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NEWSLETTER

International Lake Environment Committee

=Promoting Sustainable Lake Management=

This Newsletter is also available in Japanese.

13th World Lake Conference Successfully Organized

The 13th World Lake Conference was held in Wuhan, China from November 1st to 5th, 2009 under the theme of "Rehabilitate the Lake Ecosystem: Global Challenges and the Chinese Innovation". The Conference was co-organized by two Chinese academic societies (Chinese Society for Environmental Science and the Chinese Research Academy of Environmental Sciences), Wuhan Municipality (the host city of the conference), and ILEC. More than 1,000

IN THIS ISSUE

participants form more than 50 countries, domestic and abroad, participated in the Conference. This was the second time for the World Lake Conference to have been organized in China, where currently many lakes are faced with serious water pollution and ecosystem degradation amid the continuing remarkable economic development. The Chinese government wanted to use the opportunity of this Conference to stop further degradation and expand rehabilitation efforts towards conservation of lakes and rivers. Mr. Zhou Shengxian, Minister of the Ministry of Environmental Protection of the People's Republic of China and President of the 13th World Lake Conference, stressed the importance and necessity of "balancing economic development and lake environment conservation" by repeating the key concept "Rehabilitation: letting rivers and lakes rest and recuperate from human impacts" in his keynote speech at the opening ceremony

This World Lake Conference became one of the most eventful ones in its history due to extensive support from the Chinese Government. In addition to normally organized sessions and events, the Conference organized a number of unique gatherings, such as Governors' Dialogue (Nov. 2) and Mayors' Forum (Nov. 3), Students' Session and Children's Meeting (both on Nov. 3). Thirty-two thematic sessions discussed wide-ranging issues and problems that lakes are currently facing. Some sessions were highlighted by presentations from citizens, high-school students and private sectors. There were 16 keynote speeches presented by distinguished speakers from China and abroad. They included Stockholm Water Prize Winners (Professors Sven Erik Jorgensen and William J. Mitsch), Representatives from International Organizations (World Bank, UNEP) and National Governments (Japan, China). Along with the Conference, an International Technology and Equipment Exhibition was organized for the first time from Nov. 1-3. Many water-related companies from China and overseas presented their state-of-the-art technologies for water management and lake restoration.

On Nov. 5th, the final day of the Conference, Dr. Masahisa Nakamura, Professor of Shiga University and Chairperson of the ILEC Scientific Committee, made a comprehensive review of the meeting discussion at the conference. The "Wuhan Declaration" was adopted by the participants, which highlighted preciousness of freshwater and importance of lake conservation (See a full document at www.ilec.or.jp). At the end of the Conference, as a tradition, the venue and organizer of the next conference was announced. Prof. Walter Rast of Texas University introduced the State of Texas, USA and his university, and extended a happy welcome message to the audience, calling wide participation. The 14th World Lake Conference is scheduled for November 2011.

ILEC organized a number of sessions on the occasion of this Conference, self-organized or co-organized, in addition to the mentioned above. They include a JICA follow-up session, the UNEP-IETC/ILEC Joint Session on Innovative Technologies (both on Nov. 3), a TWAP (Transboundary Water Assessment Programme) Consultative Meeting (Nov. 4), and an ILBM Experts Meeting (Nov. 6) organized in collaboration with Shiga University as part of activities under "Lake Basin Governance Project".

Governor's Dialogue

On the afternoon of November 2, 2009, a Governor's Dialogue was held as one of the special events of the 13th World Lake Conference. The governor of Hubei province (the host province), vice governors of Hunan, Yunnan, Jiangsu and Jiangxi provinces from China, and the governor of Shiga Prefecture, Japan, participated in the event. Other participants included the vice minister from the Ministry of Environmental Protection, PRC and the former German Defense Minister among others.

This event took place at the Hubei Television Station in Wuhan City, about 20 minutes away from the venue of the World Lake Conference. The Dialogue was broadcast live not only in Hubei Province, but also across the country via satellite.

A TV shot from Governors' Dialogue

This shows a high expectation and a strong interest in this Dialogue on Chinese side.

The Governor of Shiga Prefecture, Ms. Yukiko Kada, explained various lake conservation activities being undertaken in Shiga Prefecture, as well as the prefecture's international experiences and contribution in lake conservation, such as hosting of the World Lake Conference in the past. She also emphasized the role of agriculture in lake basin management by showing some ongoing projects being implemented under the name of "Environmentally Friendly Agriculture" and "Rice Field as Fish Cradles."

From the provinces of China, the vice governor of Jiangxi province talked about the province's lake environment conservation measure through the management of forests, which cover more than 60 percent of the land of the province. The governor of Hubei province explained efforts to build a recycling system for the purpose of creating a beautiful countryside, through which they achieved reduction of the amount of chemical fertilizers and pesticides released from rice fields and poultry and hog farms. The vice governor of Hunan province presented their law enforcement approach, by which they closed down a paper mill plant which had been a constant source of contamination of the lakes in their province. The Vice-Minister explained the government's strict regulation about the release of water to combat eutrophication problems currently afflicting more than 80 percent of the lakes in China. He also mentioned special regulative measures on some very important lakes.

During the Conference, a similar event entitled the "Mayor's Forum" was organized on November 3. This is the first time the heads of the local governments got together on the occasion of the World Lake Conference. The organization of these two events demonstrates an increasing role of local governments and a higher expectation to the local governments in the conservation of lakes.

A Japan-China-Korea Children Gathering

A special event “A Japan-China-Korea Children Gathering” was co-organized at the occasion of the 13th World lake Conference in Wuhan, China, by the Ramsar Center of Japan, Shiga Prefecture and ILEC, in collaboration with the Ramsar partners in China and Korea. The objective was to share experiences and opinions about environmental activities among the children of the three neighboring countries.

From Japan, seven children selected through public advertisement in Shiga Prefecture participated in the event. They had four meetings before going to China to study about Lake Biwa, the nearest and most familiar lake to them, under guidance of Professor Munetsugu Kawashima from Shiga University.

On November 1st, 2009, Japanese children and their attendants visited Huazhongli Primary School in Wuhan to participate in an opening ceremony of “Wetland School” (The school was designated a model school for environmental study). After that, together with their friends from China and Korea, they visited Lake Choto designated as a protected lake by the municipality because of its important role as a habitat for many hawks and herons.

On November 2nd, 2009, the children participated in an opening ceremony of the

13th World Lake Conference and interviewed Professor Sven Jorgensen, a 2004 Stockholm Prize Winner, and Ms Adelina Santos-Borja, an official of Lake Laguna Development Authority, Philippines. Based on their findings and coverage, they published a “Children’s Newspaper”.

On November 3rd, 2009, a special exchange event “Japan-China-Korea Children’s Meeting” took place. Twenty (20) children, 7 from Japan, and 13 of their counterparts from China and Korea, whose home towns were registered Ramsar sites, made presentations about their lake environment conservation activities in front the audience of more than 100, including Yukiko Kada, Governor of Shiga Prefecture, Japan and Hironori Hamanaka, Director General of ILEC. After that, they had discussion how to enjoy lakes while protecting them, including doing some exercise using cards. Through this event, children not only learned about lake environment problems, but also they deepened their friendship.

Student's Meeting on Lake Management at WLC 13

An international student meeting was organized during the 13th World Lake Conference on November 3rd as a special technical session, chaired by Dr. Michio Kumagai (Researcher of Lake Biwa Environmental Research Center) and Dr. Charles Goldman (Professor of the University of California, Davis). The "Student Session" aimed to discuss a vision for the future how to practice sustainable lake basin management to realize a low carbon society. Thirteen members participated in the session, including students from various countries, Chinese government officials, and lake researchers.

Prior to this session, the international participants made a field visit to Lake Taihu, the third largest lake in China from October 30th to 31st, 2009 to do some preparation for discussion at the meeting. They visited a number of places, including a plant near Wuxi, a place engaged in removing the lake's algae, an aquaculture farm near Lake Taihu, and a dredging operation unit. They learned that the Chinese government has been undertaking a lot measures to fight serious eutrophication problems, but most of them seem to be "treating symptoms as they appear", not attacking the true causes. Participants had a feeling that it may take some more time to reach a true solution.

The session started with a brief presentation about environmental problems in Lake Taihu by Mr. Cho Limin, Chinese government official. Then Mr. Masahiro Abe, a Ritsumeikan University student and the representative of students, reported findings about their visit to Lake Taihu. Next, students presented their ideas to improve the water environment of Lake Taihu, about which students and experts discussed with researchers and government officials. The discussion covered wide-ranging topics, such as "Technical control of non-point source contamination through calculation of overall amount of run-off", "Promotion of environmental education to raise awareness on water problems and the responsibilities of people living in the basin of Lake Taihu", "Need of initiatives to go forward in realizing a low-carbon society, focusing on stopping the rising of lake water temperature leading to frequent occurrence of eutrophication", "How to encourage a meaningful exchange of ideas and opinions among stakeholders," and "Development of a compact town with less impact on lakes", and so on.

The session was wrapped up by Professor Goldman and closed with an announcement that the 2nd Students Meeting, of which 1st one was organized in 2008 in Shiga, Japan, will be held in September 2010 at Lake Tahoe Environmental Research Center near the lake.

JICA Follow-up Session

The JICA Follow-up session was held at the 13th World Lake Conference (WLC13) in Wuhan, China on November 3, 2009. The objective of the session was to bring together past trainees of the JICA-funded, ILEC-implemented Integrated Lake Basin Management Training Courses (previously called Water Quality Monitoring Training Course) to share experiences since completing the courses. The session was chaired by Professor Saburo Matsui and Professor Masahisa Nakamura, with Ms. Adelina Santos-Borja as sub-chair and Dr. Victor Muhandiki as adviser.

Six past JICA Trainees, one from Sri Lanka, China, India, and three from the Philippines participated in the session and made presentations about the lake environment in their countries with reference to the country reports they made at the end of their training course. The presentations included four lakes, namely Lake Beira (Sri Lanka), Poyang Lake (Cina), Lake Chilika (India), and Rinconada Lakes (the Philippines), followed by comments and suggestions from the above-mentioned experts.

Ms. Santos-Borja pointed out eco-tourism as a common issue in the four case studies presented as a means of conserving lakes. Prof. Matsui observed that there is need to maintain good water quality by installing sewage treatment

facilities in the case of urban lakes to enhance tourism, while there is no such need in the lakes where aquaculture is important. Prof. Nakamura noted that it is often the case that funds are allocated for resource development while little or no funds get allocated for resource provision services that lakes provide. To break this vicious cycle, financial resource mobilization has to be addressed in a collective way and we have to make a strong case for appropriate funding for resource provision services.

In concluding, Prof. Nakamura emphasized that there is need for continuous lesson learning and experience sharing to accelerate mutual learning and broaden the scope of what we are doing collectively.

IETC-ILEC Session on Innovative Technologies for Water Management and Lake Restoration

This session was co-organized by UNEP-IETC and ILEC on November 3, 2009, with participation by about 40 experts in the field of technologies for water management and lake restoration.

There were five presentations covering a wide range of topics. Dr. Saburo Matsui, Emeritus Professor of Kyoto University, introduced new and traditional technologies for recycling of organic liquid/solid to agriculture, in which he demonstrated that traditional technologies are used even in innovative technologies. Dr. Yoshimori Kato of Nihon Suido Consultants Co. introduced his company's energy efficient technology to prevent eutrophication focused on toxic algae control using water density circulation system. Dr. Sang Gil Kim from South Korea introduced an innovative eco-toxicological monitoring system using Closterim sp. and Daphnia. He also showed the equipment his company developed and illustrated the application of the technology in some countries. Dr. Sandeep Sudhakar Joshi from India stressed the need of restoration of lake environment based on eco-hydrology principles. He also highlighted the usefulness of ILBM framework for the lake basin management. Finally Dr. Yosuke Yamashiki, associate professor of Kyoto University introduced the recent development in monitoring techniques, and emphasized the usefulness of modeling as part of assessment tool for monitoring. At the end of his presentation, he showed a prediction about the serious effects of global warming on Lake Biwa based on the latest simulation model. Global warming is a common and global concern to lakes around the world. Modeling can play an important role in projecting the future possible conditions taking place in lakes.

After presentations, a question/answer session was held, chaired by Professor Matsui. Active discussion and exchange of useful information were undertaken by the participants.

Promotion of ILBM: Current and for the Future

Since its launching at the 11th World Lake Conference (2005, Kenya), Integrated Lake Basin Management (ILBM) has been gaining an increasing support in various parts of the world, including through the “Lake Governance Project” (A joint project among Shiga University, University of Shiga Prefecture, and ILEC, sponsored by the Ministry of Education and Sciences, Japan). The following is a summary of the current status of ILBM promotion and discussion about its future strategy.

ILBM Special Expert Group Meeting: ILBM Beyond WLC13

An ILBM Special Expert Group Meeting was held on 6th November 2009 in Wuhan, China, following the 13th World Lake Conference (WLC13). The aim of the meeting was to make an interim progress review on the ILBM-Governance Project currently being pursued for selected lake basins in different parts of the world, in relation to the outcome of the WLC13.

The meeting was chaired by Prof. Masahisa Nakamura. Nearly 60 participants joined the meeting, including representatives from the local ILBM-Governance project teams, invited experts in various disciplinary fields pertinent to ILBM, ILEC Scientific Committee members, and individuals interested in the global ILBM challenge.

Presentations were made under two themes. The first theme was “Outputs from Local, National and Regional ILBM-Governance Workshops” with presentations on: 1) Needs, Accomplishments and Challenges (India, Philippines and Latin/Central Americas), 2) National Policy and Program Development: Interim Outputs (Malaysia and Nepal), and 3) Knowledge Base: Its Development, Use and its Impacts (Russia and ILEC). The second theme was “ILBM Global Strategy Development”, with presentations on: 1) Local, National, Regional and Global Actions: What's Next?, 2) Decentralized ILBM Resource Development and Networking, and 3) ILEC's Role and Regional Focal Point Initiatives.

Experts discussing strategies for ILBM promotion

Main points of the discussion from the case presentations are summarized below:

India: Ongoing ILBM activities in Upper Bhima Basin and Yeshwantsagar (Ujjani Lake) in Maharashtra State were highlighted. Jal dindi (an annual pilgrimage on water) was noted as an example of a people’s movement that has had significant impact in creating environmental awareness.

Philippines: Ongoing ILBM activities in the Philippines were highlighted. Institutional arrangements were identified as one of the key challenges in lake basin management in the Philippines.

Russia: Presentations were made on long-term monitoring of Lakes Ladoga, Pskovsko-Chudskoe and Ilmen, and information systems for data storage and communication. It was noted that ILBM activities in Russia are very much science driven unlike the cases presented from other countries.

Malaysia: It was noted that in Malaysia efforts are already underway to make ILBM a national program. Lake briefs for eight lakes are under preparation. In contrast to the Russian case that focuses on science, in Malaysia the focus is on the ILBM process.

Lake Victoria Basin: The Lake Victoria Environment Management Project Phase II (LVEMP II) that is currently under implementation was introduced. It was noted that the LVEMP II had incorporated ILBM principles in its design. The need to share lessons from the already completed Phase I of the project (LVEMP I) was noted.

ILBM Expert Meeting in Japan

Japan has a long history in lake management. It is very useful to re-visit these past experiences from the ILBM perspectives for refining and developing ILBM framework in the future. As already mentioned in the last newsletter (No.52), the three parties promoting the "Lake Governance Project" set up a "Basin Management Policy Forum" to study management practices and discuss challenges in lake management. As part of its activities, the Forum organized an expert gathering under the title of "Integrated Management and Basin Governance in some Japanese Lake Basins: Changes and Prospects". The meeting was held from

September 17th to 20th, 2009 on the lakeside in Shiga Prefecture, Japan.

The event brought together about 20 researchers and experts from various parts of Japan. On Day 1 (September 17) was a field visit to the north basin of Lake Biwa, where experts made observation of the latest conditions of the lake under guidance of local experts.

On Days 2-3 (September 18-19) was a two-day experts meeting which introduced lake basin management practices in various lake basins in Japan, followed by a keen and productive discussion about the presentations. Eight presentations from four regions were reported, including "Lakes in Tone river and Kanto region", "Lake Shinji and Nakaumi basin", "Lake Suwa and Tenryu River basin", "Tokoro river and Lake Saroma basin", and "Bibi river /Ishikari river and Lake Utonai basin". All of these cases provided a good showcase of the cooperation in the basin management between different stakeholders (community, experts, local governments, etc.), taking into account the regional history and basin characteristics.

Japanese experts exchanging ILBM experiences

On the last day (September 20), the Forum hosted an open seminar entitled "New development in Japanese Lake Basin Management" in the morning, and a memorial symposium on "New Trends in Lake Biwa Comprehensive Conservation" in the afternoon. Community people and citizens actively participated in these events to exchange discussions with experts.

ILBM Training in Yunnan Province, China

Environment degradation is becoming serious in Yunnan Province, PR China, in particular Kunming city and the Lake Dianchi Basin. In August 2008, ILEC was requested by the World Bank to support their on-going project which includes installment of sewage treatment facilities and promotion of environment management practices in this region.

Based on the discussion with Bank project managers, we decided to implement ILBM Training, focusing on capacity building to manage the lake basin keeping in mind regional issues and problems. Specifically, we organized the following three different courses, depending on target trainees from wide-ranging stakeholders including decision-makers, technical and management staff, researchers, and lake management practitioners.

Participants learned the importance of ILBM approach and recognized the need of its implementation. Teaching materials were prepared in Chinese for the use of training in other parts of China.

Chinese participants learning about ILBM

Dates	Target trainee	Contents of training
March 15 – April 4, 2009	Technical & Administrative staff, Researchers, Lake management practitioners	∗ Useful application of geographic information systems (GIS) linked with socio-economic information ∗ Technical training of using geographic information system
May 4 – 11, 2009	Decision-makers, Technical & Administrative staff	∗ Lake basin management by ILBM approach ∗ Case studies/Challenges of ILBM implementation
May 12 – 22, 2009	High-ranking decision makers/ Support staff	∗ Policy development based on ILBM approach ∗ Institutional roles and arrangements to practice ILBM

Limnological notes from a Mediterranean island

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Sicily is the largest island (26,000 km^2) in the Mediterranean Sea and one of the most densely populated areas in the region (about 6 million inhabitants). It is characterized by an average annual rainfall of 750 mm y^{-1}, and annual average temperature is 18°C. A Mediterranean semi-arid climate is typical of the hilly and lowland parts of the island. In general, these areas are the most exploited for intensive agriculture. To fulfil irrigation needs and supply drinking water, 30 dam-reservoirs, impounding a total of 750×10^6 m^3, were built in the last 60 years. However, the lack of any plan to cut off nutrient loads to recipient water bodies has rapidly driven all of these aquatic ecosystems to eutrophication.

European countries have successfully responded to eutrophication threats by managing human nutrient emission and several Directives were issued by EU, the most famous being the so-called "Water Framework Directive", aimed at protecting inland water and at setting quality standards for freshwater compatible with their different usages. Unfortunately, a counter tendency has been observed in Sicily and almost all of its water bodies are still suffering the noisy effects of eutrophication, which can be simplified in a structural and functional change in the biological community often leading to cyanobacterial toxic blooms. The causes of this inverse trend are complex and involve political and socio-economic aspects, which have been characterizing this region since more than one century (for more details see Giglioli and Swyngedouw 2008).

Among Sicilian reservoirs, Lake Arancio is one of the best studied and offers a paradigmatic overview of Sicilian water bodies. The lake, created in 1951, is located in the South-West Sicily (Italy) at 37°37"37" N and 13°03"53" E, and it is mainly used to retain water for irrigation and recreational purposes. The direct catchment area covers a surface of 138 km^2 and the lake surface is 3.5 km^2 at maximum capacity (180 m a.s.l.). Most of the nutrient loading into Lake Arancio comes from untreated urban wastes (a village of about 7000 inhabitants is located close to the lake's shore) and agriculture. Intensive agriculture in its catchment significantly contributes fertilizers as well as the untreated wastes coming from a wine factory and a pig farm, ending up in freshwater. On the whole, the lake is receiving an estimated load of about 12 tons of phosphorus per year. The theoretical volume is 32×106 m^3 with a maximum depth of 30 m at the dam and a mean depth of 9 m. These values have been seldom attained since the creation of the lake due to the peculiarity of Mediterranean climate. Schematically, this type of climate is characterized by a dry and warm summer semester, alternating with a wet and rainy winter one. The length of the dry period can vary and recurrent periods of prolonged drought with a periodicity of 11-12 years are also typical. Due to the insularity of Sicily and according to its morphology, the river-network of the region is mainly formed by torrent-like (often temporary) systems, whose discharge is strictly dependent on precipitation. Thus, Sicilian reservoirs are characterized by wide water-level fluctuations because of the alternate periods of water storing and use: the wet winter season and the dry summer season. As a rule, reservoirs reach their maximum level in April/May at the end of the rainy season. During the filling phase, no significant water abstraction occurs. Afterwards, the absence of precipitation, the rapid raise of temperature and the evapotranspiration losses generate a strong water request for irrigation and drinking purposes, which may cause a volume contraction of more than 90% of the water stored. During this emptying phase, water abstraction is not compensated by any inflow. In this way, a summer drawdown occurs and the water level reaches its minimum value in October/November. The intensity and extent of water abstraction may differ conspicuously from year to year and a variety of physical structures are precipitated by high flushing rates and abrupt fluctuations in water level. The strength of these hydrological events can be considered an important factor governing both the biotic and abiotic compartments of these ecosystems, whose effects are rather complex and mainly involve bottom-up patterns.

Water-level fluctuations, especially summer drawdown, interfere with the periodicity and stability of thermal stratification. The deep location of outlets, typical of reservoirs, allows summer dewatering causing a depth decrease, but leaving the thickness of the epilimnion unchanged by dragging down the thermocline. However, if over a certain amount of water abstraction occurs, the stability of the water column is compromised, thermocline breaks, and the removal of water results in a deepening of the mixed layer (Naselli-Flores 2003). Ultimately, the breaking of the thermocline modifies the mixing depth-euphotic depth ratio of these water bodies. Actually, the deepening of the mixed layer may be analogized to the effect of the truncation of the euphotic depth due to an increase of phytoplankton biomass, which is generally taken to be the consequence of a shift towards a higher trophic state. The effect is to increase the value of the mixing depth-euphotic depth ratio, thus modifying the underwater light climate. This profoundly affects the structure of phytoplankton assemblages and their seasonal cycles; thus a change in the value of Z_{mix} / Z_{eu} is generally followed by sharp changes in the structure of

Lake Arancio dam. On the dam's wall the signs left by the water at different levels are easily visible.

phytoplankton assemblage. The organisms which form the spring assemblage are replaced by phytoplankton species with an elongated needle shape which enables them to tolerate highly unbalanced dark/light cycles or, when the underwater environment is too dark and $Z_{mix} / Z_{eu} > 3.5$, which can regulate their buoyancy. In this latter group, gas-vacuolated, toxin producing cyanobacteria are the best represented phytoplankton. These are generally hardly edible for zooplankton, thus impairing the control exerted by planktonic herbivores on primary producers.

Moreover, the Mediterranean climate affects nutrient loading temporal patterns since nutrients from the catchment can reach the water bodies only during winter, when precipitation occurs. In this season, according to temperature, productivity is low and no water outflow occurs from the reservoirs; thus, these environments act as a phosphorus sink; as a consequence, their internal loading is constantly increasing. The high amount of organic matter causes very rapid oxygen depletion in the hypolimnion at the onset of stratification, and the pH decreases. This reduced environmental condition promotes the release of phosphorus trapped in the sediment. The dragging down of the thermocline caused by the summer dewatering allows the "migration" of anoxic zones of reservoir bottom into the circulating part of the water body. Several hectares per week of reservoir bottom can be re-exposed to circulation and release their nutrient content to the upper layers, as demonstrated by the frequent pulses of reactive phosphorus recorded in Lake Arancio in summer, when there is not any water input from the catchment.

This pattern can be worsened when thermocline breaks. In fact, due to the high summer temperature, reservoirs may show an atelomictic behavior. This consists in a daily circulation pattern, which further contributes to nutrient release from the reservoir bottom, sustaining phytoplankton growth throughout the summer. An evaluation of the phosphorus balance in Lake Arancio has shown that the amount of phosphorus entering the reservoir during the rainy season is higher than that flushed out during the summer emptying phase (Naselli-Flores and Barone 2005), causing the progressive increase of the internal loading. Thus, the anticipated breaking of the thermocline does contribute to make this reservoir optically deep as well as to supply it with nutrients which sustain phytoplankton biomass accumulation. However, biomass accumulation is inversely related to water transparency and euphotic depth, further contributing to high values of the mixing zone-euphotic zone ratio. Ultimately, nutrient supply promotes secondary modifications in the physical environment through the decrease of light availability, again selecting those species better adapted to darker environments.

The pattern here described, has contributed to seriously impair water quality of Lake Arancio, leading to a hypereutrophic state constantly dominated by toxin-producing cyanobacteria. Analogously, several other reservoirs in the island are facing the same fate. It is thus possible to say that eutrophication processes proceed much faster in these man-made lakes than in natural ones because the above cited operational procedures applied to reservoirs have a general negative impact and contribute to worsening water quality.

The only way to counteract this tendency is the urgent development of a more integrated eutrophication management strategy. The goal of the strategy should be to reduce the frequency and intensity of cyanobaterial blooms and other water quality problems associated with nutrient pollution in Mediterranean reservoirs. To meet this goal, a management of hydrological patterns in the reservoirs has to be planned. However, this alone would only be a palliative method. Eutrophication phenomena in Sicilian and Mediterranean reservoirs can be effectively counteracted only promoting an integrated lake basin management (ILEC 2007) planned:

i) to reduce nutrient concentrations reaching the recipient water bodies (i.e. implementing waste treatment plants and reducing fertilizers);

ii) to improve operational procedures and to minimize the effects of water-level fluctuations;

iii) to increase the community's awareness of eutrophication problems and their associated risks;

iv) to force, in this way, the political rulers toward a more efficient utilization of economic resources and, last but not least,

v) to promote research in order to obtain better information and scientific knowledge about the influence of local factors on ecosystem functioning.

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ILBM for African Lake Basin Management with Sanitation Challenges (ILBM-AFSAN)

ILEC has obtained an applied study fund Ministry of Environment, Japan, to undertake a project on African lake basins facing deteriorating water environment and sanitary conditions. The objective of the project is for the project team to explore, in collaboration with local counterparts, various ways to meet the lake basin management and sanitation challenges through the application of ILBM (Integrated Lake Basin Management) approach . The project team will conduct a series of field visits and collaborative studies with the help of local governments, NGOs, international technical collaboration agencies, research institutions and experts in Africa. Assessment will be made on ways to improve sanitation conditions, particularly in areas innovative onsite facilities such as ecological sanitation and rehabilitation of existing infrastructures that would better serve for sustainable use and maintenance. Introduction of participatory approaches in water quality and ecosystem service assessment for their restoration is one of the important components of the study.

Specifically, the activities will include the following:

1) Based on the exiting literature and survey results, an overview analysis will be made on the state of lake basins, particularly with regard to point and non-point source pollution and runoff of untreated sewerage discharge, together with analysis of their biophysical characteristics and the socio-economic implications to the basin communities.
2) Based on the field visits and consultative meetings held in selected "model" lake basins, analysis will be made on alternative possibilities to restore and rehabilitate water quality and ecosystem integrity as well as to enhance public-health awareness of the affected communities.
3) Organizing ILBM-related workshops participated by local stakeholders working on lake basin resource use and conservation. They will hopefully serve for identifying and sharing the ILBM issues with sanitation challenges.
4) Developing an ILBM implementation plan adapted to the local conditions with local initiatives, while experimenting with provision of catalytic intervention tools to local communities, such as participatory water quality monitoring and facility operation and maintenance, through broad-based community education programs.

In addition, analysis will be made on the viability of adapting various mitigation measures to deal with the climate change impacts that are now believed to have become quite serious globally.

GEF Transboundary Waters Assessment Programme (TWAP)

— GEF Medium-Size Project —

Transboundary water basins are basins shared by two or more countries. As a result, the management of these systems for sustainable use is a double-edged challenge, not only because of their specific water problems, but also because of the political implications of their transboundary nature. Further, there presently is no internationally-agreed assessment methodology for their proper evaluation. Because of this reality, the United Nations Environment Programme (UNEP) enlisted the assistance in June 2008 of relevant water organizations within and outside the UN System to develop a "Transboundary Water Assessment Methodology," as a means assessing the five major water systems, including lakes, rivers, groundwater, large marine ecosystems, and the open ocean. This initiative was officially approved by the Global Environment Facility (GEF) as a Medium-Size Project (MSP) In January 2009, and is being coordinated by UNEP's Division of Early Warning and Assessment (DEWA) through its many partners already engaged in assessment efforts. Overall, the project involves 19 partners, including the Ministry for Foreign Affairs of Finland, a number of UN and other international organizations and universities. The project was christened in late-June 2009 with an Inception Meeting held at the UNEP-DHI Centre for Water and Environment in Hørsholm, Denmark.

The goal of the project is to develop an assessment methodology(ies) relevant, credible and legitimate for each of the five above-noted water systems. Because of its reputation and consideration of expertise regarding the assessment and management of lakes and their basins for sustainable use, ILEC was requested to chair the Lake Working Group of this international project. The to-be-developed assessment methodology(ies) is meant as the basis for a subsequent GEF-sponsored global-scale assessment and demonstration projects in the post-MSP phase.

Five Working Groups and their lead agencies are the following:

- Groundwater — UNESCO-IHP
- Lakes & Reservoirs — ILEC
- Rivers — UNEP-DHI
- Large Marine Ecosystem — UNESCO-IOC
- Open Ocean — UNESCO-IOC

To develop the lake assessment methodology, ILEC formed a core team consisting of ILEC Scientific Committee members (Chairperson Dr. Masahisa Nakamura; Vice-Chairperson Dr. Walter Rast) and an international lake management expert (Dr. Jeffrey Thornton, Southeastern Wisconsin Regional Planning Commission). The team has subsequently held three meetings on the assessment project, including a consultative meeting in November 2009 at the 13th World Lake Conference in Wuhan, China, with lake representatives from a number of countries involved in lake assessment and management efforts. In developing a lake assessment methodology, ILEC will focus on impairment of ecosystem

services as a major prioritization criterion, and the role of lake governance in addressing these impairments.

A recent meeting was held 14-17 December 2009 at UNESCO in Paris to discuss inter-linkages between the five water system groups, as well as appropriate assessment indicators. A major outcome of this meeting was the general support of ILEC's proposed impairment of ecosystem services approach as the basis for an the project's transboundary assessment methodology(ies). There also was agreement to "ecosystem services conservation" and "governance" as common components overarching the five different assessment methodologies. The five groups will elaborate their own methodology(ies) in preparing their proposed assessment approach by July 2009, and collectively identify "indicators" for each water system group, based on consideration of the commonalities and differences between the water systems. ILEC will incorporate a trans-media component(s) in the lake assessment methodology, in recognition of the inter-connections between the different water systems, including inclusion of the results of case study analyses to improve its methodology.

The TWAP provides a basis for monitoring and assessment in the subsequent global-scale assessment, a long-term GEF program to be undertaken upon completion of the MSP. It also provides the GEF with a means of more effectively using its limited funds to address priority transboundary water issues. Because assessment activities are an integral part of ILEC's ongoing Integrated Lake Basin Management (ILBM) efforts, ILEC looks forward to contributing to the outcome of this important global assessment effort.

JICA Training Course: Preservation of Marshlands in Southern Iraq

The Iraqi southern marshland, located at the convergence of two great rivers, theTigris and Euphrates, was severely damaged during the Hussein Era. Based on the agreement between the Government of Japan and the Iraqi Government, JICA decided to support the restoration of this marshland and requested ILEC to organize this training course in 2005. This is the only initiative focused on environment conservation among many JICA projects to support Iraq. So far, ILEC has led 44 trainees through this program.

The course leaders are Dr. Saburo Matsui, Professor Emeritus of Kyoto University, and Mr. Masato Kawanishi, an expert from JICA. The overall goal of this training program is "to enhance the capacity of organizations and officials working on the management of southern marshlands in Iraqi" so that they will become able to collect data on water quality and quantity, analyze them, and use the results to develop effective and feasible environment management plans. By the end of 2007, the initiative identified water-monitoring points, provided measuring devices, and proposed a networking scheme of institutions and information.

The 2008 course included 11 trainees from the Ministry of Water Resources, Ministry of the Environment, Ministry of Planning and Development Cooperation, and three universities (University of Baghdad, Basrah University and Missan University). The aim of the course was to get trainees to learn how to develop environment conservation plans through the visit of various activities taking place around Lake Biwa.

In one of the highlights, trainees were given a thought-provoking lecture from Professor Masahiro Murakami of Kochi University of Technology. The professor, based on the results obtained from a state-of-the-art climate change simulation program, gave a serious projection that there may be no water in Tigris and Euphrates in the future, because of projections of declining precipitation in Turkey, the source of water for the two rivers.

In Shiga Prefecture, trainees visited many places. In Maibara town, they carefully watched a reverse-osmosis membrane process to remove minerals from the brackish groundwater and learned the potential value of this technology for getting freshwater from seawater at home. At Hayasaki naiko (an attached lake), they observed lake restoration efforts and experienced some eco-tourism activities at Nishinoko lake nearby. During the visit of Moriyama town, they practiced "Eri" fishing at Lake Biwa with the help of Moriyama Fishermen's Union. They also visited an NGO called "Akanoi-Biwako Environmental Citizens' Initiative" and learned about community-based activities for environment conservation. In Kyoto Prefecture, trainees met with another NGO called NICCO (Nippon International Cooperation for Community Development) to hear about their organic farming activities in the Middle East. They also learned about ecological sanitation. Interestingly, in spite of their feces-phobia culture, they were curious to learn the practice of ecological sanitation which uses feces as a fertilizer.

All trainees highly appreciated this training course. In addition, they commented that they found the Japanese people to be modest despite the country having advanced technologies. In this way, this program contributes to raising the reputation of Japan from people abroad.

Trainees practicing "Eri" fishing at Lake Biwa

Activities of ILEC (January - December 2009)

January - March

- 5th Integrated Lake Basin Management Training Course (Jan. 13 - March 13, Sponsored by JICA)
- Lake Governance Project Review Meeting for FY 2008 (March 2 - 8, Shiga, Sponsored by Ministry of Education & Science, Japan)
- ILBM Training in Yunan Province-1 (March 15 – Aril 4, Yunnnan, China, Sponsored by WB,)
- Participation in WWF5 (March 17 - 22, Istanbul)

Ari - June

- ILBM Training in Yunan Province-2 (May 4 –11, Yunnnan, China, Sponsored by WB)
- ILBM Training in Yunan Province-3 (May 12 - 22, Yunnnan, China, Sponsored by WB)
- World Environment Day Exhibition (June 1 – 19, IETC-ILEC joint event,)
- Participation in TWAP Inception Meeting (Jun 30 – July 2, Denmark)

July - September

- Special Envoy of Children for the 13th World Lake Conference (Including four preparatory meetings and participation in "Children Session" at the World Lake Conference) (Aug. 1 ~ Nov. 4, Sponsored by Heiwado Zaidan)
- Participation in Stockholm Water Symposium & TWAP Lake Group Meeting/Field visit to Lake Constance (Aug. 9-25, Stockholm, Lake Constance)
- 2nd Nature-based Environmental Education Training (Aug. 18 –Oct. 7, Sponsored by JICA)
- 10th Environmental Education for Water (Aug. 31 – Oct. 16, Sponsored by JICA)
- ILBM Japanese Experts Meeting (Sept. 17 - 20, Shiga, Sponsored by Ministry of Education, Japan))
- IETC Strategy Development Meeting (Sept. 28-29, IETC Office, Osaka)

October - December

- TWAP Lake Group Meeting (Oct. 16-18, ILEC office)
- 13th World Lake Conference & TWAP-ILBM Meeting (Nov. 1- 5, Wuhan, China)
- ILBM Experts Meeting (Nov. 6, Wuhan, China)
- Lake Basin Governance Workshop (Dec. 9 – 15, India)
- Participation in TWAP Inter-linkage Working Group Meeting (Dec. 14-17, Paris)

ILEC

INTERNATIONAL LAKE ENVIRONMENT COMMITTEE

–Secretariat–

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