permanent population of approximately 642,000, with 400,000 additional floating inhabitants. Sanitary coverage in the city is 100%. Over the years the slum areas have been highly populated and are known as tenement gardens. They have basic sanitary facilities including shared toilets, bathing areas, etc. The problems facing common sanitary facilities include high wastage through common outlets, hygiene problems, social problems (in the form of quarrels), attitudes of residents, and water contamination.

The Randiya Project was launched to provide individual connections to slum areas at a concessionary rate and to disconnect common outlets. The objectives of the project were as follows:

- Improve living standards and change attitudes in tenants,
- Improve hygienic conditions and enhance healthy workforce,
- Reduce wastage of water and improve pressure in the distribution system,
- Improve drainage facilities through relevant agencies,
- Better awareness for the community,
- Re-structuring of tenement gardens through donor agencies, and
- Improve the capacity of community leadership and ensure their active involvement in the project.

The project was launched in 1999 and up until 2009 a total of 18,355 connections have been provided in tenement gardens, and a total of 1,465 common outlets have been disconnected. Constraints to the project include the issue of low pressure in distribution systems. In addition, there is no proper drainage, nor are access facilities available in the tenement gardens. There is also the issue of space – living accommodations are tightly spaced, leaving little room for individual septic tanks, etc. Residents have shown a disinclination to work with government officers.

As a means of ameliorating the various issues that are faced the NWSDB has introduced active leakage controls and engages in a relaxing of distribution in order to improve pressure. As a means of promoting applications for water connections, applications using mobile phones have been introduced.

Shortcomings of the system introduced through the Randiya Project include reluctance among residents to go to the payment counter to pay the monthly bill. There is no system in place to collect bills on the doorstep and consequently the payment delinquency rate is higher in the tenement gardens than other areas of the city.

With regard to the sustainability of the project, the following points are considered to be important:

- Close monitoring mechanism to be established,
- Establishment of mobile collection system during weekends,
- Education of meter readers to motivate customers to pay their bills,
- Establishment of disconnection programs with the involvement of community leaders,
- Regular updating of the common outlet register, and
- Discovery of new connection outlets.

The lessons learned from the project are as follows:

- The consent of the majority of residents is essential,
- Individual connections tend to reduce average monthly water consumption from 20m^3/ family to 15m^3/family,
- Daily consumption of remaining common outlets was reduced drastically from 11m^3/day to 2.5m^3/day, and
- The importance of not allowing bills to accumulate.

Presentation ③

"Impossible to Possible ～ The Manila Water Experiences in Providing Water Service to Urban Poor Communities～"

by Ms. Shoebe Hazel B. Caong, Business Zone Manager, Business Group – Mandaluyong Ba, Manila Water Company Inc., Philippines

A presenter from Manila Water, a private water service operator in Manila, Philippines, introduced the case where they succeeded in connecting more than 1,000,000 individual slum dwellers through an independently developed method.

Manila Water's social and environmental objectives and business goals are perfectly aligned. The sustainability philosophy of Manila Water comprises five aspects: building communities, protecting the environment, safeguarding health and safety, contributing to local and national economies, and developing employees.

The preceding organization of Manila Water was MWSS and it had implemented a Water Improvement Project for Depressed Areas (WIPDA), but the project had not been very successful. Manila Water launched a new initiative known as "Water for the Community." This initiative targets the depressed and low-income communities of the East zone of Metro Manila. At the start of the project the potability of the water was also an issue. The ultimate objective was to help to build communities.

The challenges that were faced in implementing the initiative included addressing the issue of connection affordability and infrastructure creation. In some of the areas targeted by the initiative there was no pre-existing piped-in supply. One way of overcoming these issues was to introduce bulk meters. A "Global Partnership on Output-based Aid" was funded by the World Bank through the International Finance Corporation.

In terms of payment options for connection charges, Manila Water has adopted a 2/3, 1/3 scheme, whereby Manila Water pays two-thirds of the charge and the customer pays the remaining one-third.

The initiative has proved successful due to its visibility in the community and the efforts made in creating effective relations between the community and local government units. The increase in connections and payment collection has contributed to decreasing the unit price of the water, which now stands at US$0.15/$m^3$. Customer surveys are implemented to gauge the success of the project and the surveys show that the project is well regarded.

In response to the comments from the Moderator about the problem of land ownership, Manila Water has taken steps to address this issue and land ownership documents are no longer a requirement for a water connection.

Discussion

In this session, presentations were given concerning efforts to promote water supply to the urban poor by Manila Water, Bangalore in India, and Colombo in Sri Lanka.

Water supply utilities in all nations have similar problems concerning the provision of water supply services to the poor. Individual connection is important as a method of reducing non-revenue water in slum areas. All presenters remarked on the importance improving the independence of residents.

Also, it was stated that the connection to the poor would improve revenues and a virtuous circle would be created.

The Commentator was asked to give comment, and then, questions and comments were requested from participants from the general public.

Commentator:
Ms. Isa Imazato, Because Institute Co., Ltd.

Ms. Imazato spoke about a pilot scheme of Kalu Ganga Water Supply Project for Greater Colombo. She explained that she had worked as a JICA volunteer on the project, which involved a number of stakeholders, including JICA, NGOs, Sri Lankan government authorities, the municipality and water board, and the community. The output of the project was that basic infrastructure was improved. Individual water supply and drainage systems were created and a cost-recovery system was established. In addition, the network among stakeholders was strengthened and the sense of responsibility concerning water supply was enhanced. Ms. Imazato noted that residents had become more aware of leakage and efficient use of water.

In response to the presentations Ms. Imazato stressed the need to engage with slum dwellers and empower them. These linkages help to bring the slum dwellers closer to government officials and promote social inclusion. Water supply projects in low-income settlements face some issues that cannot be solved by water authorities, including problems of space and the fact that some slum areas are not suitable for living. Engagement and cooperation are essential. It is incumbent on governments to recognize the needs of low-income settlement dwellers.

The moderator asked for an explanation on measures against poverty to be taken by Phnom Penh Water Supply Authority (PPWSA). Also, the moderator asked for comments on the entire session from the expectation of stressing that the individual connection to the poor is important in water supply services in developing nations.

Commentator:
H. E. Ek Sonn Chan, General Director, Phnom Penh Water Supply Authority (PPWSA)

H. E. Ek Sonn Chan expressed his congratulations to the three speakers on presenting the successes achieved in Colombo, Manila and Bangalore. He stressed that investment in water is an investment in poverty reduction. The three big constraints facing water supply to the poor are: (1) Legal issues: This has been overcome by exempting the requirement for property documentation. (2) Mentality: This may not be a particularly troublesome issue as there are generally people who are willing to work with the poor and engage in efforts to empower slum dwellers. (3) Connection cost: This is perhaps the most significant issue. In the case of Colombo common water supply was provided free of charge to the tenement gardens, however, it may be preferable to provide the connection free of charge and then charge for water thereafter. With regard to the connection fee, which is the biggest constraint, Phnom Penh has some experience of this issue. One method is to incorporate the connection fee into the actual water charge. Another way to overcome the challenge of the connection fee is to provide subsidies for connection costs. A water bill exceeding US$3 per month is unlikely to be paid by a low-income family and therefore the water tariff itself could be viewed as a fourth constraint. In Phnom Penh 5% of annual profits are earmarked for support to poor families. JICA provides the largest portion of assistance to water projects in Phnom Penh and its support has been invaluable. However, other donors including the World Bank and the ADB place a greater emphasis on water service for the poor. JICA experts tend to visit only water treatment and supply facilities, whereas other donors visit the slums themselves. With a very small extra effort from JICA it would be possible to provide more opportunities to the poor in Phnom Penh.

Mr. Hashimoto thanked the commentators for their interventions. He concurred that the single most significant issue in urban water service to the poor is the water connection fee. He invited further comments and questions from the floor.

Dr. Khan (Bangladesh) thanked the presenters and commentators, noting that the situation in Bangladesh was similar to the three presenting countries. He noted that water is a basic human need and it is therefore the responsibility of the State to provide clean water to its people. However, recently a paradigm shift is occurring and water is starting to be viewed as a commercial venture. Another problem is that of floating populations, who are reluctant to pay for water as their dwelling place changes on a regular basis. The basic attitude to water should not be focused on revenue and business, but rather avoiding wastage and efficient usage. There should not be a connection fee for slum dwellers given their transitory nature. People have a right to access to water, but should be encouraged not to waste water through the levy of a nominal charge.

Mr. Vasudevan stressed that a small amount should be levied as a tariff as this serves to raise awareness among slum dwellers and encourage efficient use of water.

Dr. Khan agreed with Mr. Vasudevan that a tariff, however small, should be levied. However, he stressed that the ultimate focus should not be a commercial one, but one that focuses on the well-being of the people. However, the provision of totally free water opens the opportunity for misuse and wastage. Service standards at water authorities also need to be considered and improved.

Mr. Hashimoto referred to Dr. Khan’s comment about a paradigm shift. He noted that Manila Water has succeeded in providing water to poor populations and has balanced social contribution with business goals.

Dr. Khan responded that Manila Water has enjoyed success as it has gained revenue from the richer classes to support water supply to poor populations.

Ms. Caong stated that in the case of Manila water provision costs 7 pesos per day, whereas mobile phone usage could cost a great deal more, so the charge was not a burden on the people.

Mr. Balasuriya noted that in Colombo the first ten units of water are provided at heavily subsidized rates for domestic use as a means of supporting poor families who are using water for basic domestic purposes.

Mr. Ouchi (South Asia Department, JICA) spoke about the comments from H.E Ek Sonn Chan, acknowledging that JICA's assessment of the real situation in slums could be improved. JICA engages in regular talks with central government officials in recipient countries, but when arranging a program it is necessary to go through formalities with top level officials and these talks tend to focus on funding issues.

H.E Ek Sonn Chan concurred with the p70ilosophy of Dr. Khan about concentrating on the well-being of people rather than business. However it is important that people recognize that water is not provided for free. The example of Manila Water is an excellent example of business and social principles working hand-in-hand. If JICA could make just a little extra effort in examining how service is provided to the poor it would make a tremendous difference.

Summarization by Moderator

Mr. Hashimoto concluded the session by stating that provision of water to the poor is possible but faces a number of issues, as covered in the session. The issue of water tariffs is a major challenge and a number of approaches are possible. Through this session, the Japan side obtained good advices, as follows.

Amid continued population inflow to urban areas and the expanded scale of slums, water supply to the poor is important and individual connection in slums is essential to achieve MDGs.

One of the factors which hamper water supply to the poor is high connection charges. The poor don't have rights for land and houses. However, for water supply utilities, individual connection is essential in terms of their business from the viewpoints of receiving support from dwellers for measures against non-revenue water and water supply services.

Although the situation is such that water from water sellers is more expensive that water from tap water, the poor cannot afford to pay for connection charges. There are complicated technical and economic problems involved in this issue, and this is an area on which Japan's ODA is required to do studies and execute. Therefore, water supply cases to cope with the poor by Manila Water and others are useful. Manila Water, a private sector company, is obtaining the best results with this issue, which has great implications.

Concerning measures against poverty, there are such means as installment payments, discount, in-depth explanation to residents whose educational level is low, participation in labor by community people, and less expensive connection charges even if the service is low, etc.

In the case of Sri Lanka, in-depth explanations have to be provided by employees of the water works bureau, since poor residents have literacy problems.

Slum residents show the willingness to pay water charges if water is supplied. However

connection charges are barriers. They are conscious of providing labor when water pipes are installed.

The mission of supplying water has a social aspect, such as supporting poor people. Supplying water solely on a commercial basis doesn't necessarily work. Economic problems, religious problems, and other social problems are interlocked making it difficult to provide support.

Japan's ODA should see water supply to the urban poor as measures against poverty. JICA's measures against poverty should be considered from the perspective of human safety assurance and implications of water supply projects.

4-(6) Group 2: Financing Water Supply, Water Tariff System

Moderator: Mr. Yoji Matsui, Director, Training and International Department, Japan Water Works Association (JWWA)

Purpose of the session

The session also discussed the difficult tasks of setting water tariffs at a reasonable rate for all residents, while at the same time maintaining a healthy balance among tariffs for domestic-use, commercial-use, and industrial-use. Moreover, participants discussed how to establish a system where tariffs could be securely collected.

In this session, some cases were reported including those of the Philippines and Japan as the cases where this difficult problem of the finance and the water tariff was tackled.

Greeting from Moderator

Mr. Matsui noted that the discussion would revolve around what triggers are needed in urban water service financing and tariff to transition from a vicious to a virtuous circle.

Based on the discussions held yesterday and referring to case studies, an exploration should be made where the difference exists. Mr. Matsui stated that he would be happy if the discussion would trigger the takeoff to sustainable management of water supply services.

Sub-session 1: Financing Water Supply

Presentation ①

"Financing Water, Water Tariff System in Indonesia"

by Ir. Tami M. Zakaria Amin, MSc, Director of Water Supply Development

Ms.Amin outlined some problems and strategic issues in Indonesia, including low piped-water coverage and technical, financial and management issues.

In Indonesia as a whole, the percentage of non-revenue water in 2008 is 33%. Water pressure is low and water charges are also low.

The government has set up a policy and strategy for water supply development, aiming to increase the coverage and quality of services, increase financing, strengthen institutional and legal aspects, improve quality and sustainability of water resources, and increase community participation.

Government funding is to focus on poor and low-income communities, while high-income communities will be developed through PPP and private finance. Financing in urban areas will aim for full cost recovery, while in rural areas grants will be provided. The investment plan requires 78.4 trillion rupiah. Finances for investment will come from Water Enterprises internal funds, commercial bank loans, trade credit, private investment and government grants.

To improve the soundness of PDAM business operation, understanding has been sought on business performance of water supply utility and its improvement program (so-called healthy PDAM program) (2005-2009). Through this program, soundness of each PDAM business operation is grasped and future investment plan is formulated. Through this development program, consistent improvement of business performance of water supply services in Indonesia has been shown for the past 5 years

Revision of water charges is proposed by the chief of the Bureau after approval by a regulatory body and determined by a top local government official. Prior to the enforcement of new charges, the chief of the Bureau must ask for understanding of users concerning revision of charges through the media for 30 days.

Q&A
Mr. Takizawa asked how the classifications of PDAM health were set.

Mr. Amin responded that the health was scored based on three areas, composed of 45% financial indicators, 15% technical indicators and 40% management indicators.

Presentation ②
"Japan's Experience in Financing Water Supply"
by Prof. Hiroki Hashizume, Professor, School of Global Studies, Tama University

Water resource development is subsidised one-third to one-half by national government, with the remainder to be paid by the water tariff. One third of the construction cost may be contributed from the general account of the municipality. Long-term, low-interest loans are provided by the Japan Finance Organisation for Municipalities. When the municipality amortises this loan portion, half of the sum of the capital and interest is granted by the national government each year.

Q&A

Mr. Rivera Jr. asked what the impact of removing national subsidy would be on customer tariff rates. Prof. Hashizume replied that he did not have figures for that. Mr. Rivera Jr. noted that taxpayers would at some point be dissatisfied with subsidising water supply. Mr. Rivera commented that a typical government or entity from an emerging economy country runs deficits, meaning that it does not have extra cash to subsidise supply, requiring customers to pay for everything.

Hiroki Hashizume, Professor, School of Global Studies, Tama University
He noted that he doesn't have numerical values for the question. However, as shown above, taxpayers would at some point be dissatisfied with subsidizing water supply.

Mr. RIVERA Jr. Virgilio Cervantes Manila Water Company, INC. Mr. Rivera indicated that a problem would occur if the national citizens say that they don't want to allocate subsidies, because financial resources of subsidies are paid by users.
Emerging nations, such as the Philippines, don't have excess funds (no surplus), so supply of subsidies is difficult. Users must pay for everything.

Mr. Djamal opined that subsidy is necessary, noting that it is the obligation of government. He gave the analogy of people using roads, without paying for their upkeep. Prof. Hashizume remarked that in his opinion subsidy should be limit for specific policy purposes.

Hiroki Hashizume, Professor, School of Global Studies, Tama University

Mr. Hashizume noted that his opinion concerning subsidies in his presentation was meant to express that subsidies should be used limitedly for particular policy objectives.

Mr. RIVERA Jr. Virgilio Cervantes Manila Water INC.

Mr. Riveral wanted to know about the financial structure of Japan's sewage system.

Mr. Hashizume answered that the sewage financing system in Japan doesn't depend on collection of charges, and the system has a more comprehensive structure.

Ir. DJAMAL Irzal Zeiroeoddin Jakarta Water Supply Regulatory Body

In the water supply financing, Mr. Zeiroeoddin agreed to inject more public subsidies than water charges.

Mr. Hashizume commented that subsidies should be considered separately and they should be injected for a particular purpose. He remarked that attention should be given that water financing shouldn't be looked at such that the greater the amount of subsidies, the better.

Sub-session 2: Water Tariff System

Presentation ③

"Water Tariff Setting in Asia – Jakarta Case Study "

by Mr. Irzal Zeiroeoddin Djamal, Chairman, Professional and Independent Body, Jakarta Water Supply Regulatory Body (JWSRB), Indonesia

Mr. Djamal stated that water charges were set at 5 groups plus commercial (Special Group) in 1998 in Indonesia, but they were changed to 3 groups plus 4 commercial groups. It was very hard to shift to the new system from the old system.

Mr. Djamal began his presentation and stated that under regulations introduced in 2006, customer groups are split into four customer groups based on economic situation, and two groups based on consumption. Low consumption groups receive lower and subsidised tariffs. Yearly tariff adjustment is conducted by Local Water Enterprise using an indexation formula.

In 1998, Local Water Enterprise entered into a 25-year cooperation with the private sector, giving exclusive rights to develop and manage the production and distribution of clean and potable water. The cooperation agreement stipulates the tariff as well as the establishment of an independent regulatory body.

A major problem with the tariff is that the water charge from operators increases year-on-year, while the government-set tariff remains the same. The deficit must be repaid from reserves. The PPP scheme also has some problems with increase of operating expenditure caused by higher expatriate fees, higher standards of office location, golden handshakes, technical service assistance, operators' right to index water charge every semester, and risk protection on currency exchange.

Mr. Djamal concluded by noting that water demand forecasts indicate an increasing water deficit, and he requested JICA's assistance in addressing this serious challenge.

Q&A

Mr. Riviera Jr. remarked that one difference with Manila's implementation of a PPP agreement was that it had a very transparent bidding process.

Presentation ④
"Water Tariff System in MANILA "
by Mr. Atty. Goldelio Galapon Rivera, Deputy Administrator, Financial Regulation, Metropolitan Waterworks & Sewerage System- Regulatory Office, (MWSS-RO), Quezon City, Philippines

Mr. Atty. Goldelio Galapon Rivera, Deputy Administrator, Financial Regulation, Metropolitan Waterworks & Sewerage System-Regulatory Office, (MWSS-RO), Quezon City, Philippines, began by stating that the MWSS is a government-owned and controlled corporation, mandated to develop water sources and provide water and sewage services.

In 1997, Manila entered into a PPP concession agreement. Under the agreement, the primary obligations of concessionaires are operating, maintaining and renewing the water system, and providing water supply and sewage services. They are entitled to reimbursement of expenditures prudently and efficiently incurred.

The regulatory framework aims to protect consumers from high prices and poor services, and to provide incentives to firms to invest, be efficient and earn profit. The enforcer of the concession agreement is the MWSS Regulatory Office. Its core functions are to monitor private operators to ensure that they are fulfilling their obligations, and to determine CPI, EPA, rate rebasing, FCDA, early term
ination amounts and assessment of penalties. A benchmark for performance provides incentives via rewards and penalties.

Tariff adjustments are driven by inflation, unforeseen events, five-year business plan reviews, and quarterly review and adjustment of foreign currency differential. Rate rebasing involves a thorough review of the historical and future cash flows of the concessioner.

Mr. Rivera concluded by outlining some regulatory best practices.
- Accountability by private sector service providers should be enforced.
- Business plan
- MWSS and interests of users should be aligned on the same level in the investment plan.
- The level of service should be equal to water charges.
- Establishment of 14 Key Performance Indicators (KPIs) and 9 Business Efficiency Measures (BEMs).
- Rewards and penalties based on the benchmarks for performance mentioned above and a management benchmark (for example, non-revenue water and OPEX).
- Preparation of CAPEX monitoring manual, one of the management benchmarks
- Amendment of concession agreement should be handled flexibly (for example, ratio of FOREX loss and profit, water connection charges, streamlining of charges for sewage and sanitary facilities)
- Implementation of survey by citizens for water supply services (PAWS)
- Creation of project management committee (PMC)

・Adjustment of tariff structure (Staggering of rates)
・Transparency of regulatory process
・Management for private sector service providers to the minute details should be avoided.
・Solid partnership with the public sector, the private sector, local governments, and NGOs.

Q&A

Mr. Samreth asked what the driving force was behind privatisation.

Mr. Rivera replied that the large capital expenditure can better be handled by the private sector.

Presentation ⑤
"Water Supply Utilities and Water Tariffs in Japan "
by Dr. Haruo Ishii, Professor, Faculty of Business Administration, & Graduate School of Business, Toyo University

Dr. Haruo Ishii, Professor, Faculty of Business Administration, & Graduate School of Business, Toyo University, began by defining the different types of water supply utilities, and the key laws governing them.

Local government is responsible for provision of water supplies, and water tariffs are set and enforced by local government. The charging base of water tariff is based on meter size or type of usage, and is composed of a fixed charge plus a variable charge. The fixed charge is levied irrespective of the volume of water used, and consists of cost of meter and tariff collection. The variable charge is levied depending on the volume of water consumed.

A special committee exists to review the tariff structure. In considering increasing block tariffs, the key issues to bear in mind are the long-term recession after 1993, a decrease in demand of bulk users, and expansion of ground water business towards bulk users due to prevalence of technology in membrane treatment.

Lastly, Dr. Haruo Ishii introduced the following measures to raise customers' satisfaction.
・Thorough maintenance of water supply facilities and preparation of services for 24 hours and 365 days even in the event of earthquake.
・Thorough water quality testing should be performed periodically from the source of water to the tap to provide safe and tasty water.
・Direct water supply to the third floor of a building should be promoted and awareness of users for the use of tap water should be fostered
・A greater variety of payment methods for water charges should be introduced (such as bank transfer, payment at a bank, payment at a convenience store, and payment by a credit card)
・The Waterworks Law should be amended concerning responsibility of water supply utilities and responsibility of representative person regarding installation of water-receiving tanks (because there are cases where water in water-receiving tanks is contaminated due to lack of maintenance)
・An effective and responsible system for operating water supply services should be established.

Q&A

Mr. Gamini asked what involvement the private sector has in Japan.

Dr. Ishii responded that the Japanese water supply body is almost entirely public sector.

Mr. Rivera asked what the financing structure is for wastewater.

Dr. Ishii replied that about 80% of the water tariff is set for sewage charges. Sewage operators mostly operate at a loss, so the cost burden is shared by national and municipal government.

Mr. Gamini asked how the cost of water in Japan has increased at such a low rate over the last 15 years.

Dr. Ishii replied that the inflation rate in Japan has been very low. However costs are increasing due to upkeep and upgrading of infrastructure, so the issue of how municipalities cover these costs is a key issue under discussion.

Presentation ⑥
"Cost of Water"
by P H Sarath Gamini, Project Director (GKWSP), National Water Supply & Drainage Board (NWSDB), Sri Lanka

P H Sarath Gamini, Project Director (GKWSP), National Water Supply & Drainage Board (NWSDB), Sri Lanka, began by introducing the NWSDB. The cost of water is around US$0.50 per cubic meter. The average billing rate has increased significantly over the last few years.

32% of the population do not use the national water system. In bringing water to this part of the population, innovative cost recovery systems are required. Subsidies should be paid for the poorest people. New indicators are needed to identify the poorest people by considering the actual expenditure of users. Policy makers need to be educated in order to establish effective cost-recovery systems.

Households which cannot use a systematic water supply system use water by water supply tank cars and well water, and there are costs that arise in such a case. If 15 tons of water are consumed per month, NWSDB users pay 1.9 dollars, while costs incurred from using water from water supply tanks are 50 dollars (26 times as much as the costs of NWSDB customers) and the pump costs for a well is 10 dollars (5.3-fold). If water is drawn by manpower, the cost would be 30 dollars (16-fold).

Subsidies should be paid for the poorest people. New indicators are said to be needed to identify the poorest people by considering the actual expenditures of users. A campaign for collecting charges is necessary concerning why users must pay water charges and such payment is for the convenience and interest of users, etc. Policy makers and school children need to be educated in order to establish effective cost-recovery systems

Discussion

Commentator :
Mr. Hiroyasu Saito, Senior Advisor, Overseas Services Department, Nihon Suido Consultants

Co.,Ltd

Mr. Hiroyasu Saito outlined a number of issues that are common between many different countries.

First, that it is desirable that the cost recovery principle and rate-setting procedure be clearly described in a formal policy. Second, that sound financing is essential. Full cost recovery is important for operators to operate independently; however, this principle is often distorted in many countries by the influences of politicians. The accounts of water supply services need to be separated from the municipal general accounts. It is realistic to proceed step-by-step in order to achieve full cost recovery.

Third, water rate policy and social welfare policy, in particular measures for relieving the poor, should be clearly defined, and poor people should be exempt from paying a rate for basic water usage of 10 cubic meters. Fourth, it is important to promote the voluntary management efforts of operators by creating subsidisation policies for water suppliers, in particular strict standards and expenditure limits. Fifth, guidance by central government on setting water rates is very useful. Sixth, it is essential to improve water rate collection ratio by improving unsuitable meter reading practices. Seventh, it is desirable to set up more incentives for operators by using performance indicators. Eight, water suppliers have monopoly, and therefore should make efforts to maintain and improve water services by pursuing better public and customer relations.

Mr. Saito concluded that the PPP experience of water rate setting and adjustment systems in Jakarta and Manila are very interesting and will be very useful for other participants to study and learn from.

Commentator :
Mr. Virgilio C. Rivera, Jr., Group Director, Regulation and Corporate Development Group, Manila Water Company, INC.

Mr. Virgilio C. Rivera Jr remarked that the OECD recently came up with a report on sustainability of tariffs rates, looking at tariffs, transfers and taxpayer money. Their proposal is sound for countries where government has sound financial conditions. However, the typical situation in emerging countries is that operating and capital costs must be recovered from the customer, because government funding can be too erratic to rely on.
Cost of financing is key to affordable tariff rates. Access to cheap, long-term financing is crucial to managing the tariff adjustment.

Tariff-setting policy needs to be well communicated to all stakeholders. Telecommunications, electricity, and water are all public services, and it is now a necessity to function well in this new environment and compare water to these other services.

If a government decides to engage in PPP arrangements, tariff increases should be matched by service improvements. If not, tariff increases are unsustainable. The challenge for the regulator and the operator is which should come first: the operator will prefer to raise tariffs in order to fund service improvements, while customers will prefer to pay more only once they receive improved services.

Open Discussion

Mr. Matsui posed two questions to the participants. First, he asked what the key activities or triggers are in transitioning from a vicious to a virtuous circle. Second, how can JICA or advanced utilities help in such activities.

Mr. Gamini replied by suggesting that important activities include international forums, multilateral projects and education on cost recovery.

Prof. Ishii noted that in Manila, if performance indicators are not achieved, strict penalties are applied. He asked how the situation compares in Jakarta, and whether penalties are regularly reviewed. Mr. Djamal responded that performance indicators in Jakarta are only indicators, not regulating the content of the contract. There are penalties for failing to meet performance indicators, but these penalties are very low and therefore ineffective as incentives.

Mr. Rivera Jr. stated that tariff adjustment must be market-driven, performance based and based on the principle of rewards and penalties. Regarding JICA's contribution, JICA can strengthen its cooperation with Asian water utilities. Japanese water utilities have implemented advanced technology and innovation, which Manila utilities would like to learn from and follow.

Mr. Zakaria Amin suggested that a key point is clear government policy, allowing private organisations to make realistic business plans. He suggested that JICA could help with capacity building to improve utility management.

Mr. Matsui concurred that JICA could provide capacity building assistance.

Mr. Rivera Jr. remarked that a key factor for transitioning from a vicious to a virtuous circle is leadership and political will. In Manila, during the term of Fidel Ramos, three major crises of electrical power shortage, telecommunication shortage and poor water were addressed through political will and leadership.

Summarization by Moderator

Mr. Matsui summarised the session, noting that the two concession agreements by Manila and Jakarta are unusual in Asia, where most utilities are managed by public municipalities.

The information provided was very useful, in particular regarding the structure for tariff determination. Given the specialists and experience present regarding water tariffs, good use should be made of the network provided by this forum.

The system for maintaining sustainability is to support operation by the government but not to cover deficits by the government. This doesn't mean that the government bears deficits. Subsidies are not necessarily needed. Subsidies should be kept to the minimum for a particular purpose, and it should be noted that subsidies are by no means recommended.

Also, in order for water supply utilities that have problems to take off, it was commented that following outside supports are effective, including support for formulating a management plan, and support for establishing an organization like the former Japan Finance Corporation for Municipal Enterprises. Mr. Matsui expressed his hope that water supply utilities, based on today's discussion, work on their operation to establish long-term, sustainable operation. He also asked advanced water supply utilities to give consideration on cooperation among water supply utilities and the methods of JICA's support.

Prof. Hashizume suggested continuing the practice of sharing information within the network of forum participants, and to include participants from other countries and cities not present. Mr.

Matsui agreed with Prof. Hashizume's proposal and stated that he would recommend that JICA organise further forums on the topic.

4-(7) Group 3: Safe Water and Water Quality Management

Moderator: Dr. Shoichi Kunikane, Professor, Institute of environmental sciences, University of Shizuoka

Purpose of the session

Supplying safe water is one of the most important missions of urban water service. Supplying safe water directly affects health and welfare of urban residents. In the case of Japan after the World War II, for example, increase in the rate of population with safe water supply had drastically decreased the number of waterborne diseases. Supplying water which people can drink directly from faucets is a difficult task, even in highly industrialized countries. Even when water treatment plants produce safe water, there is a possibility that it could be contaminated in the distribution pipe networks. In addition, pollution of water sources has recently become another serious and hazardous matter to be tackled.

In order to supply safe water, necessary points of consideration for the government and operators are as follows; (1) improving drinking water quality standards, (2) improving capacity to analyze and monitor water quality, and (3) enhancing capacity to instruct and enforce improvement of urban water services based on the results of analyses and monitoring .

Participants discussed about requirements for standardizing safe water, its health and economic impacts, and measures for improving water quality. There would be references to cases where safe water is successfully being supplied, including preparation of a Water Quality Safety Plan (WSP), acquisition of ISO certification on water quality, etc.

Greeting from Moderator

Prof. Kunikane welcomed the participants to the group session and added that this session is very important since it has as its purpose the sharing of experiences and lessons learned on water safety. In this session, he explained, there are five speakers giving presentations on the situation of water safety in five different countries, namely Thailand, Bangladesh, Vietnam, Pakistan and Japan.

Presentation ①

"MWA's Experience on Providing Tap Water for Bangkok "

by Mr. Jerngklinchan Jerdsak, Deputy Governor, Water Production and Transmission, Metropolitan Waterworks Authority (MWA), Bangkok, Thailand

In Bangkok, declaration of safety was issued at the time of completing a technical cooperation project of JICA. Mr. Jerdsak gave a presentation concerning the management of water quality thereafter and people's consciousness.

We would like to share experiences of supplying tap water around Bangkok, the capital city of Thailand.

Thailand is located in the Asia region and has 76 provinces. The Metropolitan Waterworks Authority (MWA) is responsible for providing tap water to Bangkok and two nearby provinces: Nonthaburi and Samutprakarn. In Thailand, the public utility organizations, such as waterworks and electricity, are under the Ministry of Interior. The MWA is also one of the public utility organizations which is a state-owned enterprise. The area covered by the MWA is around 3,200 square kilometers and the serviced area is around 2,300 square kilometers, about 73% of the responsible area with 1.9 million connections. In Bangkok, without the neighboring provinces, the MWA covers almost 90%. The MWA's production capacity is about 5.5 million cubic meters per day with the non-revenue water about 28%.

Water supply in Thailand was initiated by King Rama V in 1909. After that, Bangkok Waterworks began operations with its first service in 1914. Then, the MWA was established in 1967 by merging the water supply of Bangkok and nearby provinces for greater flexibility in administration.

Compared to that time in 1967, before the results of urbanization, the population has grown from 3 million people to 10.1 million people. The serviced area was only 240 square kilometers and there were only two water treatment plants, Samsen and Thonburi, together with water from deep wells. The total production capacity was about 0.9 million cubic meters per day and non-revenue water was well above 50%. Due to urbanization, the supply of tap water was inadequate.

Therefore, the Royal Thai Government decided to launch a comprehensive 30-year Master Plan for the water supply system and distribution to increase the water for Metropolitan Bangkok. The first Comprehensive Long-Term Master Plan covered 30 years from 1970 to 2000 for the water supply system and distribution for Metropolitan Bangkok included setting up and expansion of the Bangkhen Water Treatment Plant and expanding the transmission tunnel and distribution system to serve the area in the east of Bangkok. Midway through the Master Plan, it was found that the area in the west bank was increased more than had been planned.

Thus, the revision of the First Master Plan turned into the Second Master Plan over the period of 1987-2017. This Second Plan included the development of a new raw water canal from Maeklong River to use it as a new raw water source, setting up and expansion of Mahasawas WTP to serve the area in the west of Bangkok and continued expansion of Bangkhen WTP.

Over the past 42 years, the MWA has carried out 15 projects. The serviced area has grown about 10 times compared to the past and can supply tap water to more than 10 million people. Also, the production capacity increased about 6 times with a reduction of around half of non-revenue water. These were done with a total investment cost of about US$2.4 billion.

Recently, the eighth Metropolitan Water Supply Improvement Project has been launched to extend the reach of the MWA for the next 3 to 5 years. It aims at increasing the total capacity from 5.5 million to 6.3 million cubic meters per day, installing pipelines into the targeted no access area and extending the serviced area around 200 square kilometers to cover another 1.6 million people. This could be done by the loan from JICA about 4.46 billion yen or 1.65 billion baht.

For safe water supply and management, there is a water safety plan that is used for taking care of water quality in all the steps of the water supply chain from raw water sources to the consumer. There are two surface water sources: the Chaophraya river and the Mae Klong Dam.

For the Chaophraya River, the abstraction is about 5.2 million cubic meters per day to supply raw water to the Bangkhen, Samsen and Thonburi water treatment plants. As for the Mae Klong Dam, the abstraction is about 3.9 million cubic meters per day to supply raw water to the Mahasawat Water Treatment Plant. In order to assure the raw water quality, the monitoring program is done by: field investigation (for field testing the quality of the raw water sources), online monitoring (for continuous monitoring) and fish monitoring (for inspection for heavy metals, pesticides, and other contaminants that may be harmful to humans).

Moreover, on a national scale, the National Environmental Board (NEB) is responsible for setting up the Surface Water Standard for Pollution Control such as announcing the restricted zone for protecting the source of water supply in the Bangkok Metropolitan Region, prohibiting the installation of new factories or expansions which discharge wastewater containing toxic substances and controlling the treatment of agro-industrial wastes before discharge.

Additionally, because the MWA considers water sources reservation an important issue, it launched projects called “Revival Water Source to Natural Condition in Celebration of His Majesty the King’s 80th Birthday.” The objective of the activities in this project are to conduct public relations to make people aware of the value of water resources ad use water wisely, to arrange a network for cooperating in water conservation and also to promote the use of effective microorganisms to treat household waste water before discharge to the environment. After dealing with the safety plan for raw water sources, the next part is the water treatment plants.

Routine process control and monitoring are done in each treatment step complying with the WHO Guidelines. The MWA applies the GMP principles for plant operation practice for cleanliness and hygiene. The chemicals used in the treatment process are aluminum sulfate, polyaluminium chloride and chlorine, and other optional chemicals. As for tap water, the standard follows the WHO Guidelines for Drinking Water Quality.

For process control and monitoring, the MWA uses our testing organizations and independent auditing. The verification program such as sample testing and auditing are also done both by internal and external organizations. The next part of the chain is the distribution system. After entering the network, the water is monitored for turbidity and residual chlorine not only by direct sampling but also by online instruments for real-time inspection. There are many spots for inspection. The acquired data from both is reported as a chlorine contour, which is a tool for production management.

To encourage people to save money on bottled water, which is also a cause of environmental problems, and to build up a good image for the country’s sanitation, the Ministry of Public Health and MWA launched a project called “Water Supply is Drinkable Everywhere” in 1984. The procedure was done by setting up the committee responsible for inspecting and guaranteeing the hygiene and potability of the tap water and officially announced the water drinkable zone. In 1999, the project was completed for every zone. The continuous project, “Drinkable Tap Water” has been conducted since 1999 to ensure that the quality of tap water at the end-pipe or at customer’s places is safe. Customers are invited to attend the project and continuously inspect the water quality. If the test result meets the standard, they are given a certificate guaranteeing that the water in their places is safe to drink. The number of attendants has been on an increase and provides support for the success of the program.

Various management systems have been integrated, such as the achievement of international standards in several processes: for example, ISO 9001 in the water treatment process at the Bangkhen and Thonburi water treatment plants, HACCP certification at the Samsen Water Treatment Plant and also ISO 9001 for the scope of branch offices services and training scheme. The MWA adopted a risk management process in 2004 and is continuously improving it, such as with emergency plans for rapid variation in raw water quality and the action plan for recovery of the treatment system.

All aspects mentioned are part of the MWA’s business approaches based on the State-Enterprise Framework, which is now adopted to MWA Management Strategy. The

strategy map was developed by applying the principles of Balanced Scorecard and the Economic Value Management together. The major strategies can be categorized into four perspectives, consisting of the Financial Perspective, the Customer and Marketing Perspective, the Internal Process Perspective and the Learning and Growth Perspective Moreover, the MWA won the Outstanding Award Year 2009 in Organizational Management from the Ministry of Finance.

Thus, the MWA's success depends on many different activities and strategies. The net profit is about 32% at MWA from its income, but the water charge has not been increased in the last ten years (US$0.75 for the individual customer and US$0.50 for factories). However, the water tariff is now being adjusted since the growth of water demand is in a state of reduction as all big customers have been acquired already. Finally, all relevant strategic processes are clearly manifested in all aspects to attain the MWA's vision, mission and values.

Prof. Kunikane shared that he was very impressed by the project on "Drinkable Water Everywhere" and then introduced the second speaker from Bangladesh, **Mr. AKM Fazlullah** who gave a presentation on the water quality situation in Chittagong, Bangladesh and the measures taken by the Chittagong water authority.

Presentation ②
"Current Situations and Measures on Water Quality in CWASA "
by Mr. AKM Fazlullah, Chairman, Chittagong Water Supply and Sewerage Authority (CWASA), Bangladesh

Bangladesh emerged in 1971 after the war of independence and started its development. It is politically very volatile with decisions taken by politicians. Therefore, much of the water supply has not been able to be developed. The Chittagong Water Supply and Sewerage Authority (CWASA) was established in 1963.

The biggest challenge in Bangladesh is the huge gap between the demand and supply of water. Water is sourced from surface water and ground water. The surface water is taken from the river Halda, along which there are several ongoing projects. Due to the lack of water supply, people use pumps and other methods to get at the water, leading to the many problems. In addition, water is taken from ground water sources. The proportion of surface to ground water is 45% and 55%, respectively.

There are 78 deep tube wells (48 Deep Tube Wells under MOD-2 and 30 Deep Tube Wells under MOD-1). Due to the high iron concentration in the water (2~8 mg/l), the water has to be refined in a treatment plant, where the iron and water are separated. The river too suffers problems. The Halda river meets with the Karnaphuli which leads into the sea. In times of high tide, especially around March or April, the calcium level has been observed in 1994 and 2009 to increase due to effects of the dry season on the water levels of Kaptai Dam.

Chittagong is the second largest city, main port and commercial capital of Bangladesh. Its importance as a port and trading centre goes back to the 9th century. As per the master plan, the detailed plan area of Chittagong city including its suburbs is around 550 square kilometers. Between 1974, when it was only 77 square kilometers, and 2009, the built-up area has increased by around 614%. The present population is 3.75 million, which is estimated by 2021 to grow to 5.2 million and by 2031 to 6.32 million.

On the long history of piped water supply, it was started after 1892 when Chittagong became the headquarters of the Asam Bengal Railway Company. Pourashava established piped water supply system in 1920 and since 1963 CWASA took up the responsibility of water supply.

The ground water condition in Chittagong faces two situations: one with high iron concentration and the other with high chloride concentration. Both types have been analyzed for their usability. In the future, Bangladesh hopes to get more water sources inland so that the water source sharing will be 96% surface water and 4% groundwater. Existing facilities include two water treatment plants, deep wells and 556 kilometers of pipelines. There are also small reservoirs in different places and booster pumps in different areas.

The chronology of supply and demand shows that in 1963, the demand could be met to about 76%. However, with demand now at 500 MLD, only 40% of it can be met. The supply is about 210 MLD, so supply cannot catch up with the increasing demand. There are two types of consumers, slum dwellers and city dwellers. Sometimes, they get water from stand pipes, which are free of cost and connection from the authority is chargeable.

The water quality is checked on a regular basis. For the project, the water is analyzed every day. Every week, the water is also analyzed for the water treatment plants. The analysis shows that mostly the water quality is kept at WHO standards. The biggest challenge therefore is the wide gap between demand and supply. In addition, the high iron concentration in the ground water and the chloride intrusion in the river Halda are the key issues to tackle in water supply. Add to that are low pressure in distribution pipelines, intermittent supply and underground & overhead reservoir, as well as the installation of inline suction pumps are causes of deep concern. The high iron concentration in ground water and the pollution through chlorine in the rivers also need to be dealt with through treatment at the treatment plants.

The projected water demand for 2009 is expected at 500 MLD, 545 MLD for 2011 and 1,241 MLD by 2021. There two rivers, Halda and Karnafuli, and there are three future projects. From these projects, the forecast is that 97% of the water for Chittagong will be taken from surface water and not from ground water. Measures will have to be taken that the rivers are not polluted despite new industries not using the ETP. Another factor to consider is that the raising of tariffs is also problematic as the demand is to achieve full supply before a raise of water tariffs can be executed.

Several projects are underway with JICA on Karnafuli river for a capacity of 136 MLD and a project with the World Bank to expand the supply and improve treatment facilities. Hopefully, with these projects and expanded capacity, water supply in Chittagong will not be such a big problem.

Prof. Kunikane said that the presentation highlighted some of the major problems but commended CWASA for taking measures to tackle these.

Presentation ③
“Water Safety Plan at HUEWACO ”
by Mr. Truong Cong Nam, President – Director of Company, Thua Thien Hue Construction and Water Supply State-owned Company Limited (HUEWACO)

Thua Thien Hue Province is located in the central area of Vietnam with an area of 5,009 square

kilometers and a population of 1.148 million people. It includes Hue City and eight districts belonging to the province. HUEWACO is a state-owed enterprise established in 1909 with the total capacity today at 140,000 cubic meters. In the past the company provided water to only the urban areas, but now covers all the rural areas as well for 105 of 152 wards and communes. The number of customers is 115,000 main connections, serving about 700,000 people. In Hue City, water supply is about 99%, but in the whole province, the coverage is only 60% with a loss rate of 15%.

The WSP has been carried out patiently and continuously by the company for the past ten years. With the help of JICA and other organization, regulations and related boards for Water Safety have been set up. In particular, JICA and the Yokohama Waterworks have supported successful projects in human resources training and provision of equipment. For the project on human resources development, 17 Japanese experts were dispatched to HUEWACO for training the employees in the detection leakage and software training.

The company has built a laboratory of high quality in order to meet the analyzing requirement of water norms according to the Vietnamese Standard of the Ministry of Health. HUEWACO has also received the Quality Management System ISO9001:2000 and ISO/IEC17025 in quality analysis. The guidance handbook on implementing safety water supply has also been edited and promulgated to standardize training as well as working implementation. This guidebook can be used by many companies to improve their technology at the plants.

Another measure is the use of activated coal (to absorb the color, smell and poisonous substances), PAC, soda replacing lime, polymer and anthracite coal to enhance the performance of sediment, filter, bacterium sterilization by ultraviolet rays and javel manufacture replacing chlorine. Thanks to this, water quality has been improved, with turbidity after treatment less than 0.2 NTU. There are also projects to reduce the Fe and Mn contents and HUEWACO is analyzing methods to minimize the risks. On the facilities, there are standby generators and have machines to check the pressure and water quality inside the customers' houses. Water quality maps in the network and control of water sources have been set up. In addition, measuring machines for recording water quality have been installed, as well as a SCADA system for supervising automatic control.

The old pipelines have been replaced since the time the company was established. This means that 100 kilometers of pipeline have been upgraded from 80 to 800 millimeters. This upgrading of the system is a major undertaking. There is also an initiative to research causes and measures to overcome sediment in the supply network, especially using sponges to rinse the inside of pipelines in the whole supply network and turbidity in the supply network is now less than 0.3 NTU.

Moreover, HUEWACO has created a good relationship with the community. Every year, students are invited to come visit the plant, he surveying and collecting of customers' opinions is organized and newspapers and the Internet website are published.

The results of the program are the announcement of the water supply system at Bach Ma Tourist Area in May 2003 and in June 2005 in Hoa Binh Chuong. With the help of the Yokohama Waterworks and WHO, HUEWACO has realized a successful project in Thua Thien Hue in 2009. With these efforts, safe water supply in the whole province was declared in August 2009 on the occasion of the 100th year since the company's establishment.

However, after declaring the safe water supply, in order to maintain sustainability of the WSP,

the company faces the following difficulties and challenges:

Meeting the regulations of MOH, especially the norms of residual chlorine in the network from 0.3-0.5 mg/l is very difficult to achieve, because at present, some plants are small, old with backward technology and the operation of these plants exceed their designed capacity. Therefore, water after treatment is sometimes over 0.2NTU and attention should be given to small and retail supply networks at districts because some old pipelines of bad quality have not been replaced yet. It is necessary to execute the construction to increase pressure and to ensure a stable pressure station with less than 0.5bar in the rural areas.

Climate change is also a difficult issue as it causes the sea water level to rise. The effect of rising water levels is to overflow the dam to stem salt, so the water source can be salty. The flow slows due to the dam at the end of the source and the dam takes the water at the riverhead.

With the change of the water source quality, the following solutions have been implemented:
1. Checking all the dangers and suggesting solutions to overcome and prevent them.
2. Reinforcing the control and evaluation on happening of water source quality.
3. Installing pumping station to supplement chlorine.
4. Installing SCADA system.
5. Organizing training courses.
6. Promoting community relations.
7. Rinsing the network periodically.
8. Deploying water source reasonably to ensure safety.
9. Reducing loss rate of less than 10%, expanding coverage of water supply network from 56% to over 75% in 2015.
10. There is also a plan on water supply in the whole province beyond the central government from 2010 to 2020.
11. With continued support from JICA, continue the Water Sewerage Project in Hue City with 24 billion Japanese yen (3,560 billion Vietnam dong) to create convenient conditions for WSP and improve the situation of pollution.

Presentation ④
“Water Quality Management of Water Supply in Punjab ”
by Mr. Yusuf Salman, Deputy Secretary (Technical), Housing Urban Development & Public Health Engineering Department, Government of PUNJAB, Pakistan

The availability of safe drinking water is a basic necessity for good health. Unsafe drinking water can be a significant carrier of enteric diseases (including cholera and typhoid) and parasites, such as roundworm. Drinking water can also be tainted with other bacteriological, chemical, physical and radiological contaminants with harmful effects on human health. Therefore, it is necessary to provide quality water service, protect water quality and conserve water sources in the province of Punjab.

Punjab relies primarily on hand pumps (42%), followed by donkey pump/turbine (29%) and piped water (21%). These 21% are the “safe water.”

The global situation analysis on drinking water is that 1.1 billion people across the world lack clean, drinking water, the level of water pollution is rising day by day due to increasing consumption of water in domestic, industrial and agriculture sectors and water pollution is

responsible for 80% of all illness & death in the developing world.

In Punjab, the total population to be served is 89 million with 31.3% living in urban areas and 68.7% in rural areas. The provision of sustainable water supply to such a large population in itself is a big challenge. The responsibility of fetching water is mainly that of women and children from different unsafe sources.

As for the availability and quality of water in Punjab, Punjab can be divided into four major zones on the basis of drinking water quality:

a. sweet zone
b. brackish zone
c. barani zone
d. mixed (brackish / barani) zone

The sources of water supply include surface water, canals and springs. For underground water, water is extracted from shallow tube wells, deep tube wells and percolation wells. The total area of Punjab is over 205,000 square kilometers, of which about 53% is in the sweet zone and 29% in brackish and the rest in hilly and barani areas.

For water testing arrangements, there are public health establishments and about 31 laboratories and testing arrangements all over Punjab.

As for futuristic issues relating to water supply, there problems are: availability/scarcity of water; economic value of water; conservation of water; segregation of drinking water from municipal water supplies; Punjab water supply policy; absence of mandatory drinking water standards for public water supplies; and the lack of awareness both on part of consumers and government functionaries.

As for development and management, the issues are: increasing population coverage; ensuring of drinking water quality; operation and maintenance (lack of funding); and ensuring sustainable development.

And for governance, the issues are: lack of ownership by government departments in water supply provision; weaker role of community; administrative inefficiencies and institutional set-up; absence of cohesion between various departments involved directly or indirectly in respect of provision of safe drinking water to consumers; environmental issues; lack of regulatory framework for O&M of WSS Schemes by community; and duplication of development programs.

Financial issues are: lack of public sector funding for the WSS sector; investment for rehabilitation and upgrading; subsidy and cost recovery; and lack of private investment in the WSS sector.

The technical issues are: technical capacity of the department; treatment and re-cycling of wastewater; development of low cost techniques; and planning and development guidelines, social & treatment services and technical standards for drinking water supplies.

Lastly, monitoring and evaluation issues are: establishment of Punjab WATSAN Policy & Development Unit; development of linkages; lack of computerized database; and policy implementation.

Suggestions to improve the management and development of water supply service (WSS)

delivery mechanism are:

- Improved governance by improving managerial skills.
- Increased budgetary allocations for water supply, especially for less developed areas/regions.
- Adopting measures for adequate, equitable distribution.
- Adoption of an integrated approach, rational resource use, and introduction of efficient water supply techniques.
- Institutional strengthening, capacity building and human resource development, which is the most important.

With respect to policy and strategy, the recommendations are that:

- The main challenge is to shift from infrastructure of water supply service to provision of reliable, sustainable and affordable water supply service.
- The success of water supply programs would depend on governance issues in the sector.

On the policy framework, a comprehensive Punjab water supply policy needs to be developed in the light of prospective national drinking water supply policy which would:

- Emphasize water sector reforms, and
- Integrated water resource management linking water to Punjab development goals and protection of environment.

The future hopes for safe drinking water.

Prof. Kunikane thanked Mr. Salman for the clear presentation and moved on to the final presentation by Mr. Masayuki Miwa gave the final presentation on water quality management in Osaka talking about the previous experience in Osaka focusing on changes in the water source quality and improving water treatment methods as well as giving examples of some measures already taken.

Presentaion ⑤

"Drinking Water Quality Management in Osaka Municipal Waterworks Bureau"

by Mr. Masayuki Miwa, Manager in charge of research, Water Examination Laboratory, Osaka Municipal Waterworks Bureau

The water source of Osaka is the Yodo River System, as is the primary water source for Kyoto, Kobe and Osaka. The Yodo River is the source for six prefectures in the Kansai region and the catchment are is 8,240 square kilometers. The establishment of the modern water supply system in Japan was at the end of the 19th century. In Osaka also, the system was set up in 1895. Since then, work has been done on nine expansions to satisfy water demand and improve the social and economic conditions of the city. The present capacity is sufficient to meet the demand for 2.6 million people.

One challenge in the water quality management issue is that in the upstream portion of the catchment area, there are more than 5 million people. However, more than 11 million people use the water from the same supply. That means high susceptibility to water pollution.

In fact, the raw water quality has been deteriorating for more than a half century. Between the 1950s and 1970s due to increased industrial activity, the deterioration was most evident. However, after the 1970s, when national legislative systems were established to control the

water pollution in Japan, the water quality improved gradually. To manage the water quality, the best treatment adaptable to the source water quality was adopted. Until the 1930s, this meant filtration systems, after which Japan used chlorination, further accelerated in the following 30 years. In the 1960s, break point chlorination was adopted but a musty odor in the water developed since the 1970s and finally in 1971 the powder-activated carbon treatment method was introduced in the treatment plants. Furthermore, granular-activated carbon was introduced to the water treatment plants from 1998-2000.

These efforts aimed to improve the health of consumers. The rate of patients infected by waterborne diseases decreased with the enhancement of chlorination. Though the number of patients has grown with increased pollution, the effects of chlorination are seen to be suppressing the number. At present, the presence of waterborne disease is very rare in the city because of the management of tap water.

The use of available chlorine (HCIO) is an effective disinfectant for bacteria in water. However, it reacts with various impurities, such as organic compounds and iron rust in the pipe, consuming each other completely. Therefore, water containing HCIO is now supplied only after the breakpoint. In Japan strict turbidity guidelines are set to control sediment and filtration process. The enhancement of turbidity control prevent waterborne disease caused by parasites. The guidelines are hard to achieve and sudden changes in water treatment conditions are prohibited.

Following advanced water treatment, the musty odor was completely removed and lowered the level of THM. Besides this, organic materials also decreased to almost 60% as well as other contaminants, thus improving water safety and drinking water quality. However, there may be a limit to the capability of advanced water treatments to secure water safety in the future. There are many sewage facilities in the Yodo River system upstream but they deal only with a limited part of the supply for the downstream.

The mission of any waterworks is to provide safe and high-quality drinking water. This affects the entire system over the whole water supply system, including the water source. The OMWB conducts independent quality monitoring for its water sources and takes necessary actions in case of violations.

As for the diffusion of sewerage treatment in and around Kyoto and the changes in the three branches of the river system, since the 1970s, BOD change of industrial effluents have decreased to 10 mg/l. Based on this positive result, the OMWB has requested the construction of further water treatment plants through lobbying activities. The total BOD load in the Yodo River has decreased significantly recently, as has the ammonia load.

The relationship between the upstream and downstream of the Yodo River can be changed by conducting risk assessment and management of the water sources. The OMWB also examines parameters set on over 208 items and contaminants and uses data for these for the risk assessment. On the WSP in OMWB, the plan is based on international standards ISO22000. According to results, an appropriate monitoring frequency can be determined for each contaminant. The latest research shows that effective treatment succeeds in removing the contaminants and the system collects data on turbidity and residual chlorine concentration. Around every 30 years, the water treatment methods have been improved so the current ones can be viewed as most advanced.

Water source protection and appropriate water treatment are essential to provide safe and

good quality drinking water. Almost all conservation activities for protecting drinking water sources are carried out by METI, MHLW and MLIT as well as local governments. The local waterworks need to work in collaboration with these authorities on remaining activities for the conservation of water sources.

<< Message from WHO/WPRO>>

Ms. Yamaki conveyed a message to the session from **Mr. Terrence Thompson**, Regional Adviser in Environmental Health of the World Health Organization, Western Pacific Regional Office (WHO/WPRO).

The safety of drinking water has been a priority health issue for the World Health Organization since the first international standards were published by WHO more than fifty years ago. Today, the WHO Guidelines for Drinking-water Quality serve as a basis and point of reference for the development of national standards and national drinking water quality programmes in almost every country worldwide.

While much has been accomplished, many challenges remain to provide sustainable access to safe drinking water to all. Despite massive and ongoing investments in infrastructure and services, waterborne disease outbreaks still occur in countries at every level of social and economic development.

Since 2004 WHO, in partnership with the International Water Association (IWA) and others, has promoted a risk management approach to the control of drinking water quality. In this approach, system-specific Water Safety Plans serve as the primary tool for assessing system hazards from the catchment, through treatment and distribution, to the consumer; and for establishing practical operational monitoring systems, and planning effective and timely improvements to operations and maintenance programmes in order to manage risk.

In the Asia-Pacific region, WHO has worked with national water associations and with both public and privately held water utilities to conduct Water Safety Plan training and to demonstrate Water Safety Plans through pilot projects.

Challenges remain to expand our support for Water Safety Plans to other countries of the region. A great deal of work also needs to be done to build technical capacity for the development and implementation of Water Safety Plans in the region, and to develop and disseminate WSP auditing tools that can be used by regulators or - in a self-regulating system - by water utilities themselves.

Historically, WHO has enjoyed strong technical support from the Japanese water industry and academia in the development of the WHO Guidelines for Drinking-water Quality, and in capacity building activities benefitting many countries. WHO will continue to count on Japan as a strong partner in this important line of work. Increasingly, we are seeing more and more integration of Water Safety Plan principles in Japan's bi-lateral assistance programmes and this too will go a long way towards assisting water utilities in their quest to provide consumers with sustainable access to safe drinking water.

The message closed with congratulations and best wishes for a successful meeting.

Discussion

Commentator:
Dr. Mari Asami, Chief, Division of Water Quality Management, Department of Water Supply Engineering, National Institute of Public Health, Ministry of Health, Labour and Welfare, Japan
Dr. Mari Asami expressed her happiness at the successful efforts made in the different cities in Asia on water quality. She commended the exchange of information and hoped for continued efforts in the region towards this issue.

Commentator:
Mr. Hiroshi Sasayama, Assistant Manager for Water Quality, Kosuzume Purification Plant, Yokohama Waterworks Bureau
Mr. Hiroshi Sasayama thanked all the presenters for their impressive presentations. He pointed out several points on the purpose of providing safe drinking water. One was for the sake of hygiene and to decrease illness from contaminated water.

As for achieving safe drinking water, collaboration with environmental protection agencies is necessary to provide a safe water source. With appropriate treatment, water quality is also greatly improved. The presentations demonstrated that the technology is already present, but more can be done to improve the water quality further. Another point is on the importance of the distribution system and upgrading it continuously. The final point of note is the issue of monitoring to ensure the safety of water.

Specifically on the presentation about Vietnam, Mr. Sasayama asked for clarification on the guideline for residual chlorine levels, to which Mr. Nam responded that 0.3-0.5 mg/l is a regulation from the Ministry of Health. Mr. Sasayama agreed that it was a difficult level to maintain and therefore may be inappropriate as a regulation for water supply.

H.E. Phork Sovanrith (Cambodia) addressed the group and thanked JICA for the invitation to the forum. He explained that his ministry was responsible for the water supply in the whole of Cambodia. Due to the civil war, everything in the country was destroyed. After 1999 the rehabilitation of the country started from scratch, including the pipelines for the water supply sector. The first priority was the water supply for Phnom Penh. Before the pipelines in Phnom Penh were replaced, the quality of the water in the households was so bad that even after some treatment, the water was not safe for drinking. Thus, the pipelines were all replaced and the water quality in the water treatment plants is checked, also in laboratories. The water is sent abroad to Singapore and Australia for analysis also. As long as the new pipelines are clean, the quality of the safe water from the water treatment plants can be maintained. Now that Phnom Penh has fully potable water, other provinces can be examined. For this, investment from JICA and ADB has provided much support. However, this investment is for the setting up of water treatment plants, but it is also important to replace the old pipelines to improve water quality.

Dr. Ir Syaiful (Indonesia) as the Chairman of the Indonesian Water Supply Association thanked the presenters for their presentations and gave information on the water management system in Indonesia. Water utilities in Indonesia are owned by local governments and service about 74% of the urban areas. There are 372 water utilities in urban water supply with differing tariff levels and only few operate at cost recovery. The water treatment methods used are chemical coagulation, sedimentation and chlorine addition. However, due to the bad quality in the distribution system which cannot supply water 24 hours a day, the water quality cannot be declared to be safe drinking water. Now, there are programs to achieve safe drinking water supply through conservation of water sources, monitoring of water resources and examination

of treated water quality. There is also a project to reduce non-revenue water and change intermittent supply to continuous supply. In fact, the aim is for all water supplied to customers to be of drinking water quality

Mr. Mangalam Sankaranarayanan (India) thanked JICA for his participation in the forum also. He spoke on behalf of the technical side of the Ministry of Urban Development. The same problems are faced in India which has dealt with water quality management, surveillance and monitoring. It was suggested that monitoring should be done by independent entities, as there is a lack of collaboration among the authorities involved. There must be proper coordination to improve water quality.

As for the surveillance of the water sources, this was important for the improvement of water quality. Testing should be done at various places and as random sampling from the source to the consumer end. Furthermore, infrastructure availability is necessary since lack of lab facilities is one factor affecting the testing of water quality.

The floor was opened to questions from the audience. **Mr. Saito** expressed his thanks to the presenters and explained the contribution of the Yokohama Waterworks Bureau on the water supply in Hue. He congratulated Hue on their efforts and asked Mr. Nam on the presentation in Vietnam about the technical agreement to maintain, manage and upgrade the facilities, in particular what the plan for the future is in the field of human resources development.

Mr. Nam responded that maintaining the supply of safe water is still an issue. For the next six years, the loss ratio should be decreased from 15% to 10%. For the next 3-5 years, Hue will be directly used as a model for the continuous supply of water for the nation with an aim to increase supply from 60% to 90%. As part of those efforts, HUEWACO would like to collaborate with the City of Yokohama, based on previous experience, on the improvement of human resources. Further collaboration with universities and academia has been established voluntarily. Human resources development is integral, so HUEWACO is grateful for the support of Japan.

Mr. Jerngklinchan further expressed on the WHO standard on residual chlorine that it is a very difficult level to maintain. He asked concerning the distribution procedure how the disinfection can be managed. Mr. Sasayama reiterated that he mentioned the level of residual chlorine exactly because it is difficult to achieve in Vietnam. If the area is small, a decrease would be possible, but in Vietnam it would be almost impossible.

Mr. Fazlullah said that as water source, Chittagong has a problem of high iron concentration in the groundwater and chloride intrusion in the Halda River.

Mr. Miwa remarked that Osaka Municipal Waterworks Bureau, whose water source is the Yodo River, faces difficulty of water source contamination by upstream cities. Introducing examples of Water Safety Plans of Osaka Municipal Waterworks Bureau, he stated that drinking water should be safe and of good quality, and protection of water source and effective water treatment need to be performed to secure the safety.

Summarization by Moderator

Prof. Kunikane closed the group session by generalizing the measures for drinking water safety. He summarized the measures mentioned in the presentations into: source

protection/facility development, quality standards/monitoring and surveillance, and good operation and maintenance.

As for aspects for the improvement of drinking water safety, these include:

- water safety plans as useful and important tools for systematic water quality management from source to tap,
- international standards (ISO9001, ISO22000 and ISO/IEC17025)
- integrity of water distribution networks (intermittent supply/leakage, water quantity and distribution system)
- disinfection (preferably, tap water residual chlorine concentration should be kept at a certain level, but it is a challenge to provide drinkable water)
- “drinkable” water

In conclusion, safe drinking water supply is vital to our health. Drinking water safety can be achieved through good management and O&M. Finally, capacity building is essential for the improvement of drinking water safety.

Prof. Kunikane hoped for more opportunities to exchange ideas and experience, especially in urban water supply. With this, he thanked everybody for their attention and patience and their participation.

4-(8) Agenda 4: Public and Private Partnership on Urban Water Service and New Technologies

Moderator: Prof. Satoshi Takizawa, Department of Urban Engineering, Graduate School of Engineering, University of Tokyo

Purpose of the session

・ Background

Lately, advancement into international water supply services by private sector companies has shown remarkable progress. In Japan, management of water supply services has been performed by local governments for a long time, but water supply utilities and private sector companies have developed their systems, facilities, machines, technical development, and construction works under close cooperation. Momentum of developing business in Asia and various countries in the world by Japanese private companies has been growing for the past several years. Taking advantage of the respective characteristics of public and private entities, they are expected to develop water supply services actively in the world. Technical renovation in the area of water services shows remarkable achievements on one hand. Water supply systems are undergoing major changes, such as membrane treatment and introduction of ICT.

・Purpose

The purpose of this session was to introduce Japanese private companies that have made advancement in various countries in the world, mainly in Asia, and that are about to make inroads.

In order to make public and private partnerships successful in the area of water supply services of high public nature, it should be recognized that existence of neutral regulatory body is essential.

A project of Yokohama Waterworks Bureau was introduced as an example of introduction of new technology and public and private partnerships in Japan.

Greeting from Moderator

Prof. Takizawa welcomed the participants back to the plenary session. He noted that there were two components in the session, namely public and private partnerships (PPP) on urban water service, and the development of new technologies. Partnership between the public and private sectors is one of the key issues for urban water service. There are, however, advantages and disadvantages associated with PPP projects, including contracts and other issues. It would be useful to continue discussions on PPP from the perspective of Asian countries.

Presentation ①

“Introduction of Japanese water supply technologies and new turning to overseas business by Japanese players”

“Strategy of Japanese Water Utilities Vitalization”

by Dr. Hiromichi Sakamoto, Managing Director, Federation of Japan Water Industries., Inc.

Japan has successfully achieved a high quality of water supply services. Service coverage nationwide is more than 97%, with leakage rates in Tokyo standing at around 3%. Due to efforts by waterworks authorities people can enjoy tap water anywhere, at any time. Technical staff for water supply utilities are, however, decreasing. The number of technicians has

decreased by about 9,000 persons since 1980. A shortage of technical staff is recognized as a serious issue for the future. Replacement of pipelines and earthquake resistance are also other issues. The Revitalization Plan 2008 was launched by the Federation of Japan Water Industries, Inc., with these and other issues in mind. Japanese water industries will cooperate for both technical and managerial improvement of international water supply services by high technology. Japan's water supply services, adjusting to population decrease, climate change, etc., will serve as a valuable international reference for other countries.

Presentation ②

"Hitachi Group's Advanced Technologies Contributing to Global Water Environment Preservation"

by Mr. Takahiro Tachi, Chief Engineer, Public & Industrial Systems Division, Industrial & Social Infrastructure Systems Company, Hitachi, Ltd.

This year Hitachi will celebrate the 100th anniversary of its founding. Hitachi Group is a conglomerate that covers a wide range of businesses, employing over 107,000 employees in Asia (excluding Japan). It provides various products for the water environment, including water monitoring and control, water purification, sewage treatment, recycling and so forth. One strong point of the Hitachi Group is the use of simulation technology, for example, simulating water pollution scenarios. Another feature is integrated solutions to water supply, including a water distribution management system.

The water distribution management system consists of online and offline sections. Sensors on the water distribution network measure the real time pressure. Offline data such as demand assignment, parameter running and database updates are also used. The system features monitoring and data management through geographical interface.

In terms of Hitachi's contribution to the Asian water environment, the company has participated in 23 projects in ten countries in Asia. In water purification projects, Hitachi performs many expansions and rehabilitations of existing plants. Hitachi Group has also constructed five sewage treatment plants in Malaysia. It is also engaged in the water recycling business and has established a joint company in the United Arab Emirates for this purpose.

Presentation ③

"Hi-Technology and New-Tech and Basic-Tech for Waterworks～Membranes & Valves"

by Mr. Akio Ohkawara, Chief Manager, International Dept., Maezawa Industries, Inc.

Maezawa Industries operates a valve business and environment business for mainly the waterworks and sewage industry. One of the major products is a PTFE (Teflon) membrane used for wastewater treatment. PTFE has high alkaline resistance and excellent mechanical strengths, ensuring stable operation for a long period of time. The membrane module and membrane unit are components in water treatment equipment. PTFE membranes with excellent chemical resistance enable strong alkali washing. This system can respond to different types of troubles. There are various types of construction available, suitable for small to large-scale water treatment plants. PTFE is particularly effective in a membrane separation reactor (MBR).

Maezawa Industries produces a valve known as LO-Tm, which features vanes that break down

flows into mini turbulence. The use of the LO-Tm valve reduces the emergence of large cavity bubbles, which can cause noise pollution and reduce the life span of valves. The LO-Tm can replace two butterfly valves. The Capatech valve is another product that works by itself even in power failure situations.

Every year Maezawa Industries offers training to overseas trainees. In total 500 trainees have received training at the company and the company exports to a number of countries around the world.

Presentation ④
"PPP Projects in Water Supply Sector"
by Mr. Hisahiro Kitahara, President & CEO Japan Water Corporation

Japan Water Corporation is not a manufacturer. It was founded in 2000 to contribute to the water supply service, in anticipation of the change to the Water Law in 2002. Japan Water Corporation is a pioneer in participation in waterworks management. Following the change of the Water Law in 2002, private companies were allowed to undertake water quality assessments and to provide water quality guarantees. The company also engages in projects for design and build. Japan Water Corporation is a subsidiary of Mitsubishi Corporation and Nihon Hels Industry Corporation. Mitsubishi has a track record on participation in infrastructure projects all over the world. Nihon Hels Industry Corporation has more than 700 facilities related to water supply and sewage treatment in Japan.

In Japan one challenge is the necessity to renew and replace waterworks systems. In terms of PPP, Japan Water Corporation is seeking to engage in operation and maintenance, design and construction, financing and leakage checks, among other operations. Partnership with Japan Water Corporation has resulted in effective cost cutting effects, including in the areas of personnel expenses and operating costs.

In terms of the formulation of an optimal PPP it is important for companies to cooperate with government bodies to create the best mix for operations.

Presentation ⑤
"Introduction of Small-scale Water Supply System"
by Mr. Katsuhiro Yambe, Manager, International Engineering Department, Business Development Division, METAWATER Co., Ltd.

METAWATER was established through a merger of Fuji Electric Water Environmental Systems and NGK Water Environment Systems. There are a number of overseas offices. METAWATER is a leading company with unique products, providing services from product supply up to operation and maintenance. The ceramic membrane is a microscopic membrane technology featuring membrane filtration with a backwashing and air flush technology.

The ceramic membrane technology offers the following advantages: short construction period, high reliability, stable quality and ease of operation and maintenance. Ceramic membrane filtration also does not require highly skilled workers. Installation is a simple process and can meet all the requirements of a small-scale water treatment plant. The equipment is also very reliable, in contrast to polymeric products.

A project is currently underway in Thailand whereby water from the Ping River, with high turbidity, is being treated. Very promising results have been achieved under the project, demonstrating the usefulness of the technology in Asian countries.

Presentation ⑥
"Solution for Small-Scale Water Supply System by Use of Groundwater Technology"
by Dr. Toshiyuki Kawaguchi, Project Engineer, Water & Environmental Project, Nagaoka International Corp.

In Japan, groundwater is the major source of water in rural areas. The filtration systems for surface and groundwater are different, with surface water filtration requiring more complicated processes. Due to its simplicity groundwater treatment is the preferred option. However, the use of groundwater presents a number of problems, including land subsidence and saltwater intrusion. Groundwater supplies also tend to be high in iron, manganese and other elements, which need to be removed. For these reasons groundwater should be exploited in a reasonable and balanced manner, so as to control groundwater levels. In Japan cement pipes were the most often used pipes for intake of groundwater, but now the NAGAOKA Screen is gaining popularity, as it serves to reduce the movement of fine sand in aquifers. NAGAOKA Screens have been delivered to more than 1,000 locations in Japan and the number is increasing as our technology is adopted.

CHEMILES is a filtration process developed by NAGAOKA. It uses no chemicals, like chlorine for example, thus providing safe and low cost operation and easy maintenance. It boasts a high filtration rate and is compact and can be installed outdoors and takes up only a small area. Iron and manganese can be filtered using this method. If back filtration and the CHEMILES process are applied to wells drawing from groundwater aquifers, filtration can be implemented at low cost and easy operation.

In conclusion, by changing water sources from surface water to groundwater, better solutions can be found such as: (1) saving initial costs for total water supply system, (2) saving energy and operating costs, and (3) decreasing water leakage.

Groundwater is a cleaner and more accessible water source than surface water from ponds and lakes that need large water purification to remove algae and other materials. As the groundwater purification is a comparatively simple system, special engineering knowledge is not required for operation and maintenance.

Presentation ⑦
"Public Private Partnership in Water Supply Service by Using Performance Indicators"
by Mr. Kenei Ishii, Technical Adviser, Japan Water Research Center (JWRC)

International standards and performance indicators have been developed for water quality, through the ISO mechanism. ISO/TC224 standard contain principles, goals, evaluation, and application on a voluntary basis. Each country, however, is faced with its own geographical, economic, cultural, historical and management requirements. The Japanese standard of water supply service was published in 2005 by JWWA and the purpose of the standard is to be used in a regional vision for water supply. The distinctive feature of the Japanese Standard is its

requirements for a high level of operation and maintenance. It also concentrates on risk management, given Japan's susceptibility to earthquakes.

Since the Japanese Standard was passed more than 300 utilities have announced their performance indicators, with data being published by the Japan Water Research Center (JWRC). The publication of these indicators raises accountability of utilities to stakeholders.

Public-private partnerships in Japan are divided into three categories in Japan: operation and maintenance outsourcing, DBO and PFI. Outsourcing bodies include other utilities, private companies and public ownership companies. It would be advisable to use performance indicators in operating and maintenance contracts, including numerical values, an objective approach, and the strict definition of PI. In conclusion, PPP are contract-based and therefore should incorporate technical evaluation of performance.

Presentation ⑧

"Renewal of the Kawai Purification Plant Project utilizing the Private Finance Initiative (PFI)"

by Mr. Tomoyuki Watanabe, Manager for Kawai Purification Plant, Redevelopment, Yokohama Waterworks Bureau

The Kawai purification plant is the oldest plant in Yokohama and is in need of replacement. There is a plan to introduce the PFI method at the plant. The plant itself includes eight rapid filtration basins and wastewater treatment facilities, as well as a sedimentation basin and receiving well. It was judged that the plant did not have sufficient seismic resistance and a total overhaul was therefore required.

It was decided to introduce a membrane filtration method as this method would save space and enable the utilization of residual pressure of raw water transmission. The raw water used at the plant is sourced from a river that is the cleanest in Yokohama, making it suitable for use of the membrane filtration technology.

PFI is a business method used in constructing, maintaining/managing, or operating public facilities utilizing private sector funds, managerial abilities, and technologies, with the aim of providing best value for money. It has been decided that the PFI method will be used in the replacement of Kawai Purification Plant as a means of reducing cost and shifting risk appropriately. The Kawai Plant project has adopted a build-transfer-operation (BTO) formula, which is advantageous in terms of cost. The project is anticipated to boost capacity of the plant from 106,400m^3/day to 171,070m^3/day. The entire project is anticipated to last 25 years, from 2009 to 2033. The total cost is 26.5 billion yen with a "value-for-money" figure of 6%.

This project has attracted a great deal of attention from other organizations or companies, as an example of introducing PFI for the purification plant redevelopment project. It will create the nation's largest membrane filtration facilities, and is expected to further attract a great deal of interest. We are determined to proceed with this purification plant project to make it a successful example for years to come.

Presentation ⑨

“Large-scale Ceramic Membrane water Treatment Plant”
Mr. Yoshi Kanto, Water Next Yokohama Co.,Ltd.

Of the drinking water treatment processes in Japan the most popular method is rapid sand filtration. Membrane filtration currently accounts for only 1.6%, but is on the increase, and is the technology that will be employed in the new Kawai Purification Plant. METAWATER products (ceramic membrane) currently account for approximately one-third of all ceramic membrane plants and processes in Japan. Ceramic membranes enjoy high permeability (with low power consumption), long service life and have a low environmental impact. Ceramic membrane technology is also extremely space-saving and highly effective in extracting materials present in raw water. Super-Powdered Activated Carbon (S-PAC) is a feature of filtration technology, but using ceramic membrane technology it is possible to reduce the S-PAC dosage. In addition, it is possible to use gravity through water-level difference in the Kawai Plant and therefore avoid the need for pumps.

The new plant will also feature energy-saving measures using solar power, which, it is anticipated, will reduce energy costs by approximately one-third, thereby also reducing CO_2 emissions.

Discussion
Commentator:
Mr. Atty. Goldelio Galapon Rivera, Deputy Administrator, Financial Regulation, Metropolitan Waterworks & Sewerage System- Regulatory Office, (MWSS-RO), Quezon City, Philippines

Mr. Goldelio Galapon Rivera stated that the presentations had introduced a wide range of technologies that would improve performance. However, the question that presents itself is how can water utilities in developing countries in Asia tap these cutting-edge technologies given their financial restraints? PPP is likely to be the predominant method in the future. However, PPP has its own advantages and disadvantages.

In the Philippines the Regulatory Office of the MWSS is a new entity, having been a “child” of a PPP between MWSS and Manila Water. The success story of Manila Water is a clear demonstration of the wisdom and soundness of PPP. The public, represented by the Regulatory Office, sets the rules and the business operator provides a business plan based strictly on the rules. The PPP is market-driven and customer-oriented. Key performance indicators are also laid out and if Manila Water fails to attain these indicators then it will be penalized by the regulator.

Prof. Takizawa noted that Japanese companies are continually developing their technologies and looking for opportunities to adapt the technologies to local situations.

Mr. Rivera stated that one of the presenters had noted the impending human resources crisis in Japan and the lack of technicians. He asked about the strategy for attracting and retaining young professionals.

Dr. Sakamoto explained that Japan is currently considering this issue, particularly in view of the aging population.

Prof. Takizawa added that staff members at water utilities are expected to retire in large numbers over the next ten years. PPP could be one means of filling the gap.

Mr. Watanabe stated that the impending human resources crisis is true for every industry and the water industry in particular. He noted that PPP is one way of filling the HR gap. Training needs to be provided to younger staff from the senior staff members so that knowledge can be passed on effectively.

Mr. Sovithia (Cambodia) asked a question about ceramic membrane technology. He asked the presenter to make an investment cost comparison between ceramic membrane technology and sand filtration technology.

Mr. Watanabe explained that the facility investment costs and management costs are added together to arrive at the final total. The cost reduction gained through PPP was a 6% reduction.

Summarization by Moderator

Prof. Takizawa concluded by noting that in the morning Group Session discussions had also turned to the issue of financing and PPP.

Mr. Takizawa stated that PPP's Kawai Purification Plant was challenging. Also PPP become the key to water supply services in the world, but it is also heard that PPP has some problems in Jakarta, etc.

There are good and bad parts in PPP. It is necessary to determine the target value of management by using PI at the time of concluding a contract. Thereafter, PPP can be checked by monitoring PI whether the work has progressed in accordance with the contract.

There is no standard PPP formula that can be adapted to all cities in Asian countries. PPPs need to be tailor-made and therefore it is important to continue to exchange ideas and experience in the coming years.

Concerning high-level technologies of Japanese companies, they are positive for the development of business and technologies tailored for local situations.

4-(9) Agenda 5: Introduction of JICA's Cooperation in Urban Water Service Sector

Presentation by Mr. Fumihiko OKIURA, Director, Water Resource Management Division I, Water Resource & Disaster Management Group, Global Environment Department, Japan International Cooperation Agency(JICA)

Purpose of the session

(As reference materials, documents explaining the outline of the new JICA after the merger with Japan Bank for International Cooperation (JBIC) were distributed at the venue.)

In 2008, JICA merged with Japan Bank for International Cooperation (JBIC), becoming the second largest aid agency next to the World Bank. The merger has enabled new JICA to achieve more synergy effects among different schemes, such as loans, grants, and technical assistance projects. In this section, JICA introduced its experiences in urban water service sector, its issues, and discussed future strategies with participating countries.

Presentation

Mr. Okiura, Water Resources Division 1, JICA, delivered a presentation on JICA's activities in the urban water service sector. He also explained that he had distributed a document for reference that provided an overview of the new JICA, following its merger with the Japan Bank for International Cooperation (JBIC). He noted that the biggest point of the new JICA is its combination with JBIC, meaning that JICA is now responsible for grant aid, ODA loans and technical cooperation in a unified framework. Yen loan facilitation is largely implemented under the auspices of the "Regional Departments" of JICA. "Regional Departments" engage in close cooperation with the "Issue Departments," which include the Global Environment Department, where the Water Resources Division is located. JICA has four main strategies: (1) Integrated Assistance, (2) Seamless Assistance, (3) Promoting Development Partnerships, and (4) Enhancing Research and Knowledge Sharing.

Concerning actual results of assistance in the area of water supply (by region and by scheme), the area of water supply is a top priority issue, and Japan is a top donor in the area of water supply among DAC countries.

In terms of JICA cooperation in water supply development, the main assistance policies are:
(1) Safe and stable water supply, (2) Improve river conservation to protect lives and property, (3) Conservation of the water environment, and (3) Promote integrated management of water resources. Three key measures to realize a "safe and stable water supply" are: (1) organization of water supply facilities, (2) sustainable operation and maintenance, and (3) improvement of sanitation.

JICA's water supply projects involve a variety of aspects, such as plan formulation and design or system strengthening. Facility improvement is also supported through the provision of grand aid and yen loans for water treatment plant improvement, pipeline replacement or expansion and the procurement of equipment. Technical cooperation covers such issues as operation and maintenance and water leakage countermeasures.

JICA has implemented comprehensive assistance to restore water supply facilities destroyed in the civil war. The process for assistance was to (1) formulate a master plan for PPWSA, (2) improve the water supply infrastructure, (3) capacity development of PPWSA, and (4) project to

construct Niroth Water Treatment Plant. The entire project has incorporated technical cooperation studies, grant aid, technical cooperation project and finally a yen loan project (for the water treatment plant construction). The most important factors for success in the case of PPWSA were good governance, HRD, ownership and self-help (including the three "Fs" mentioned in the previous day's presentations). The achievements in Phnom Penh provide an instructive example of an integrated approach, which can be used as a reference for dissemination to regional cities in Cambodia.

Official Development Assistance (ODA) is provided to low income countries for water projects, and this ODA can be put to use for a variety of measures, including rapid/slow filtration, water leakage measures, hand pump wells, etc.

JICA will the integrated management of three modalities of assistance: (1) technical cooperation, (2) ODA loans, and (3) grant aid, to offer comprehensive support that organically combines such elements as policy and institutional improvements in developing countries; human resources development and capacity development; and improvements in infrastructure.

Discussion

Prof. Magara noted that in the morning session one of the groups had discussed urban water service to the poor. He asked how JICA is integrating issues of water supply and poverty in low income countries.

Mr. Okiura responded that this is a very important issue and it is one where JICA has little experience of water supply to the very poor. To date JICA's efforts have been focused on expansion of water supply capacity and reduction of non-revenue water. JICA realizes that it needs to make new efforts to tackle the issue of water supply to the poor. JICA will try to be more innovative with its cooperation in the future.

Mr. Vasudevan cited a case of yen loan cooperation from JICA for water supply service in India.

Prof. Magara explained that in developing countries a lack of funds prevents authorities from purchasing chemicals to treat water. He asked whether there was any possibility of JICA providing grants for water treatment chemicals, in view of the fact that funding is available for fertilizer.

Mr. Okiura noted that this was a difficult issue as JICA policy is not to donate consumables.

Dr. Sakamoto asked about JICA's strategy for assistance for maintenance and management.

Mr. Okiura responded that the issue of maintenance and management is tackled under the technical cooperation projects of JICA.

<Day 3>

4-(10) Agenda 6: Development of Human Resource in Urban Water Service

Moderator: Ms. Keiko Yamamoto, Senior Advisor (Water Supply & Sanitation), Japan International Cooperation Agency (JICA)

Purpose of the session

In order for a sustainable development of the urban water sector, human resource development is essential. In this session, the issues concerning human resource development in the other sessions were compiled and organized. Based on this, the session aimed to discuss ideas for future cooperation by identifying the appropriate skills, training methods and departments to be trained.

Greeting from Moderator

Ms. Yamamoto explained that human resource development is essential to face the problems of urban water supply. She noted that during the session participants would hear about the present situation regarding human resources in two countries, followed by a presentation on what can be implemented in the human resources sector, based on the discussions in this Urban Water Executive Forum.

Presentation ①

"Current Situations on Human Resources Development of MWA "

by Mr. Wirachat Olapiriyakul, Deputy Governor, Metropolitan Waterworks Authority (MWA), Bangkok, Thailand

In the past the Thai people used water from rivers, but with the growing population demand for clean water has also risen. Bangkok Waterworks was founded almost 100 years ago for the purpose of supplying clean water and to set up a water distribution system. In 1957 the Bangkok Waterworks become the Metropolitan Waterworks Authority (MWA), under the control of the Ministry of Interior. Preliminary challenges were responding to the large amount of non-revenue water. In 1970 MWA launched its first 30-year Master Plan, which included the construction and expansion of Bangkhen water treatment plant. The second 30-year plan included additional raw water sources from Maeklong Dam, among other tasks. The objectives of the Master Plan were to survey and acquire raw water sources for waterworks and distribute clean water of a world-class standard throughout the service areas.

National Waterworks Technology Training (NWTTI) was established in 1985 by the joint efforts of Metropolitan Waterworks Authority (MWA) and Provincial Waterworks Authority (PWA) with financial support from the Japanese Government through the Japan International Cooperation Agency (JICA). In terms of cooperation with JICA, in the first technical cooperation phase (1989-1994) the goals were: (1) to transfer fundamental knowledge of waterworks to the Training Center, (2) to enhance technical skills and knowledge on waterworks, (3) to build competency in manpower by the provision of training from Japanese experts to Thai staff, and (4) to set up training centers (3 centers). In the second phase (1994-1999) the aims were: (1) to build up technical and managerial staff, and (2) to set up an additional training center. As a result, advanced technologies have been transferred.

MWA has three main water production plants, serving a total of 1.9 million households with a

population of approximately 10 million persons. The MWA vision is to be a leader in providing high-quality water supply services that meet the needs of society. The mission is to provide cost-effective water supply services with high standards, up-to-date technology, and competent professionals to ensure customers' satisfaction. The three primary problems faced by MWA are: (1) water leakage management, (2) HR, KM-LO and R&D, and (3) sludge treatment. Technical assistance is being provided by JICA in the following areas: (1) water leakage management, (2) water production and sludge treatment, and (3) water distribution system including pipe network design and management.

Presentation ②

"Current Situation and Future Plan on Human Resources Development in PUNJAB, Pakistan"

by Mr. Yusuf Salman, Deputy Secretary, Housing Urban Development & Public Health, Engineering Department, Government of Punjab

There is a need to take into account our existing policies and experience with a view to achieve sustainable development. It is high time for us to enhance our efforts to facilitate the provision of basic needs to the general public. It is necessary to set realistic goals and then strive to achieve them in a sustainable and cogent manner. Institutional performance is one of the critical factors that determine development outcomes. Institutions are responsible for enforcing government policies and consequently institutional design effects of development outcomes.

It is important to consider what makes water utilities in some countries perform better than other countries. The underlying reasons for intermittent supply in Punjab are technical, organizational and financial, and are symptoms of a wider problem. A good institution framework is one that overcomes these difficulties. Needs assessment information is critical when engaging in human resources development. There are never enough resources available and it is essential to prioritize efforts.

JICA is providing support for a training center for HRD in Lahore. It is conducting training for organizational restructuring, preparation of HRD strategy, implementation of comprehensive HRD and training needs assessment, strengthening the WASA Academy, and improvement of personnel management systems, among others. The development of an adequate policy and regulatory environment is also essential.

"Human resources" is a term used to refer to how people are managed by organizations. The field has moved from a traditionally administrative function to a strategic one that recognizes the links between talented and engaged people and organizational success. The objective of human resources development is how to foster human resourcefulness through enlightened and cohesive policies in education, training and health at all levels. Key functions include; recruitment and selection, redundancy, organization and employee relations.

Human resources development is a framework for the expansion of human capital within an organization or a municipality. HRD is a combination of training and education. HRD is the structure that allows for individual development, potentially satisfying the organizations or the nation's goals. In terms of training, at the organizational level, a successful HRD program will prepare the individual to undertake a high level of work. Institutional performance is one of the critical factors that determine development outcomes.

Presentation ③

"Human Resource Development in Urban Water Service: To solve the problems facing the urban water sector"

by Mr. Kiyoshi Miyauchi, Director, Water Distribution and service connection installation, Osaka Municipal Waterworks Bureau, (Representative of Japanese Water Works Bureaus who conduct JICA training Courses)

It is essential to enhance institutional capacity through developing and strengthening human resources at each division and level of institutions in order to solve various issues. Regional utilities and bureaus are cooperating with JICA to engage in HRD programs and assess needs for the future in Asian countries. The team comprises members from JICA and the Waterworks Bureaus of Sapporo, Saitama, Yokohama, Nagoya, Osaka, Kita-Kyushu and others.

Major Japanese waterworks authorities have cooperated with JICA through the implementation of training programs. A total of six JICA group training courses and 14 regional training courses for 57 people and 46 people respectively have been held.

The training subjects in the training courses are largely technical matters. However, in order to deal with technical issues effectively, we are aware of the necessity for training on management and governance. For example, in the case of identifying and repairing water leakage it is necessary to add training and lectures on water theft and water tariff adjustment.

In terms of matching needs to training content it was the case that training in the past has not necessarily matched needs. In group training courses it is not easy to meet individual needs of participants, but efforts will be made to improve the content of training in the future. In the future, training packages could be formulated based on the needs of the target group and contents will need to be adjusted in view of the actual level of knowledge of the participants.

With regard to public-private partnerships (PPP), as there is no set formula for PPP, training could present valid formulas and pointers for implementing effective PPP. In terms of follow-up projects, it will be necessary to establish a follow-up structure. It will take some time to evaluate the results of training.

It is essential to develop human resources in order to operate water utility businesses effectively and gain the satisfaction of users. In order to establish a virtuous circle between waterworks utilities and users the importance of HRD remains the same in both industrialized and developing nations.

<u>Discussion</u>

Commentator:

Ms. Hiroko Aotake, Assistant Director, International Cooperation Office, International Affairs Division, Ministry of Health, Labour and Welfare, Japan

Ms. Hiroko Aotake noted that HRD in the water sector is essential. For the staff of local and central governments, training is also of great importance. Japan has two main schemes for ODA: technical cooperation overseas and training programs conducted in Japan. By using these two schemes effectively it has been possible to emphasize the importance of partnerships between water supply utilities. Many experts in water supply utilities have been involved in the programs.

Japan should continue to provide technical cooperation, however management and business know-how are also critical for future development. In Japan there are more than 100 indicators available to monitor the performance of water utilities. HRD systems in central governments and water supply utilities need to be strengthened. MHLW seeks to dispatch 400 Japanese staff to engage in training over a period of 10 years. MHLW would like to express its appreciation to water utilities in Japan for their cooperation in training programs.

Commentator:
Mr. Yasuhiro Kawashima, Deputy General Advisor, Planning Division, Bureau of Waterworks, Saitama city
Mr. Yasuhiro Kawashima spoke about the provision of technical assistance. The linkage between providers and recipients of HRD training is of great importance. In terms of training and HRD there is a vertical line from government to local operators. There is also a horizontal link among local operators, which are also of great importance. Both of these vertical and horizontal linkages are important.

For the three years from 2006 to 2008 the Waterworks Bureau of Saitama City provided training to 500 engineers and created various materials for training. To enhance the results of this training the Waterworks Bureau has resolved to dispatch experts overseas. After the program came to an end a final seminar was held. The greatest concern was to provide training to younger professionals. It was decided to implement a new program from 2008 to 2011 for partnership training, for which Saitama Waterworks Bureau will provide 70% of the budget. This new program is aimed at continuing training and also developing the knowledge and experience of young water-related professionals.

Commentator:
Ms. Chizuru Sato, Manager, Human Resources Development Div., Yokohama Waterworks Bureau
Ms. Chizuru Sato stated that HRD is a never-ending effort and results cannot be produced overnight, however, HRD is essential in order to strengthen institutional organization. Yokohama Waterworks Bureau has been implementing training since 1978. When it comes to international cooperation, we need to make sure that partnership is on an equal footing and that expertise is shared effectively. This is important for enhancing mutual understanding.

During 2008 we worked with the Hue Waterworks Bureau and Ho Chi Minh Waterworks Bureau and exchanged a Memorandum of Understanding for future cooperation. Yokohama City will dispatch experts and also receive trainees from Vietnam. The cost of the program is being borne by both sides. On the basis of equal partnership we were able to boost the results of training and dispatch. These cooperative efforts are beneficial not only to the receiving side, but also for the staff of Yokohama Waterworks Bureau. What is necessary in terms of policy is strong leadership, a transformation in mindset, and enhancement of motivational skills. In October 2008 JICA and JBIC merged to become the new JICA. I hope to see organic synergy between the two former organizations. I would like to stress that HRD represents an investment in the future and is essential for the continued provision of safe water.

Discussion
Mr. Rivera (Philippines) stated that HRD encompasses a broad range of systems and processes. Some operators give priority to technical development, whereas in others framework enhancement measures take precedence. One question that needs to be addressed

is which focus should be given priority.

Mr. Miyauchi responded that the situation depends from one country to another. However, JICA has so far focused on technical cooperation when it comes to HRD. Countermeasures against non-revenue water include the prevention and detection of leakage, however it is important to focus on other non-technical issues too. What is also important is a close relationship between the donor and the recipient.

Mr. Rivera (Philippines) stated that the water sector is now operating in a dynamic and globalized world. The industry faces a major challenge in attracting and motivating young professionals. One issue that needs to be addressed is salaries for professionals. Many new graduates have a great sense of social responsibility and this is something that should be harnessed and utilized.

Prof. Magara stated that the Japanese government has recently enhanced the higher education system in public policy management and many universities have developed new courses for public policy management. He noted that he had recently been appointed as a professor of public policy management, where students from a variety of backgrounds, including engineering, law and economics gather together. The most interesting issue for students is how to remobilize public utilities including waterworks, hospitals and how to respond to environmental pressures.

Dr. Khan (Bangladesh) noted that slowly a paradigm shift is occurring, where water is gradually coming to be perceived as a product. In the future it will be difficult for poor people to access water if it is viewed as a product. He asked what measures are being implemented to respond to this paradigm shift and ensure access to water for those persons who have zero purchasing power and cannot afford to pay for water supply, no matter how cheap the tariffs.

Mr. Sankaranarayanan (India) responded that water provided free of cost tends to be wasted and it is therefore advisable to charge for water. However, if charges are to be implemented it is important to raise awareness about water usage and the benefits of clean water, thus making clean what water tariffs are to be used for.

H.E Ek Sonn Chan concurred with Mr. Sankaranarayanan. He noted that nothing in the world is free. Accordingly, water should be charged for, but at an affordable cost for all people. He asked Ms. Sato about methods of transforming the mindset of trainees.

Ms. Aotake stated that the Japanese government is ready to dispatch experts and accept trainees. These efforts require greater cooperation from water utilities and the private-sector.

Ms. Sato responded to H.E Ek Sonn Chan, explaining that in Yokohama a management training program is being implemented. The training focuses on changing mindsets of middle managers. The training includes lecturers from outside, who can provide insightful information about experiences in the private sector that have proved successful.

Dr. Khan (Bangladesh) stressed that in countries where no social safety network exists there are some people who cannot afford to pay for water.

Summarization by Moderator

The training issue was revealed to be the issue to be asked the most in the area of water

supply. It was recognized that not only training on technologies but also training on the way of working, changing mindsets, and changing customs is important. As the results of presentations and discussions, it also became clear that JICA training is expected. Moreover, collaboration between human resource development projects of each country and various schemes of JICA, mutual cooperation, which is not one-sided training from donors, but reciprocal training such as reciprocal learning, becomes important. Various ideas for improving the system for human resource development were presented, including: exchange of communication via networks, long-term basic learning, and synchronization of the timing of different training programs such as objective-wise training. The moderator commented that he would like to close the session with renewed recognition on the importance of human resource development.

4-(11) Review and Summary

Purpose of the session

Discussions over 3 days at Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region were compiled and actions necessary for the achievement of sound management were clarified. Major points were incorporated into the "Yokohama Forum Statement" and activities to be held and cooperation to be extended in the future in each country were confirmed.

A draft of the above Yokohama Forum Statement which was compiled by the Secretariat by the morning on that day was distributed to participants from overseas, moderators in Japan, presenters, and commentators after the end of all-participant session, Agenda 6 "Development of Human Resource in Urban Water Service," and their comments were invited at the session of review and summary to incorporate them in the last edition.

Comments and impressions of representatives of participating countries concerning the Statement, etc.

From Vietnam, **Ms. Nguyen** emphasized that the Executive Forum had been most beneficial for the Vietnamese delegation. Water supply is an important issue for Vietnam and a great deal of support has been received from international donors. Further improvement of management, from the local to national levels, is, however still an urgent requirement. Participation in this Forum has helped the participating countries understand the situation in neighboring countries, with particularly instructive presentations being provided by Cambodia and the Philippines. Vietnam would like to suggest that an annual meeting be organized on this subject. If an annual meeting would not be possible, a video conference may be a useful means of promoting communication and maintaining momentum.

From Thailand, **Mr. Jerngklinchan** stated that the draft statement contained all of the issues that had been discussed during the course of the three-day Executive Forum. He noted that the visit to the water purification plant had been particularly informative. MWA has a history extending almost 100 years and has accumulated a number of experiences, which it would be happy to share with colleagues.

From Sri Lanka, **Mr. Balasuriya** stated that the Executive Forum had provided an excellent opportunity for interaction and information sharing. He suggested that it would be a good idea to promote networking among water utilities as a means of sharing experiences. A resource pool could be created as means of sharing ideas and good practices, which could be used to develop human resources in each country.

From the Philippines, **Mr. Rivera** stated that the diverse ideas and open exchange of information at the Executive Forum had been very beneficial. He suggested that the Forum Statement should focus more on the Millennium Development Goals, which he thought were the most important key performance indicators for the water sector. Manila Water is an advocate of PPP, and in its experience PPP has the potential to meet the goals of better water supply, in the process improving the lives of many people. Manila Water has achieved significant improvement in service delivery to customers. While this Forum is heavily focused on water, the issue of sanitation must not be overlooked, as it cannot be unbundled from the

water cycle. Human resource development is essential for Manila Water and it is very important to understand and have a focused discussion in a seminar entitled, “Human Resources Development: The Challenges for the Global Water Sector.” **Prof. Magara** thanked Mr. Rivera for his comments and acknowledged the importance of considering water supply in conjunction with sanitation.

From Pakistan, **Mr. Salman** thanked JICA for conducting the Executive Forum. The Yokohama Statement is in accordance with the aims of moving to a reliable water supply service in terms of adopting an integrated approach, institutional strengthening, capacity building and human resource development.

From Indonesia, **Mr. Djamal** concurred with Sri Lanka about the inclusion of “local governments.” He also made a number of other changes to the document. In terms of HRD, he stressed the importance of inclusion of non-technical aspects. He also concurred with the Philippines about stressing the importance of the MDGs.

From India, **Ms. Nivedita** thanked JICA for holding the Executive Forum. The Government of India’s position is generally in concordance with the issues in the Yokohama Statement. The Indian government is implementing a variety of issues in the water supply sector. A number of progressive local bodies have taken the step of drastically reducing the connection fee, which has resulted in a dramatic increase in connectivity to the water network. India looks forward to strengthening its relationship with JICA in the future. Ms. Nivedita concurred with the Philippines concerning the importance of sanitation.

From Cambodia, **H.E. Ek Sonn Chan** stated that at the beginning of the Forum Dr. Magara had stated that access to water is a human right, which is a new concept. He stressed however that nothing is free in this world and it is essential to charge for water. If the poor are well-served in terms of water and sanitation, then everyone in a country will be well served. The title of the Forum was “Enhancing Sustainability of Urban Water Service in Asian Region,” and it has been very informative. There are two criteria that are of particular importance: (1) government will and commitment, and (2) commitment at the operational level in terms of investment, service availability, quality, customer satisfaction, reliability, revenue and operation. Many challenges still remain in order to secure urban water in a sustainable way, but with efforts at the operational level it will be possible to provide water to all people. H.E Ek Sonn Chan stated that the Forum presented a tremendous opportunity to work together at the operational level and expressed his hope that the participants in the Forum would continue to exchange information via e-mail and the internet.

From Bangladesh, **Dr. Khan** thanked JICA for providing an opportunity to share ideas at the Executive Forum. Many people in Bangladesh live under the poverty line and the democratically elected government has made a commitment to provide safe water to all people in the country. With regard to the Yokohama Statement, Dr. Khan stressed that ways should be found to provide water to people who do not have any purchasing power. Regarding human resources development, Dr. Khan pointed out that Japan’s greatest resource is her people, through which various methods, such as the *kaizen* method have been developed. From this perspective, HRD training from Japan would be extremely useful. One issue that is faced, however, is a difference in mindset, culture and business practices between countries, which could impact the positive effects of HRD training. Dr. Khan suggested that it would therefore be advisable to concentrate on single projects over the long-term in order to ensure that training methods can permeate thoroughly. In addition, principles for water utilities should be introduced to ensure that they are engaging in socially responsible activities. Public-private partnerships

(PPP) are useful but have the potential to adversely impact public interest and extreme care should be taken. With regard to JICA's yen loans, these tend to take a long time to implement, and efforts should be made to expedite these loans. Dr. Khan requested that this type of forum be held on a regular basis.

Summarization of 3-day Forum by Moderator

Prof. Magara thanked the participants for their comments. He noted that many issues had been discussed over the course of three days. The circumstances for sustainable water supply in urban areas vary from country to country. It is essential that efforts continue to be made however, as water supply and sanitation contribute to great reductions in mortality and illness. He stressed the importance of efforts designed to escape from a vicious circle to a virtuous circle. With the three "Fs" (firmness, fairness, faith) in place great advances can be made, fully utilizing the knowledge and experience that is available in both the public and private sectors.

Dr. Sakamoto thanked the comment of Prof. Magara. He stated further efforts would be made to assist Asian countries continuously.

Adoption of the Yokohama Statement

The final version of Yokohama Forum Statement (as attached in Appendix 4), in which comments for revision from overseas participants were reflected, was prepared, projected on a screen and read by **H.E. EK Sonnchan**, General Director of Phnom Penh Water Supply Authority, representing participants from overseas.

After reading, agreement from overseas participants was obtained, the Forum Statement was adopted, and the Forum was closed.

Closing remarks by Mr. Shinji Yoshiura, Director, Yokohama International Center, Japan International Cooperation Agency (JICA)

Mr. Yoshiura extended his heartfelt gratitude to all participants, including those from overseas and also Japanese resource persons from water utilities and central and local government bodies. JICA is proud to have engaged in this forum together with the City of Yokohama and will ensure that the Yokohama Statement is forwarded to the relevant international water-related bodies. JICA will continue to be active in promoting measures for the enhanced wellbeing of people worldwide and the water sector is a top priority. This Executive Forum demonstrated the abundant possibilities for cooperation among various public and private organizations. In conclusion, Mr. Yoshiura extended his congratulations to all the participants and wished the delegates from the nine Asian countries a safe journey home.

5. Achievements of the Forum

In opening the Forum, 5 objectives were established as the results to be achieved. The results of presentations and discussions in each session were compiled and reported in the following.

(1) Participants confirmed the importance of formulation and enforcement of policies, improvement of operation and maintenance of facilities, and improvement of business management capacity.

As the importance of policies for the development of water supply services, the case of Japan was introduced. In Japan, there is the Waterworks Law targeting the improvement of public health in accordance with the Japanese Constitution. Based on the Law, water supply systems were developed, driven by policies of the central government, such as design criteria, water quality standards, approval and license, and subsidies and local government bonds. It was reported that policy adjustments and the regulatory role of the central government functioned effectively through the process. From India, which is said to be a federal state, the presentation was made that smooth operation of water supply on-site would be difficult without commitment and support by the central government while decentralization of authority is respected. Through these presentations, participants recognized that recognition of the roles to be played by the central government and their execution are important even if responsibility of water supply services is transferred to local governments.

In the session of policy on urban water supply, as the issues to be tackled for the development of water supply services and sanitation, they were organized into: (1) formulation of appropriate policies and their enforcement; (2) operation of water supply utilities based on high management methodology; (3) good maintenance of facilities; (4) fair partnerships between public and private sectors; (5) obtaining understanding of users on these issues of water supply services; and (6) human resources development to promote these issues.

Also, it was recognized by participants that the central government should work on water supply to low-income populations to achieve MDGs, and it is important to devise means to realize individual connection in slums from the viewpoint of business management of water supply utilities.

Concerning the importance of improving business management capacity of water supply utilities, participants recognized that water supply utilities should start with consideration on users' satisfaction first, and on that basis, users find the value of paying water charges. The mission of water supply utilities is to supply safe water needed by residents at appropriate prices at the necessary places. Water supply reduces labor and time which residents spend on water drawing and clean life is secured. Participants recognized that the results would be linked to the payment of charges by residents and to sound management which is operated on a principle of full cost recovery.

As for the measures to be taken in water supply utilities for the sound management, participants recognized, as intangible aspects, that strong leadership by top management and improvement of motivation of workers of water supply utilities are necessary. Success cases were reported, including: Cambodia, where organizational reinforcement was carried out along with execution of ODA loan projects; and the Philippines, where change of mindsets for workers was realized through privatization.

As the issue of tangible aspects which is essential for sound management, the importance of maintenance of facilities was recognized. In particular, participants shared their recognition that the promotion of measures against non-revenue water is essential. Based on the cases

presented, it was also shared that measures against non-revenue water would lead to protection of water sources and improvement of management efficiency. Also, information was shared among participants that elimination of non-revenue water would prevent the secondary contamination of water quality, and supply of safe drinking water to users could be promoted through the introduction of “Water Safety Plans” which were understood to be an effective tool in the Forum. In relation to this, in the session of water quality management, participants shared their recognition as a strong message that monitoring is important for water quality management, and it is meaningless to discuss safety without monitoring.

Concerning promotion of measures against non-revenue water, information was shared among participants, including the matters of intangible aspects such as leadership of top management as stated above, and that adjustments are necessary in plans, methods, technologies, and equipment to be used actually. In relation to tangible aspects, through presentations by the manager of a purification plant and representatives from the water supply industry, interests among participants grew concerning the latest technology to be introduced in Japan.

How would difficulties which management faces be overcome? A message was delivered that it is the responsibility of participants of the Forum to finance water supply, improve facilities, and link these efforts to services to create “a virtuous circle” Through the introduction of cases to break up “a vicious circle,” consciousness expanded among participants that sound management, led by participants in this Forum, is possible.

(2) Measures to solve current issues, centered on maintenance of water supply facilities and improvement of business management capability through yen loans (loan fund cooperation), were reviewed.

Comments and requests for JICA projects from participants of each country included assistance to water supply services in large cities. Concerning relatively large-scale supportive measures using loan fund cooperation, which became one of JICA schemes, the necessity of conducting comprehensive review including cooperation in the intangible aspects was indicated.

As a background of the above requests, it is pointed out that effectiveness of measures against non-revenue water, which were reported and discussed as a key to sound management of water supply and assurance of safe water quality, gave strong impact on participants and motivation toward development, and maintenance of facilities was enhanced for that reason. At the same time, strengthening of human resource development in this area was also requested. In implementing loan fund cooperation, more cooperation than ever, including a human development scheme, would be expected to be requested.

For example, concerning water supply services in Indonesia, which face many difficulties despite shift to privatization, participants from Indonesia approached Japan concerning the possibility of Japan’s cooperation concerning how to reconstruct the managing status which falls into “a virtuous circle.”

In the future, based on the Report and past experiences of JICA, JICA is expected to present cooperation programs to change water supply services of each country to a “virtuous circle.”

(3) A proposal was made concerning JICA projects, such as projects of accepting overseas trainees, which are necessary for executing the measures mentioned above.

Participants in the Forum are top-level counterparts for JICA projects. In exchanging opinions related to (1) and (2) above, requests for JICA’s cooperation were high not only in the tangible aspects but also in the intangible aspects, including formulation of policies,

maintenance of facilities, improvement of business management capability, and human resource development.

On the other hand, as reported in the session of human resource development, it was reported that international cooperation concerning human resource development serves as a place of mutual learning instead of one-sided action from Japan side and such cooperation also contributes to the human resource development in Japan. Mutual learning has a significant meaning for Japan, where a shortfall in human resources in water supply services would become problem in the future. Participants shared recognition that it is important to develop human resources on a continuous basis, as results would be difficult to be achieved in a short term and that it is useful to create networks for that purpose.

It was expected that the new JICA after the merger will demonstrate its capacity improvement to respond seamlessly from technical cooperation, grant aid cooperation, to yen loan, which seem to be left for more good practices to be accumulated.

In addition, although explanation was given that it is difficult to implement at the current moment, a request was made to consider a new scheme where JICA works on problems of water supply and poverty in low-income nations concerning the possibility of including maintenance costs into grant aid, such as chemical costs (agglomerating agent and chlorine agent) necessary for facilities subject to JICA water supply projects and the possibility of covering connection charges by ODA, which become necessary when expanding water supply pipes to poor areas.

Moreover, in the efforts of the new JICA, expectation was expressed from participating countries that support for water supply and sanitation could be provided as a package.

(4) Current status and issues of water supply services of participating countries were shared by Japan and overseas representatives.

Through presentations and discussions in each session, current status and issues of water supply services in each country were shared by participants. Also, in the session of review and summary, comments were heard again from representatives of each country concerning their respective matters of concern, which were incorporated into the “Yokohama Forum Statement.”

As Prof. Magara, moderator of the Forum, stated in the summary, how sustainable water supply system in urban areas works differs from country to country, but common “distress” suffered by urban water supply services in each country was shared among participants. Such distress includes shortfall of funds and personnel (including skilled workers) and difficulties in acquiring understanding and trust of users (citizens). However, participants renewed their recognition that water supply service contributes to substantial decrease in death rate and illness, and so, consistent and continuous efforts are essential and that water supply is the service that is worth making such efforts.

In particular, Japanese participants recognized that Japan’s experiences and technologies could contribute to the development of water supply services of participating countries while they learned about the current status of participating countries from overseas and shared same issues with them in the Forum.

（5） Through introduction of Japan’s water supply services and water supply industries, participants shared their recognition toward Japan’s water supply technologies.

Concerning Japan’s water supply services, as a representative of Yokohama Waterworks Bureau presented, process of development of water supply policies and technologies and overcoming of difficulties were reported. At present, a shift has been occurring from the era of developing facilities to the era of maintaining and renewing facilities, and a large shortfall of human resources is expected.

It could be indicated that high level of execution capabilities and technologies concerning measures against non-revenue water (measures against water leakage) in Japan would make it possible to solve problems which overseas participants are facing.

In the session of partnership between public and private sectors, high level of technologies of Japanese private companies were introduced and it was conveyed that they are positive for the development of business and technologies tailored for local situations. Participants from each country deepened their understanding toward Japanese companies.

Also, during the period of Forum, panels of each company were displayed concurrently, so each company could answer questions from overseas participants during intervals. For Japanese private companies, the Forum helped them understand the current status and issues of each country and the Forum also served as a useful reference for them to provide more practical technologies, including support of technical cooperation to be extended by JICA.

6. Conclusion of "Yokohama Forum Statement"

The executive leaders of water supply services from 9 countries in Asia, Bangladesh, Cambodia, India, Indonesia, Pakistan, Philippines, Sri Lanka, Thailand and Viet Nam, gathered in Yokohama, Japan from January 20th to 22nd, 2010 at the Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region, co-organized by Japan International Cooperation Agency (JICA) and City of Yokohama.

The participants, including Japanese resource persons from academic institutes, water-related organizations, the central government, local governments and JICA, discussed issues on the urban water service so that they could learn each other's experiences as lessons to be shared for the improvement of the service in each of participating countries.

The leaders of each country have been making good efforts for the betterment of water supply in various ways as reported in the Forum. Japanese Official Development Assistance (ODA) has been extended to the urban water sector through ODA loans and technical cooperation projects, both of which are now handled by JICA since October 2008. Japanese water utilities of local governments, together with the public and academic institutes, have been cooperating in the Japanese ODA projects. All of the Forum participants, including those from Japan, earnestly wish the water supply is to be facilitated in a sustainable manner for the people in each country by utilizing all of their efforts in addition to the outcome of Japanese ODA projects.

On the last day of the Forum, the participants agreed to let every stakeholder know that they discussed the following issues, measures and actions to be taken into account for and with the people.

1. In the era of rapid expansion of urban population, the urban water service, facing explosive demands by the people, is to be improved not only by the water utilities but together with the strong commitment of central and local governments.

In general, urban water supply is provided as local government service not only in Japan but also developing nations except some regions, but in many cases water supply networks designed and installed during the colonial age are being used by adding new pipes. Inefficient conditions exist due to water leakage caused by obsolete facilities, and water supply to rapidly-growing urban population is not sufficient. It is essentially ideal to establish self-supporting system (full cost recovery), including renewal of facilities, through revenues from water charges, but such systems have not been achieved in many regions. Participants confirmed that execution of consistent policies by the central government and local administrative bodies (in case of a federal system, in particular) play an important role for the realization of this idea.

2. Our target is to transform the service system from "vicious cycle" to a "virtuous cycle" that consists of investment, service of availability and quality, customers' satisfaction, reliability, revenue, operation and maintenance. It is reassured of the importance of human resource development from top manager to frontline workers with clear motivation and vision.

Participants discussed factors that trigger the transition to "a virtuous circle," where one solution links to other solution from "a vicious circle" where one issue caused other issues in various aspects of urban water supply services. Amid difficult business conditions of water supply utilities of each country, a presentation was made concerning Cambodia, where the percentage of non-revenue water has declined to 10% or less over 10 years or so although previously 70% of water supply had been non-revenue water. Participants confirmed that it is necessary to link the objective of water supply management to motivation of human resource development to

effectively use facilities which have been developed and to properly cope with growing demand for water resources. Also, a presenter from the Philippines reported the case where water supply areas were expanded to include poor areas on the occasion of privatization. They carried out measures against non-revenue waters and linked their practices to ”a virtuous circle,” such as improvement of revenues.

An indispensable factor in these processes is to clarify awareness of the purpose of human resource development and the usefulness of human development through public and private partnerships and international cooperation was pointed out along with appropriate management within organization.

3. The Japanese experience on the mechanisms of national subsidy and local bond for water supply system, legislation for safe water supply, standardization of water quality and so on was introduced for the consideration by the participants, although it is also shared that the way of improvement may differ country by country.

Each participating country is promoting water supply based on policies in response to respective circumstances, but in some cases effective measures are difficult to implement. Participants recognized that Japan’s experiences of serving water supply nationwide and achieving extremely low water leakage rate would be helpful when each participating country formulates more practical policies. Also, it was reported that each country made efforts to overcome the particularities of each country, which include: Cambodia, which successfully developed the water supply system over a short period of time after devastation of internal conflicts; India and Indonesia, which must cover vast national land; Bangladesh, Pakistan, and Sri Lanka, which are obliged to put priority on welfare of the poor; The Philippines, where water supply to poor areas got on track on the occasions of privatization; Thailand, which, like Japan, must give considerable attention to maintenance costs; and Vietnam, in which declaration of water safety was achieved. These presentations provided much stimulus for participants mutually and they renewed their recognition that improvement should be made on a daily basis as responsibility of water supply utility.

4. It is reported that the outcome from the measures against non-revenue water (NRW) proved that it might be more economical than the cost of new water resource development, while the target rate of NRW is to be appropriately decided in each area so that the users would agree to the measures based on their willingness to pay.

It is considered that the importance of facility maintenance was shared by participants, more than development of new water sources and construction of new facilities. In particular, importance of measures against non-revenue water gave a strong impact on participants from presentation of cases; in India, where measures against non-revenue water are comparable to development of water sources; and in Cambodia and the Philippines, where measures against non-revenue water are linked to improvement of business management. Also, participants confirmed that elimination of non-revenue water prevents secondary contamination and is consistent with the “Water Safety Plan” of WHO, which was also understood to be an effective tool in the Forum.

Concerning promotion of measures against non-revenue water, information was shared among participants that adjustments are necessary in plans, methods, technologies, and equipment to be used actually, including the matters of intangible aspect such as leadership of top management. In related to the tangible aspect, water supply technologies were introduced by representatives from water supply industries in Japan, which deepened understanding of

overseas participants.

Participants renewed their recognition on the importance of measures against non-revenue water as one of the benchmarks for the question of where the first “trigger” should be set up to aim for sound management of water supply services and shift from a vicious circle to a virtuous circle regardless of public or private sector management. It is significant that actual effectiveness of measures against non-revenue water came to the fore. In the future, it is expected that actions will be taken for the objective tailored for circumstances of each country.

5. The issue on the water for the poor should be considered not only from engineering viewpoints but also from sociological aspects for the welfare of people. The mobilization of the slum dwellers and the cooperation with NGOs might be a choice in spreading water service throughout slum communities, although the connection fee remains as an obstacle to be overcome in any ways. A participant commented that JICA could deepen a bit more involvement in poverty reduction field in order to bring much better result.

Participants confirmed that ”water” relates to a basic human right to live and further efforts are needed by all people, including beneficiaries, to maintain and develop a sustainable water supply system.

From India and Sri Lanka, presenters reported cases where pervasion of water supply in poor areas was realized through cooperation with NGOs. In particular, a case was highlighted whereby residents who previously felt that “they were ignored by the government” showed eagerness to participate in society in the wake of installation of water supply system. From the Philippines, a presenter reported that expansion of service scale including individual connection to poor areas through privatization of water supply services led to improvement of management. In either case, participants recognized that inviting the involvement of water recipients’ communities is important.

6. Each country has been tackling to establish the fair and appropriate water tariff system to be accepted by target groups. A participant said the taxpayers’ understanding is essential for the introduction of subsidy, although it might be necessary for the better infrastructure. The way of public-private partnership (PPP) is to be carefully scrutinized whether it fits the socio-cultural background of the area because it may directly affect the service for the customers. It is recommended that a concrete set of performance indicators (PI) is applied for the concession contract.

Shared recognition is considered to be fostered in that a management method where understanding toward customers and their satisfaction come first would lead to success regardless of public or private sector management In conducting practical business evaluation and management diagnosis, monitoring through “PIs (Performance Indicators)” is effective, which has been reviewed by each water supply utility and is being applied.

In the Forum, although time to reach detailed discussion was insufficient, PIs can be used as a simulation of future business plans for new expansion by each water supply utility in addition to the use by regulatory bodies of water supply services. In the future, if comprehensive technical cooperation projects for shift to “a virtuous circle” of water supply management take place, needs for further specific and detailed PI monitoring methods are considered to be generated.

7. The water supply volume has been considerably increased in Asian Region. The focus is gradually shifting to quality. It is highly evaluated that “Water Safety Plan” of WHO has been contributing to the water quality management from source to tap. Safe water that is supplied through integral water distribution network is vital to our healthy life

including disinfection.

After issuing the “Water Safety Declaration” for water supply users, each water supply utility has difficulty in maintaining its water quality level. Under such circumstance, some cases were recognized in which “Water Safety Plans” of WHO are incorporated into business to cope with such problems. “Water Safety Plans” are the methods of reducing risks of a water system as a whole and prevent contamination to secure safety of water which users drink. Once business starts rotating, persistent efforts are required to improve further, and it was recognized that PDCA cycle is a powerful basic tool for water supply services whose scope of responsibility includes the health of users.

In the presentations and discussions by participants, discussions took place while striking a balance between securing of ample amount of water and assurance of good water quality, which are the objectives of the water supply sector. It often happens that too much priority is placed on securing water amount and efforts are directed toward supply of non-safe water. However, by taking measures where securing of water amount is linked to measures against non-revenue water, such measure was understood to positively affect safety of water quality.

Also, participants shared their recognition that monitoring is important for water quality management, and it is meaningless to discuss safety without monitoring.

8. It is explained that JICA has been so integrated to deal with Yen Loan, grant aid and technical cooperation as a single aid agency that it is able to execute the development program seamlessly from the stage of survey to that of actual implementation regardless of grant or loan.

In the Forum, it was expected that study would be made on measures to be taken to solve current issues, mainly improvement of maintenance of water supply facilities established through yen loans (Japanese ODA loan fund cooperation) and their business management capacity. Among comments and requests for JICA projects from participants of each country, many comments and requests relate to assistance to water supply services in large cities. When considering large-scale projects which cannot cope with grant aid, they seem to keep cooperation in developing and maintaining facilities in mind upon understanding the importance of sound management of water supply utilities and the importance of measures against non-revenue water, which becomes the base of assuring safe water quality. Also, not only the matters of tangible aspect such as facility development but also of cooperation in human resource development is requested for the improvement of business management capability even in case of privatized water supply services.

In addition, although explanation was given that it is difficult to implement at the current moment, requests were heard toward a new scheme to include maintenance costs into grant aid, such as chemical costs (agglomerating agent and chlorine agent) in JICA’s water supply projects and the possibility of covering connection charges by ODA when expanding water supply pipes to the poor, which was covered in one sub-session in the Forum.

Moreover, the new JICA after the merger is expected to demonstrate its capacity improvement, which allows it to respond seamlessly from technical cooperation, grant aid cooperation to yen loan, in more specific ways.

9. It is recognized that JICA human resource development program should be reinforced with mutual understanding to cope with ever increasing needs of water supply sector in Asian region. It is suggested that the program will be connected more closely with the on-going projects on site. It is reconfirmed that an action for human resource development is the most indispensable to be taken for any of the issues we are facing.

It was remarked that all of the processes in water supply services are checked to secure fair supply of safe water and every possible measures need to be taken, and to that end, JICA is requested to provide human resource development program on both the tangible and intangible aspects, such as formulation of policies closely linked to projects on-site, method of maintaining facilities, and improvement of business management capability.

On the other hand, human resource development is not one-way assistance from Japan, but it provides the opportunity to learn mutually. Participants recognized the importance of capacity building in Japan, where shortfall in human resources in water supply services could become a problem in the future. Participants shared recognition that it is important to develop human resources on a continuous basis as results would be difficult to achieve in the short term, and it is useful to create the networks for this purpose.

10. It is recognized that sanitation issue is also important to be taken into consideration in terms of MDGs.

Water supply services are an important area in the Millennium Development Goals (MDGs) and effective measures cannot be realized if sanitary issues are cut off. It was expressed that each participating country should consider water and sanitation as a package and JICA's contribution to this area is highly expected.

11. The Forum concluded that it encourages the partnership and continuous dialogues among the region interactively, from the policy level to the project level, not only government-to-government, but also government-to-utility domestically and also utility-to-utility internationally. All of the stakeholders including associations of utilities are welcomed into such a partnership.

It was shared among participants that challenge to improve water supply services involve efforts and cooperation of not only one water supply utility but also all stakeholders, including governments, public organizations, and the private sector. Also, taking the opportunity of this Forum, the effectiveness of sharing knowledge and experiences which are mutually available among water supply utilities was confirmed even internationally. Moreover, it was assured that multinational networks help solve issues in each country more promptly and that separation from "a vicious circle" and shift to "a virtuous circle" becomes possible.

It is considered that Japan's experiences, high level of execution capacity, and technologies concerning measures against no-revenue water (measures against water leakage) in particular, enhance expectation toward Japan's cooperation in solving problems which each participating country faces. Along with the panel exhibition at the venue of Forum, the session through partnership between the public and private sectors, in which Japan's water supply industries were introduced, provided a good opportunity to know high level technologies of private companies. Also, Japanese companies are considered to show their positive attitude to overseas participants in providing technologies and developing business tailored for local situations.

Technical cooperation based on mutual partnerships between Yokohama Waterworks Bureau and Thusa Thien Hue Construction and Water Supply State One Member Company Limited (COWASU) is an approach in which "mutual learning," the underlying idea of the Forum, is materialized. Future progress and the sharing of results are expected.

12. It is proposed that the Forum would meet again in near future bringing in the results of practicing what were discussed in this Forum.

Through the Forum, information, which serves as a useful reference, was shared among participants, including good and bad practices of other countries. In the future, each country is expected to take actions in response to respective national circumstances. Moreover, it is considered to be effective to compile practices of each country intensively issue-by-issue and to share such information.

(Summary)

It was understood that water supply projects which have been promoted in Japan based on policy-driven are not necessarily effective only in Japan. As policies concerning financing water supply projects, provision of subsidies, introduction of private funds, and request for support from overseas donors can be listed, and it was shown that the purpose of water supply projects can be achieved through systematic use of legal system of each nation, policies to materialize the purpose, and various regulations. In one case, the way was opened by strong leadership and in other cases, the way was opened driven by policies. The important point is that in all cases interests of users were placed in the center. In the future, further financing, improvement of related legal systems, and collection and sharing of practices seem to be effective. Also, introduction of private funds and technologies in this area and the utilization of ODA seem to be effective under limited budget. On the Japan side, it is necessary to study some devices to conduct more effective and efficient cooperation.

Through presentations by each country, it was assured that water supply utility of each region can be developed in accordance with respective regional characteristics by establishing laws necessary for the development of water supply services, promoting support systems by governments, building trust of users by securing appropriate charges and water safety, and promoting a 24-hour water supply system, enhancing consciousness of workers who are proud of trust of customers and using the know how of private companies, etc.

It was recognized that we, the participants, are responsible for making capital investment, supplying water stably (quality service), winning customers' satisfaction and confidence, and shifting a series of flows, from revenues to maintenance, to a virtuous circle.

The Forum brought together participants from each country and representatives from Japanese government, university and industy in water supply services; detailed information was exchanged, and human networks widened. It was proposed that partnership would be promoted in the future to work on through concerted efforts of representatives of Japan and Asian nations regardless of public or private sector. For "securing safe water," consensus on working on through concerted efforts of representative from both Japan and Asian nations was deepened, and in particular, the Forum served as a great step for JICA in bolstering cooperation in the area of water supply through promotion of collaboration between financial cooperation and technical cooperation.

Since the Forum was co-organized by JICA and Yokohama City and attended by many representatives from the private sector, discussions, which served as a useful reference mutually among participants, took place concerning: (1) sharing of awareness of issues concerning water supply utilities and strengthening of partnership; (2) concretization of perspectives concerning public-private partnership; (3) promotion of understanding on minimum technical standards to be satisfied; (4) management of water supply utility, and other topics. Concerning improvement of water supply services, the importance of human resource development in all aspects of business, from management to water supply sites, was confirmed. It was also confirmed that enforcement and buildup of various partnerships would be linked to improvement of training programs that directly connect to improvement of organizational capability of water supply utility, and the "Yokohama Forum Statement" was adopted.

7. Review and Summary

Prof. Yasumoto Magara
President, Tokiwamatsu Educational Foundation,
Honorary professor, Center for Environmental Nano & Bio Engineering in Hokkaido University

Needless to say water supply services which allow us to obtain necessary and quality water at any time at any place is indispensable as infrastructure so that all people live healthy and comfortable lives and society enjoys sound and sustainable development. Also, sanitation measures must be taken in a sanitary manner for night soil and various other types of wastewater generated as a result of using safe and abundant water so as not to give excessive load to the environment. Water and sanitation are certainly top priority issues for all nations and regions. Because of this, since the 1970s the Japanese government, with many countries and international organizations, has carried out projects for water and sanitation as ODA projects of highest priority.

As for water supply services in Asian nations, such services have reached many people compared to those in African nations. It goes without saying that this is the outcome of sincere efforts exerted by ODA donors, among which Japan plays a leading role, and Asian nations themselves. However, global economic recessions since the 1990's have hampered the sound and sustainable development of water supply services. Moreover, pressure of population increase, population migration to urban areas in particular, spurs the formation of slums of poor infrastructure, and concern is increasing further over social phenomena that even threaten human dignity. Under economic recession, water supply utilities in many cities and regions are struggling for vicious cycle of management which accelerates downgrading of services triggered by decreased revenues from water supply services. However, even under such difficult circumstances, some water supply utilities are solidly carrying on fair water supply services based on the significance of their services. We must learn the lesson that all persons concerned from public and private sectors should share experiences and knowledge of each and promote the sustainable development of water supply services with the participation of service users.

I assure that the Forum renewed our recognition that many experiences and much knowledge are shared by water supply utilities in Asian nations. Based on water supply projects which had been jointly promoted between countries, it is expected hereafter to establish a system to promote collaboration among Asian nations and the scheme to support such promotion in the future.

Annex

Annex 1

Bangladesh
Mr. FAZLULLAH A. K. M.
Chairman
Chittagong WASA

Mr. BANIK Nanda Dulal
Commercial Manager
Chittagong WASA

Mr. HASAN Syed Mahboob
Additional Secretary
Ministry of LDRD & Cooperatives

Dr. KHAN Md Nurul Alam
Deputy Secretary
Economic Relations Division

Cambodia
H.E. EK Sonnchan
General Director
Phnom Penh Water Supply Authority

Mr. SAMRETH Sovithiea
Director
Plan & Project Department
Phnom Penh Water Supply Authority

H.E. PHORK Sovanrith
Secretary
Ministry of Industry, Mines & Energy

India
Ms. Elapulli Parameswaran NIVEDITA
Director
Water Supply, Local Self Government
Ministry of Urban Development

Mr. Rangamani Vasudevan
Chief Engineer
Kaveri Zone, Bangalore Water Supply & Sewerage Board

Mr. Mangalam SANKARANARAYANAN
Deputy Adviser (PHE)
CPHEEO, Ministry of Urban Development

Indonesia
Ir. DJAMAL Irzal Zeiroeoddin
Chairman
Profesional & Independent Body - Jakarta Water Supply Regulatory Body (JWSRB)

Ir. HANDHAYANI Sarwo
Assistant for Development & Environment
Regional Secretary
Jakarta Capital City Government

Ir. ZAKARIA AMIN Tamin Mangkupraja
Director of Water Supply Development
Directorate General of Human Settlements
Ministry of Public Works

Dr.Ir. Syaiful
Chairman of Perpamsi
Indonesian Water Supply Association (PERPAMSI)

Mr. Haryadi Priyohutomo
President Director of PAM JAYA

Mr. Suhardi
Staff, PAM JAYA

Pakistan
Mr. Yusuf SALMAN
Deputy Secretary (Technical)
Housing Urban Development & Public Health Engineering Department
Govt. of Punjab

Philippines
Mr. RIVERA Goldelio Galapon
Deputy Administrator
Regulatory Office
Financial Regulation Area
Metropolitan Waterworks & Sewerage System

Mr. RIVERA Jr. Virgilio Cervantes
Group Director
Regulation and Corporate Development Group
Manila Water Company, Inc.

Ms. CAONG Shoebe Hazel Batingal
Business Zone Manager
Business Group-Mandaluyong BA
Manila Water Company, Inc.

Sri Lanka
Mr. BALASURIYA WEEBADDAGE Ranjith W. B.
Additional General Manager
Northern & Central Division
Head Office, Ratmalana, National Water Supply & Drainage Board

Mr. PARANA HEWAGE Sarath Gamini
Project Director
Greater Kandy Water Supply Project
Water Supply Division
National Water Supply & Drainage Board

Mr. KODIKARA Sumanasiri
Engineer
Non Revenue Water
National Water Supply & Drainage Board

Thailand
Mr. JERNGKLINCHAN Jerdsak
Deputy Governor
Water Production and Transmission
Metropolitan Waterworks Authority

Mr. OLAPIRIYAKUL Wirachat
Deputy Governor
Engineering and Construction
Metropolitan Waterworks Authority

Mr. KHEOLAMAI Buntoon
Director
Waterworks Business Training Department
Metropolitan Waterworks Authority

Ms. WANGKUAKUL Ratchaneekorn
Senior Training Officer
Waterworks Business Training Department
Metropolitan Waterworks Authority

Ms. PUNTHONG Parichat
Engineer 6, Water Production and Transmission
Metropolitan Waterworks Authority

Viet Nam
Ms. NGUYEN Hue Thi Bich
Deputy Director General
International Cooperation Department
Ministry of Construction

Dr. NGUYEN Thang Ba
Director
Colledge Of Urban Works Construction
Ministry of Construction

Mr. TRUONG Nam Cong
President-Director
Thua Thien Hue Construction and Water Supply State One Member Company Limited

Dr. TRINH Lai Xuan
Chief, Board of Science and Technology
Vietnam Water Supply and Sewerage Association

Annex 2

Keynote speech
Prof. Norihito Tambo
Professor Emeritus of Hokkaido University,
Former President of International Water Association (IWA)

Moderator
Prof. Yasumoto Magara
President, Tokiwamatsu Educational Foundation,
Professor, Center for Environmental Nano & Bio Engineering in Hokkaido University

Mr. Ikuo Mitake
International Director, International Division, Japan Water Works Association (JWWA)

Mr. Kenei Ishii
Technical Adviser, Japan Water Research Center (JWRC)

Mr. Kazushi Hashimoto
Councilor, Japan Water Forum, (Executive Advisor, International Division, Yachiyo Engineering Co., Ltd.)

Mr. Yoji Matsui
Director, Training and International Department, Japan Water Works Association (JWWA)

Dr. Shoichi Kunikane
Professor, Institute of environmental sciences, University of Shizuoka

Prof. Satoshi Takizawa
Department of Urban Engineering, Graduate School of Engineering, the University of Tokyo

Ms. Keiko Yamamoto
Senior Advisor (Water Supply & Sanitation), Japan International Cooperation Agency (JICA)

Presenter
Mr. Takafusa (Sombo) Yamamura
Counselor, Japan Water Forum
Ms. Kaoru Kawana
Director for Business Planning, Yokohama Waterworks Bureau

Mr. Koichi Suzuki
Deputy General Manager, Global Consulting H.Q. Strategic Business Unit, Oriental Consultant Co.,LTD.

Mr. Hiroshi Hirowatari
Assistant Manager, Construction Planning Division, Water Supply Department, Water Works Bureau, City of Kitakyushu

Mr. Hiroaki Sasaki
Director, Water Supply Section, Water Supply Division, Bureau of Waterworks, Tokyo Metropolitan Government

Prof. Hiroki Hashizume
Professor, School of Global Studies, Tama University

Dr. Haruo Ishii
Professor, Faculty of Business Administration, & Graduate School of Business, Toyo University

Mr. Masayuki Miwa
Manager in charge of research, Water Examination Laboratory, Osaka Municipal Waterworks Bureau

Dr. Hiromichi Sakamoto
Managing Director, Federation of Japan Water Industries., Inc.

Mr. Takahiro Tachi
Chief Engineer, Public & Industrial Systems Division, Industrial & Social Infrastructure Systems Company, Hitachi, Ltd.

Mr. Akio Ohkawara
Chief Manager, International Dept., Maezawa Industries, Inc.

Mr. Hisahiro Kitahara
President & CEO Japan Water Corporation

Mr. Katsuhiro Yambe
Manager, International Engineering Department, Business Development Division, METAWATER Co., Ltd.

Dr. Toshiyuki Kawaguchi
Project Engineer, Water & Environmental Project, Nagaoka International Corp.

Mr. Tomoyuki Watanabe
Manager for Kawai Purification Plant, Redevelopment, Yokohama Waterworks Bureau

Mr. Yoshi Kanto, Water Next Yokohama Co.,Ltd.

Mr. Fumihiko OKIURA
Director, Water Resource Management Division I, Water Resource & Disaster Management Group, Global Environment Department, Japan International Cooperation Agency(JICA)

Mr. Kiyoshi Miyauchi
Director, Water Distribution and service connection installation, Osaka Municipal Waterworks Bureau, (Representative of Japanese Water Works Bureaus who conduct JICA training Courses)

Commentator
Mr. Kouki Azuma
Director, Water Supply Planning Guidance Office, Water Supply Division, Health Service Bureau, Ministry of Health, Labour and Welfare, Japan

Ms. Isa Imazato
Because Institute Co., Ltd.

Mr. Hiroyasu Saito
Senior Advisor, Overseas Services Department, Nihon Suido Consultants Co.,Ltd

Dr. Mari Asami
Chief, Division of Water Quality Management, Department of Water Supply Engineering, National Institute of Public Health, Ministry of Health, Labour and Welfare, Japan

Mr. Hiroshi Sasayama
Assistant Manager for Water Quality, Kosuzume Purification plant, Yokohama Waterworks Bureau

Ms. Hiroko Aotake
Assistant Director, International Cooperation Office, International Affairs Division, Ministry of Health, Labour and Welfare, Japan

Mr. Yasuhiro Kawashima
Deputy General Advisor, Planning Division, Bureau of Waterworks, Saitama city

Ms. Chizuru Sato
Manager, Human Resources Development Div., Yokohama Waterworks Bureau

Consultant members
Dr. Shigeru Sugawara
Director, Human Resource Development Department, Japan International Corporation of Welfare Serivces

Ms. Kyoko Yamamoto
Programme Coordinator, Human Resource Development Department, Japan International Corporation of Welfare Serivces

Mr. Naofumi Owada
Programme Coordinator, Human Resource Development Department, Japan International Corporation of Welfare Serivces

Ms. Yurie Takeda
Programme Coordinator, Human Resource Development Department, Japan International Corporation of Welfare Serivces

Annex 3

Day 1 (Wednesday, January 20)

9:30 Opening
Opening remarks by:
Mr. Eiji HASHIMOTO, Vice President of JICA
Ms Fumiko HAYASHI, Mayor of Yokohama City Government

10:00 Keynote Speech
" Modern and Post Modern Civilization From 1 to 10 Billion World "
presented by Prof. Norihito Tambo, Professor Emeritus of Hokkaido University, Former President of International Water Association (IWA)

(11:00-11:15 Coffee Break)

All-Participant Session:

11:15-12:45
Agenda 1: Policy on Urban Water Supply

Moderator: Prof. Yasumoto Magara, President, Tokiwamatsu Educational Foundation, Honorary professor, Center for Environmental Nano & Bio Engineering in Hokkaido University

"The role of Central Government in Japan's Development on Water-Supply SystemsResponsibilities of Central Government during Japan's development on Water-supply Systems "
Presentation by Mr. Takafusa (Sombo) Yamamura, Counselor, Japan Water Forum

"Urban Water Supply Policy in India"
Presentation by Ms. Nivedita Elapulli Parameswaran, Director, Water Supply Department, Ministry of Urban Development, India

Discussions

Commentator: Mr. Kouki Azuma, Director, Water Supply Planning Guidance Office, Water Supply Division, Health Service Bureau, Ministry of Health, Labour and Welfare, Japan

(12:45-14:00) Lunch Break

14:00-15:45
Agenda 2: Sound Management of Urban Water Service

Moderator: Mr. Ikuo Mitake, International Director, International Division, Japan Water Works Association (JWWA)

"Soft Landing for the Era of Non Expansionary "
Presentation by Ms. Kaoru Kawana, Director for Business Planning, Yokohama Waterworks Bureau
"A Good Practice of Urban Water Supply Service Management – The MANILA WATER STORY "
Presentation by Mr. Virgilio C. Rivera, Jr. Group Director, Regulation and Corporate Development Group, Manila Water Company, INC., Philippines

Annex 3

"Effort for Sound Management of Urban Water Supply Service in Phnom Penh"
Presentation by H.E. Ek Sonn Chan, General Director, Phnom Penh Water Supply Authority (PPWSA), Cambodia

Discussions

Commentator: Ms. Keiko Yamamoto, Senior Advisor (Water Supply & Sanitation), Japan International Cooperation Agency (JICA)

(15:45-16:00) Coffee Break

16:00-17:45
Agenda 3: Measures against Non-revenue Water

Moderator: Mr. Kenei Ishii, Technical Adviser, Japan Water Research Center (JWRC)

"NRW IMPROVEMENT WORK, Cauvery Water Supply Project Stage IV, Bangalore India "
Presentation by Mr. Koichi Suzuki, Deputy General Manager, Global Consulting H.Q. Strategic Business Unit, Oriental Consultant Co.,LTD.

"BWSSB'S EXPERIENCE ON NON REVENUE WATER STUDIES "
Presentation by Mr. Ramamurthy Bangareshwar Padavagodu, Chairman, Bangalore Water Supply and Sewerage Board (BWSSB), India

"Experiences of PPWSA for reduction of NRW "
Presentation by Mr. Samreth Sovithia, Director, Plan and Project Department, Phnom Penh Water Supply Authority (PPWSA), Cambodia

"Technical cooperation to PPWSA on leakage reduction ～ Block distribution system～"
Presentation by Mr. Hiroshi Hirowatari, Assistant Manager, Construction Planning Division, Water Supply Department, Water Works Bureau, City of Kitakyushu

"Leakage Prevention in Tokyo "
Presentation by Mr. Hiroaki Sasaki, Director, Water Supply Section, Water Supply Division, Bureau of Waterworks, Tokyo Metropolitan Government

Discussions

17:45 Closing of Day 1

17:50 (Group Photo)

18:00-20:00
Welcome Reception (at TOTENKO, 10th Floor of International Trading Center building)

Annex 3

Day 2 (Thursday, January 21)

9:30-12:00
Group Sessions: participants will be divided into the following three groups for exchanges of the ideas

9:30-12:00
Group 1: Urban Water Service for the Poor

Moderator: Mr. Kazushi Hashimoto, Councilor, Japan Water Forum, (Executive Advisor, International Division, Yachiyo Engineering Co., Ltd.)

"Service Delivery to the Poor"
Presentation by Mr. Rangamani Vasudevan, Chief Engineer, Kaveri Zone, Bangalore Water Supply and Sewerage Board(BWSSB), India

"JBIC Project in Colombo"
Presentation by Mr. Balasuriya Weebaddage Ranjith, Additional General Manager, Northern & Central Division, Head Office, Ratmalana, National Water Supply & Drainage Board (NWSDB), Sri Lanka

"Impossible to Possible ～ The Manila Water Experiences in Providing Water Service to Urban Poor Communities～"
Presentation by Ms. Shoebe Hazel B. Caong, Business Zone Manager, Business Group – Mandaluyong Ba, Manila Water Company Inc., Philippines

Discussions

Commentators:
Ms. Isa Imazato
Because Institute Co., Ltd.
H. E. Ek Sonn Chan, General Director, Phnom Penh Water Supply Authority (PPWSA)

9:30-12:00
Group 2: Financing Water Supply, Water Tariff System (at JICA YOKOHAMA)

Moderator: Mr. Yoji Matsui, Director, Training and International Department, Japan Water Works Association (JWWA)

Sub-session 1 on " Financing Water Supply "

"Financing Water, Water Tariff System in Indonesia"
Presentation by Ir. Tami M. Zakaria Amin, MSc, Director of Water Supply Development

"Japan's Experience in Financing Water Supply"
Presentation by Prof. Hiroki Hashizume, Professor, School of Global Studies, Tama University

Sub-session 2 on "Water Tariff System"

"Water Tariff Setting in Asia – Jakarta Case Study "
Presentation by Mr. Irzal Zeiroeoddin Djamal, Chairman, Professional and Independent Body, Jakarta Water Supply Regulatory Body (JWSRB), Indonesia

Annex 3

“Water Tariff System in MANILA ”
Presentation by Mr. Atty. Goldelio Galapon Rivera, Deputy Administrator, Financial Regulation, Metropolitan Waterworks & Sewerage System- Regulatory Office, (MWSS-RO), Quezon City, Philippines

“Water Supply Utilities and Water Tariffs in Japan ”
Presentation by Dr. Haruo Ishii, Professor, Faculty of Business Administration, & Graduate School of Business, Toyo University

“Cost of Water”
Presentation by P H Sarath Gamini, Project Director (GKWSP), National Water Supply & Drainage Board (NWSDB), Sri Lanka

Total discussions

Commentators :
Mr. Hiroyasu Saito, Senior Advisor, Overseas Services Department, Nihon Suido Consultants Co.,Ltd
Mr. Virgilio C. Rivera, Jr., Group Director, Regulation and Corporate Development Group, Manila Water Company, INC.

9:30-12:00
Group 3: Safe Water and Water Quality Management

Moderator: Dr. Shoichi Kunikane, Professor, Institute of environmental sciences, University of Shizuoka

“MWA’s Experience on Providing Tap Water for Bangkok ”
Presentation by Mr. Jerngklinchan Jerdsak, Deputy Governor, Water Production and Transmission, Metropolitan Waterworks Authority (MWA), Bangkok, Thailand

“Current Situations and Measures on Water Quality in CWASA ”
Presentation by Mr. AKM Fazlullah, Chairman, Chittagong Water Supply and Sewerage Authority (CWASA), Bangladesh

“Water Safety Plan at HUEWACO ”
Presentation by Mr. Truong Cong Nam, President – Director of Company, Thua Thien Hue Construction and Water Supply State-owned Company Limited (HUEWACO)

“Water Quality Management of Water Supply in Punjab ”
Presentation by Mr. Yusuf Salman, Deputy Secretary (Technical), Housing Urban Development & Public Health Engineering Department, Government of PUNJAB, Pakistan

“Drinking Water Quality Management in Osaka Municipal Waterworks Bureau”
Presentation by Mr. Masayuki Miwa, Manager in charge of research, Water Examination Laboratory, Osaka Municipal Waterworks Bureau

Discussions

Commentators:
Dr. Mari Asami, Chief, Division of Water Quality Management, Department of Water Supply Engineering, National Institute of Public Health, Ministry of Health, Labour and Welfare, Japan
Mr. Hiroshi Sasayama, Assistant Manager for Water Quality, Kosuzume Purification plant,

Yokohama Waterworks Bureau

(12:00-14:00) Lunch Break

All-Participant Session:

14:00-16:00
Agenda 4: Public and Private Partnership on Urban Water Service, and New Technologies

Moderator: Prof. Satoshi Takizawa, Department of Urban Engineering, Graduate School of Engineering, the University of Tokyo

" Introduction of Japanese water supply technologies and new turning to overseas business by Japanese players "
Presentations by the following Japanese private companies;

"Strategy of Japanese Water Utilities Vitalization"
Presentation by Dr. Hiromichi Sakamoto, Managing Director, Federation of Japan Water Industries., Inc.

"Hitachi Group's Advanced Technologies Contributing to Global Water Environment Preservation"
Presentation by Mr. Takahiro Tachi, Chief Engineer, Public & Industrial Systems Division, Industrial & Social Infrastructure Systems Company, Hitachi, Ltd.

"Hi-Technology and New-Tech and Basic-Tech for Waterworks～Membranes & Valves"
Presentation by Mr. Akio Ohkawara, Chief Manager, International Dept., Maezawa Industries, Inc.

"PPP Projects in Water Supply Sector"
Presentation by Mr. Hisahiro Kitahara, President & CEO Japan Water Corporation

"Introduction of Small-scale Water Supply System"
Presentation by Mr. Katsuhiro Yambe, Manager, International Engineering Department, Business Development Division, METAWATER Co., Ltd.

"Solution for Small-Scale Water Supply System by Use of Groundwater Technology"
Presentation by Dr. Toshiyuki Kawaguchi, Project Engineer, Water & Environmental Project, Nagaoka International Corp.

"Public Private Partnership in Water Supply Service by Using Performance Indicators"
Presentation by Mr. Kenei Ishii, Technical Adviser, Japan Water Research Center (JWRC)

"Renewal of the Kawai Purification Plant Project utilizing the Private Finance Initiative (PFI)"
Presentation by Mr. Tomoyuki Watanabe, Manager for Kawai Purification Plant, Redevelopment, Yokohama Waterworks Bureau

Annex 3

"Large-scale Ceramic Membrane water Treatment Plant"
Mr. Yoshi Kanto, Water Next Yokohama Co.,Ltd.

Discussions

Commentator:
Mr. Atty. Goldelio Galapon Rivera, Deputy Administrator, Financial Regulation, Metropolitan Waterworks & Sewerage System- Regulatory Office, (MWSS-RO), Quezon City, Philippines

(16:00-16:15) Coffee Break

16:15-17:00
Agenda 5: Introduction of JICA's cooperation in Urban Water Service sector

Presentation by Mr. Fumihiko OKIURA, Director, Water Resource Management Division I, Water Resource & Disaster Management Group, Global Environment Department, Japan International Cooperation Agency(JICA)

Discussions

17:00 Closing of Day 2

18:00-20:00
Welcome Reception hosted by Federation of Japan Water Industries., Inc. (at 4th floor of Yokohama International Center of JICA (YIC)

Day 3 (Friday, January 22)

9:00-13:30
Study Visit to Facility:

Facilities being planned to be visited are a solar power and sludge treatment system, Yokohama Waterworks commemoration hall and archive, etc.

(12:00-13:00) Lunch Break (at YIC)

All-Participant Session:
14:00-16:00
Agenda 6: Development of Human Resource in Urban Water Service

Moderator: Ms. Keiko Yamamoto, Senior Advisor (Water Supply & Sanitation), Japan International Cooperation Agency (JICA)

"Current Situations on Human Resources Development of MWA "
Presentation by Mr. Wirachat Olapiriyakul, Deputy Governor, Metropolitan Waterworks Authority (MWA), Bangkok, Thailand

"Current Situation and Future Plan on Human Resources Development in PUNJAB, Pakistan"
Presentation by Mr. Yusuf Salman, Deputy Secretary, Housing Urban Development & Public Health, Engineering Department, Government of Punjab

Annex 3

“Human Resource Development in Urban Water Service: To solve the problems facing the urban water sector”
Presentation by Mr. Kiyoshi Miyauchi, Director, Water Distribution and service connection installation, Osaka Municipal Waterworks Bureau, (Representative of Japanese Water Works Bureaus who conduct JICA training Courses)

Discussions

Commentators:
Ms. Hiroko Aotake, Assistant Director, International Cooperation Office, International Affairs Division, Ministry of Health, Labour and Welfare, Japan
Mr. Yasuhiro Kawashima, Deputy General Advisor, Planning Division, Bureau of Waterworks, Saitama city
Ms. Chizuru Sato, Manager, Human Resources Development Div., Yokohama Waterworks Bureau

(16:00-16:15) Coffee Break

16:15-17:15 Review and Summary
Summarizing the identified points and subjects

Moderator:
Dr. Yasumoto Magara, President, Tokiwamatsu Educational Foundation, Honorary professor, Center for Environmental Nano & Bio Engineering in Hokkaido University

Discussions

Declaration

17:15-17:30 Closing of the Forum

Closing remarks by Mr. Shinji Yoshiura, Director, Yokohama International Center, Japan International Cooperation Agency (JICA)

(17:45-19:00)
Water Works Association’s Workshop by Japan Water Works Association
Room 901, SYMPOSIA YOKOHAMA

Annex 4

"Yokohama Forum Statement"
by the Participants in
the Executive Forum for Enhancing Sustainability of
Urban Water Service in Asian Region
2010

The executive leaders of water supply services from 9 countries in Asia, Bangladesh, Cambodia, India, Indonesia, Pakistan, Philippines, Sri Lanka, Thailand and Viet Nam, gathered in Yokohama, Japan from January 20th to 22nd, 2010 at the Executive Forum for Enhancing Sustainability of Urban Water Service in Asian Region, co-organized by Japan International Cooperation Agency (JICA) and City of Yokohama.

The participants, including Japanese resource persons from academic institutes, water-related organizations, the central government, local governments and JICA, discussed issues on the urban water service so that they could learn each other's experiences as lessons to be shared for the improvement of the service in each of participating countries.

The leaders of each country have been making good efforts for the betterment of water supply in various ways as reported in the Forum. Japanese Official Development Assistance (ODA) has been extended to the urban water sector through ODA loans and technical cooperation projects, both of which are now handled by JICA since October 2008. Japanese water utilities of local governments, together with the public and academic institutes, have been cooperating in the Japanese ODA projects. All of the Forum participants, including those from Japan, earnestly wish the water supply is to be facilitated in a sustainable manner for the people in each country by utilizing all of their efforts in addition to the outcome of Japanese ODA projects.

On the last day of the Forum, the participants agreed to let every stakeholder know that they discussed the following issues, measures and actions to be taken into account for and with the people.

1. In the era of rapid expansion of urban population, the urban water service, facing explosive demands by the people, is to be improved not only by the water utilities but together with the strong commitment of central and local governments.
2. Our target is to transform the service system from "vicious cycle" to a "virtuous cycle" that consists of investment, service of availability and quality, customers' satisfaction, reliability, revenue, operation and maintenance. It is reassured of the importance of human resource development from top manager to frontline workers with clear motivation and vision.
3. The Japanese experience on the mechanisms of national subsidy and local bond for water supply system, legislation for safe water supply, standardization of water quality and so on was introduced for the consideration by the participants, although it is also shared that the way of improvement may differ country by country.
4. It is reported that the outcome from the measures against non-revenue water (NRW) proved that it might be more economical than the cost of new water resource development, while the target rate of NRW is to be appropriately decided in each area so that the users would agree to the measures based on their willingness to pay.
5. The issue on the water for the poor should be considered not only from engineering viewpoints but also from sociological aspects for the welfare of people. The mobilization of the slum dwellers and the cooperation with NGOs might be a choice in spreading water service throughout slum communities, although the connection fee remains as an obstacle to be overcome in any ways. A participant commented that JICA could deepen a bit more involvement in poverty reduction field in order to bring much better result.
6. Each country has been tackling to establish the fair and appropriate water tariff system to be accepted by target groups. A participant said the taxpayers' understanding is essential for the introduction of subsidy, although it might be necessary for the better infrastructure. The way of public-private partnership (PPP) is to be carefully scrutinized

whether it fits the socio-cultural background of the area because it may directly affect the service for the customers. It is recommended that a concrete set of performance indicators (PI) is applied for the concession contract.

7. The water supply volume has been considerably increased in Asian Region. The focus is gradually shifting to quality. It is highly evaluated that “Water Safety Plan” of WHO has been contributing to the water quality management from source to tap. Safe water that is supplied through integral water distribution network is vital to our healthy life including disinfection.
8. It is explained that JICA has been so integrated to deal with Yen Loan, grant aid and technical cooperation as a single aid agency that it is able to execute the development program seamlessly from the stage of survey to that of actual implementation regardless of grant or loan.
9. It is recognized that JICA human resource development program should be reinforced with mutual understanding to cope with ever increasing needs of water supply sector in Asian region. It is suggested that the program will be connected more closely with the on-going projects on site. It is reconfirmed that an action for human resource development is the most indispensable to be taken for any of the issues we are facing.
10. It is recognized that sanitation issue is also important to be taken into consideration in terms of MDGs.
11. The Forum concluded that it encourages the partnership and continuous dialogues among the region interactively, from the policy level to the project level, not only government-to-government, but also government-to-utility domestically and also utility-to-utility internationally. All of the stakeholders including associations of utilities are welcomed into such a partnership.
12. It is proposed that the Forum would meet again in near future bringing in the results of practicing what were discussed in this Forum.

January 22, 2010
Yokohama, Japan


JICA