



Topics and Issues in

Attended by a record number of 24,000 participants searching for solutions to water issues

The 3rd World Water Forum

Shimadzu Presented its Commitment as a Company Thinking of Water in Global Dimensions

24,000 participants from all over the world

The 3rd World Water Forum, an event aimed at establishing concrete steps for finding global solutions to water issues, was held from March 16th to 23rd, 2003, at 3 venues in Japan, including Kyoto and Shiga, home of Japan's largest lake, Lake Biwa. The World Water Forum is an opportunity for people from a wide range of backgrounds, such as water-policy makers, experts, corporations, and NGOs, to get together to discuss a wide range of topics. At this year's Forum, more than 180 countries were represented by around 24,000 participants, the highest number in the history of the event. Water issues were discussed at over 350 separate sessions, and Shimadzu participated in some of the events and exhibitions.

The opening ceremony was held on March 16th at the Kyoto International Conference Hall (Sakyo-ku, Kyoto), the main venue for the Forum, and was attended by around 1,800 representatives from all over the world, including Japan's Crown Prince and Princess. After this, the participants divided into groups to take part in separate sessions of discussions. The discussed themes included



Shimadzu exhibition at Kyoto venue

“Water and Climate Change”, which focused on droughts and floods caused by global warming, and “Water Supply, Sanitation and Pollution”, which mainly picked up issues related to water and hygiene in developing countries. Discussions and other events started in Osaka on the 18th and in Shiga on the 20th. Numerous discussions covered many different areas as the participants searched for solutions to water issues.

Shimadzu President Hidetoshi Yajima attended CEO Panel

Shimadzu President Hidetoshi Yajima attended the session of the CEO Panel, held in Osaka on March 19th, as a keynote speaker. The CEO Panel, one of the Forum's separate sessions, is a voluntary organization of CEOs from corporations emphasizing water management in their corporate policies. The Panel focused on the theme of pro-

moting sustainable water use in agriculture, and the representatives made presentations on topics such as how to raise awareness for water issues, integrated water resource management, and financing for water infrastructure improvements. The Panel consists of CEOs from the following 13 corporations: Ebara Corporation, Heineken N.V., NUON, Oji Paper Co. Ltd., Suez, Rabobank, Royal Haskoning, Sappi Limited, Shimadzu Corporation, Thames Water PLC, Toray Industries, Inc., Unilever N.V. and Vivendi Water.



Shimadzu exhibition at Osaka venue

Shimadzu also gave presentations on its environmental activities based on a theme of “Thinking of Water in Global Dimensions” at four exhibitions and fairs held as parts of the World Water Forum.

At the Water Expo and Sewage Fair held in the Osaka venue, Shimadzu exhibited its water-related analytical and measuring instruments, as well as control devices such as TOC and TNP analyzers,

GCMS, HIC ion chromatograph, and the remote monitoring system RIMO-KA. The Water Expo and Sewage Fair were industrial exhibitions in which governments, local municipalities, and private businesses participated; over 100 thousand people visited the fairs during the five days from March 18th to 22nd. Shimadzu used areas of 108 m² (12 booths) and 18 m² (2 booths) at the Water Expo and Sewage Fair, respectively. At the “Mizu-en” Festival, held in Kyoto from March 21st to 23rd, Shimadzu Rika Instruments Co., Ltd. exhibited and demonstrated a variety of water-related laboratory instruments and introduced the application of GCMS to analyze water. The “Mizu-en”

Festival was a series of events focusing on various water issues and topics related to Kyoto. NPOs and private businesses made exhibitions, which attracted more than 50,000 visitors.

At the Lake Biwa Water Fair held in Shiga from March 19th to 21st, a series of events in which NPOs and private corporations participated, Shimadzu also presented panel displays about its commitment to the environmental issues. More than 20,000 people visited the fair during the three days. Shimadzu’s exhibition during the World Water Forum also included panel displays about Mr. Koichi Tanaka’s Nobel Prize. The 3rd World Water Forum ended on March 23rd with the adoption of the

ministerial declaration entitled “Message from Lake Biwa and the Yodo River Basin”, which expresses the Forum’s continuous commitment to developing a new framework between the public and private sectors and to pursuing all potential sources of financing.



Shimadzu exhibition at Shiga venue

The CEOs of 13 multinational corporations meet to discuss solutions to water issues



Shimadzu participates in the 3rd World Water Forum’s CEO Panel, industrial initiative for water issues

On March 19th, the 3rd World Water Forum’s CEO Panel, one of the Forum’s major separate sessions, convened at the Osaka International Convention Center. Shimadzu President Hidetoshi Yajima participated as a keynote speaker. The CEO Panel consists of the CEOs of 13 multinational corporations* and aims at pursuing solutions to various water issues. The session was

attended by around 1,000 people, including representatives from industry, U.N. organizations and NGOs, as well as ordinary citizens.

The CEO Panel covers five areas as its major themes: raising water awareness through education, promoting sustainable water use in agriculture, financing for the development of water infrastructure, integrated water resource

management, and valuing water for better governance and independence.

The members of a working task force spent one year and a half holding meetings and making other preparations for this event. Results-oriented, stimulating, substantive discussions were held at six meetings in London (January 2002), Amsterdam (April 2002), Rotterdam (June 2002), the Shimadzu Head Office

in Kyoto (October 2002), Paris (January 2003), and again in Kyoto (March 2003). The projects in the five areas mentioned above were promoted based on cooperation with world-class NGOs such as WWF (World Wildlife Fund) and IUCN (International Union for Conservation of Nature and Natural Resources), as well as international organizations such as UNESCO (United Nations Educational, Scientific and Cultural Organization) and JCI (Junior Chamber International).

Of the five areas, Shimadzu participated in working groups both on raising awareness and integrated water resource management, which contributed in embodying the Panel's activities in visible forms. As a contribution in the field of awareness raising, Shimadzu, together with a Kyoto-based NGO promoting the utilization of rainwater, created, edited and translated "The Adventure of Mr. Rainwater", an educational booklet for children of 8 to 12 years

old aimed at fostering a greater understanding of water issues. This booklet forms part of the "Water Toolkit", a collection of educational materials designed to promote understanding of water issues all over the world. Also the "Eco Club", a Shimadzu in-house NGO composed of women members whose aim is the promotion of ecological activities in everyday life, created a board game based on the story of the booklet. The booklet and game were actually used and highly evaluated at 100 UNESCO-affiliated schools. In the field of integrated water resource management, Shimadzu introduced three projects, including the waste water automatic remote monitoring system, a factory waste recycling system based on reverse osmosis (RO) membrane, and the participation in the U.N. University's environmental monitoring projects. These topics are accessible worldwide via CD-ROM and the Internet.

ander. President Yajima also submitted proposals based on the Panel's activities to the ministerial conference held on March 22nd. That evening he returned to Kyoto to welcome 300 guests at a dinner reception, filling in as the host in place of Anthony Burgmans who had to leave Japan earlier that day because of the outbreak of war in Iraq.

Worth mentioning with regard to the CEO Panel, which consists of corporations from different fields including water, food, pulp and paper, environmental engineering and banking, is the concept of the "triple bottom line." This concept is increasingly shared by Europe-based global enterprises, regardless of their business fields, and entails the new thinking that corporations should be evaluated in terms of the balance among three factors — economic performance, environmental awareness and contribution to society.

Another outcome of the participation in the CEO Panel is the creation of new business relationships with the member corporations. For instance, Shimadzu Advertising & Communications, a subsidiary of Shimadzu, undertook business for planning and arranging sessions and receptions for the CEO Panel and preparing the exhibitions in Osaka (Unilever, Vivendi Water, and Thames Water). Also, as byproducts of the communication in the Panel meetings, one water company showed interest in purchasing Shimadzu's instruments for its new laboratory, and Shimadzu began talks with another water company for possible cooperation in future water supply business in Japan and China. These will be great opportunities for Shimadzu to forge ahead as a global player in the field of environmental business.

Task force member of CEO Panel
TERUYOSHI AMANO, Manager, Environment
and Occupational Safety Management
Dept., Shimadzu Corporation

President Hidetoshi Yajima makes presentations on Shimadzu's efforts in improving the water environment and promoting water education



During the session, President Yajima made presentations about Shimadzu's commitment to protecting the water environment based on ISO14001 and innovative technology, and also about the importance of educating young people on water issues. He also made the closing remarks of the CEO Panel session representing the 13 corporations, and attended the press interview together with Unilever's Chairman Anthony Burgmans, who chairs the CEO Panel, and Thames Water's Group Chief Executive Bill Alex-

*The 13 corporations include: Ebara Corporation, Heineken N.V., NUON, Oji Paper Co. Ltd., Suez, Rabobank, Royal Haskoning, Sappi Limited, Shimadzu Corporation, Thames Water PLC, Toray Industries, Inc., Unilever N.V. and Vivendi Water.

Shimadzu Responding to Various Water Recycling Applications, with a Focus on Gray Water Recycling Systems

Perhaps because Japan is surrounded by major bodies of water and already has established water supply and sewer system infrastructure, the level of public interest with respect to water is not very high.

In conjunction with the 3rd World Water Forum, a great deal of information has been reported regarding global environmental water issues. The problems with water can be broadly divided into two categories – quantity and quality. First of all, concerning the problem of quantity, there is the issue of water scarcity. In 2000, there were 31 countries facing absolute shortages of water, but it is predicted that by 2025 that number will rise to 48 countries. In the midst of this situation, Japan imports 30 million tons of grain per year, where the production of one ton of grain requires 1,000 tons of water. That is equivalent to importing 30 billion tons of water each year, which is more than 30% of the 90 billion tons Japan consumes annually.

Meanwhile, global warming is resulting in flooding and drought. Even in Japan, intensified heavy rain and increased urban flooding occur each year. In addition to these water quantity issues, some water quality issues have begun to rise to the surface. As of 2000, there are 1.4 billion people in the world who do not have safe drinking water. Furthermore, the causes contributing to the pollution of drinking water, many of which are associated with economic development, such as agricultural chemicals, chemical fertilizers, in-

dustrial waste and residential waste, are becoming more complicated to the point that the problem of providing safe water has risen to emergency levels.

Industry, and in particular manufacturers, consume massive quantities of high-quality water and discharge the wastewater into the environment as part of their normal business activities. From an environmental perspective, it means they are



Water used at the plant is treated and reused using the gray water recycling system.

using natural resources and taxing the environment. However, in the current economic climate in Japan, local governments are under financial pressure and, in general, have little choice but to raise water supply and sewer rates.

In this regard, our company uses 100 tons of water from the public water supply per day as washing water for our plating operations. In August 2001, we installed a reverse-osmosis type water recycling system (gray water recycling system) at the plating facility. With this installation, up to 80 tons of wastewater can be treated per

day and reused as washing water. We anticipate recovering our initial investment within three years. In March, we also installed a gray water recycling system at our aircraft plant. Wastewater and rainwater is treated and recycled as a coolant for air-conditioning systems and for flushing toilets in the administrative buildings.

These gray water recycling systems were installed as part of Shimadzu's environmental activism, in an effort to clean and recycle our wastewater. By installing our heavy metal monitors and TOCN analyzers before and after treating the water, we also have created a business model that incorporates measurement and water treatment, which provides a promising product category for our environmental solutions business. In addition to the environmental benefits of reusing natural resources and reducing the environmental impact of wastewater, these

products provide economic benefits such as reducing water and sewer expenses and preventing risks due to environmental issues. These benefits are compelling business incentives for customers, thus making these products the focus of our environmental solutions business. Looking ahead, Shimadzu plans to expand its environmental solutions business by focusing on gray water recycling systems and providing solutions to all sorts of water recycling applications.

Junzo Ose, General Manager of the Environmental Solutions Development Dept., Shimadzu Corporation

Aral Sea Dries Up and Agricultural Land Turns to Wasteland

Pitfalls of Large-scale Irrigation Agriculture in Arid Central Asia

Fears of New International Water Battles



Aral'sk once flourished as a major port city in the north of the Aral Sea. Now it is linked by a narrow waterway to the significantly retreated waters of the lake.

Water vapor from the atmosphere falls to the ground as rain and snow, becoming rivers and ground water that flow into lakes and seas, the surfaces of which evaporate as they are heated by the Sun — these water resources, circulating over the Earth, are the priceless assets of all humans. One problem with the water environment, as far as humans are concerned, is the regional variation of the water circulation.



Prof. Norio Ishida

of the Laboratory of Ecology and Environment, Graduate School of Asian and African Area Studies, Kyoto University, explains his research project, which focuses on the regional characteristics of water problems in Kazakhstan and other Central Asian nations.

Adding Water to Land and Sunshine Must Be a Sure Recipe for Success?

Today we face so many environmental problems that we are standing on the edge of a precipice at the point of no return. Humankind faces major, worldwide environmental problems, including global warming and destruction of the ozone layer. Prof. Ishida claims that no solutions can be found to environmental problems by viewing them only from a global perspective. What we call "environmental problems" are failures of civilizations to live in harmony with the local ecology. Consequently, environmental problems initially should be discussed in terms of the relationship between the regional environment, history, and culture. Problems with the water environment typify this approach.



Abundant snowmelt waters from the Tien Shan Range feed the Syr Darya.

Salt Accumulation Gradually Destroyed Agricultural Land

As an example, let's look at Kazakhstan, in Central Asia, which Prof. Ishida has studied for over ten years. Kazakhstan covers a vast region with an arid climate. The former Soviet government turned its eyes toward the Syr Darya river, fed by the abundant snowmelt waters from the Tien Shan Range, as a source of irrigation water for large-scale cotton and rice cultivation. This irrigation started in about 1950. With the extensive land and plentiful sunshine already available, the plan assumed that the construction of irrigation waterways would ensure sufficient water to guarantee bountiful crops. At first it seemed to work.

But then things went wrong, as Prof. Ishida explains: "At one time, the cotton production from this area represented 95% of the Soviet Union's total harvest, but production has now dropped to about half the peak production. One reason is the salt accumulation in the soil due to irrigation with inadequate drainage. Another reason is a lack of management due to economic confusion after the collapse of the Soviet Union. Also, the Aral Sea fishermen and nomadic herders from the arid regions were virtually forced to work as paid agricultural laborers, such that they could no longer conduct their traditional land- and crop-management practices."

then accumulate. Irrigation in an arid climate of poorly draining soils containing a variety of salts results in a rise in the water table, whereby salt-bearing water makes its way to the surface. The water is evaporated by the fierce sunlight, leaving only salt. So much salt accumulates after this perpetual cycle that the ground surface appears as white as snow. While poor soil drainage in arid regions is not apparent prior to irrigation, once salt accumulation sets in, the soil is no longer able to support crops. Desalination is not feasible and the land must be abandoned as wasteland. The irrigation agriculture in Kazakhstan has caused another tragedy. The Syr

Darya flows into the Aral Sea on the border between Kazakhstan and Uzbekistan. The Aral Sea is a closed lake with no outflowing rivers and the only major inflowing river, apart from the Syr Darya, is the Amu Darya. The balance between the inflowing water from these two rivers and the evaporation from the lake were such as to maintain the world's fourth largest lake, with an area of 66,460 km². However, the Amu Darya has also been exploited for agriculture, which has resulted in at least 70% of its annual flow being diverted for irrigation. This is paralleled by a more than 90% decrease in the annual flow in the Syr Darya (1987 figures). Naturally, the resultant reduction of inflow has caused a gradual drop in water level and a decrease in area of the Aral Sea. By the mid-1970s, the area of the lake had shrunk to approximately 56,000 km² (85% of the original area), revealing previously non-existent islands and peninsulas.



Agricultural land that once greened the desert, thanks to irrigation (left), is now being abandoned as wasteland due to salt accumulation (right).



The black line in the photograph on the left is an irrigation pipe. The white, visible in the photograph on the right, is salt accumulated on the ground.

Lake with No Fish, Wells Full of Salt Water

Due to the extraction of large volumes of water from the Amu Darya and Syr Darya, subsequent evaporation after irrigation, and continuing salt accumulation over the irrigated area, the salinity of the small amount of water flowing back into these two rivers and in the underground water has increased. As a result, the salinity of the Aral Sea, which was originally a salt-water lake, increased to the appalling level of 30% by the end of the 1980s — a level that cannot possibly support fish life. By the mid-1980s, the fish catch had fallen to zero. The previous annual catch of 50,000 tons had totally disappeared, according to Prof. Ishida.

By 1991, the lake had split into the Large Aral in the south and the Small Aral in the north, with the total area having shrunk to 34,000 km². The Large Aral is certain to disappear eventually, claims Prof. Ishida. Where the lake has dried up, its bed is but saltpan and salty sand, which are dispersed by the strong winds typical in arid climates,



Rusted fishing boats stretch like ruins across the exposed lakebed of the Aral Sea. The boats were abandoned when no more fish could be caught, before this part of the lake dried up.

further destroying any remaining healthy agricultural land.

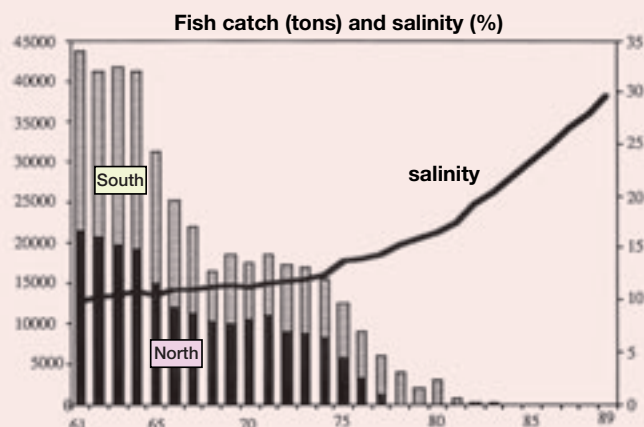
The deteriorated water quality in rivers and ground water has also had devastating consequences for people.

Once, digging a 3 m-deep well would yield water good enough to drink. Nowadays, water from such a well would be saltier than Japanese miso

soup. It's absolutely undrinkable. A well 200- 300 m deep is now needed to ensure potable water. Some people have toiled to dig such deep wells and still not reached potable fresh water.

The people in some regions have no alternative but to drink water from waterways originally built for agricultural water, which has resulted in the spread of infectious diseases.

The relationship between salinity and fish catch in the Aral Sea. The fish catch dropped disastrously due to the dramatic rise in salinity in the mid-1970s, and reached zero by the mid-1980s.



Food Production Causes Water Battles around the World

Water problems involved with the Aral Sea and the Amu Darya and Syr Darya rivers have generated tensions between the countries in the region. One or both of these rivers flow within the national boundaries of five countries: Kazakhstan, Uzbekistan, Kyrgyzstan, Turkmenistan, and Tajikistan. These countries were under the effective control of the central government of the former Soviet

Fetching water from the few remaining pools and marshes is an important job for children. The quality of this water is not good.

Union. Now, as independent countries, they must tackle their respective water-related problems through realistic, hard negotiations amongst themselves.

To protect the Small Aral, Kazakhstan is constructing a dike to prevent water flowing from the Small Aral into the Large Aral. Uzbekistan, which embraces the southern half of the Large Aral, is criticizing the construction of this dike, but Kazakhstan counters by emphasizing that Uzbekistan itself has dammed the Amu Darya.

The danger of water battles also exists in many other parts of the world, including the Jordan, Nile, and Mekong river basins. The difficulty with such water problems is that they can neither be viewed from a purely global perspective nor from the sole perspective of a single nation. In China, difficult negotiations

over water are underway between the north and south of that huge country. The 21st century is predicted to become the era of wars over water, and water battles are unmistakably here already.

The real cause of water battles is the problem of producing food, as Prof. Ishida explains: "It takes 300 tons of water to produce one ton of rice, or 250 tons of water to grow one ton of wheat, for example. The world's population is expected to increase 30% to 8 billion by 2025. It is impossible to increase crop yields by 30% from the same area of cultivated land, so the only way to increase the food supply is to increase the area of agricultural land. But where is the water going to come from?"



Not all irrigation agriculture in arid areas has proved to be a mistake. For example, irrigation has been successful in Turkmenistan, where the soil drainage is good.

We humans must re-think how we use water and determine our relationship with water according to regional characteristics and the local ecology.

(Reference: Japan Research Association with Kazakhstan Investigation Reports No. 1 to 9)



An earth dike constructed between the Small Aral and Large Aral, to protect the Small Aral, was destroyed by heavy rainfall. The accident left heavy earthmoving equipment partially submerged.