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NEWSLETTER

INTERNATIONAL LAKE ENVIRONMENT COMMITTEE FOUNDATION

— For Better Lake Management —

This Newsletter is also available in Japanese.

ILEC's New Permanent Home

The new ILEC and UNEP/IETC Building

From humble beginnings in a small room in the Prefectural office of Shiga Prefecture, ILEC has moved for the third and final time to its permanent home in a brand new building by Lake Biwa. The building is shared with UNEP/IETC Shiga, but is administered solely by ILEC.

The move was made in March, 1995 and the building was officially opened by Governor Inaba of Shiga Prefecture. Although the location is somewhat remote, it is nevertheless in beautiful surroundings. Lake Biwa, in all its splendour can be seen from most rooms in the building.

The building was designed to be in harmony with nature and employs a heating and cooling system utilising a radiating effect, with natural breezes for ventilation and plants for enhanced heat insulation. It also includes a rainwater collection system. The facility also has 11 guest rooms and one meeting room which will be used for visiting trainees and lecturers at the various training sessions held by ILEC.

The ILEC Scientific Committee meeting was held at the building in May, and this was followed by a Commemorative Ceremony and Symposium inaugurating the building in June. It is hoped that many more symposiums will be held in the building in the future, and the ILEC Secretariat looks forward to welcoming visitors and guests to its new offices from Japan and indeed all over the world.

IN THIS ISSUE

ILEC at a Turning Point

An editorial from the new ILEC Chairperson - Professor Jørgensen

At the recent meeting of ILEC's scientific committee, Professor T. Kira informed the committee that he had decided to retire as chairperson. Professor Kira has been chairperson of ILEC since it was founded almost ten years ago in February 1986. He has therefore been the crucial factor in all activities ILEC has launched during this period: a series of lake data books, a series of guideline books (five volumes have been published, with the sixth due out shortly), numerous courses and workshops and the environmental education project, which is active now in 6 countries (Argentina, Brazil, Denmark, Ghana, Japan and Thailand), to mention only the most remarkable initiatives. Let me use the opportunity provided by this editorial to thank Professor Kira for all the work, thoughts and emotions he, with all his heart, has invested in ILEC during the period from its very beginning in 1985/86 to today. Without an enthusiastic a chairperson of ILEC as Professor Kira, ILEC would not have attained the many fruitful results within environmental management of lakes and reservoirs.

I was elected the new chairperson at the Scientific Committee meeting in May, which I appreciate very much, as ILEC's activities have always been close to my heart. On the other hand, I am also fully aware of the difficulties to succeed Professor Kira's excellent leadership of ILEC's scientific committee. It will be impossible for me to imitate his personal (Japanese?) style of creating a fair consensus among the members of the committee. I have probably to a greater extent to rely on the member's democratic tradition and will to attain results.

ILEC is in many ways at a turning point. A new chairperson has to follow the footsteps of Professor Kira, which is not going to be easy. ILEC has moved to a new building in Kusatsu, where the committee meeting was held in May. A cooperation with a new UNEP centre erected in Kusatsu and Osaka has been launched.

ILEC's activities are, more important than ever. A global estimation of the pollution of lakes and reservoirs is difficult, but there are clear signs that the global level of water pollution unfortunately has increased during the last decade. More lakes and reservoirs than ever are endangered or threatened, particularly in the third world, where the economy does not allow expensive rescue operations. The need for further activities and initiatives by ILEC are obvious. I should therefore like to take new additional initiatives on behalf of ILEC, although it will be difficult due to the economic constraints.

The former and new chairperson presiding over the ILEC Scientific Committee held in May, 1995.

I should, however, like to use the coming months to discuss with ILEC's members which initiatives ILEC could and should take to attain a more direct effect on the lakes and reservoirs in the third world. Should ILEC, for instance, consider offering "first aid" to endangered and threatened lakes? Good advice from an experienced committee in the first phase of an environmental management plan could be very crucial. How should and could it be realized? There are many decisive resolutions to be taken in the coming years for the members of ILEC, and I feel confident that the component members of ILEC will help me to take the right decisions.

Scientific Committee Member Changes

The Scientific Committee Meeting held in May, 1995 approved some changes in the membership line-up. Along with Professor Kira, Professor Salánki of Hungary and Dr. Kaul of India have stepped down from the Committee and Dr. Straskraba from the Czech Republic, Dr. Chitale from India, Dr. Nakamura from Japan and Dr. Meganck (*ex-officio*) from UNEP have become members. ILEC wishes the departing members well and thanks them for their dedication and commitment to their work for the Foundation, and also warmly welcomes the new members.

Water Wars?

Water Wars may well sound like some Hollywood adventure movie, but if the World Bank is to be believed it is the reality of the next century. A recent report published by the Bank states that 80 of the world's countries are already suffering water shortages and the situation is destined to get worse due to increasing demand.

With 40 percent of the world's population living in 250 river basins which are the water source of more than one country, shortages will exacerbate tensions where they already exist, and create them where they don't. As far as back as 1988, the present UN Secretary-General Boutros Boutros-Ghali asserted that the next war in the Middle East would be over the Nile. His assertion becomes a little easier to understand when one considers that the great African river flows through some 10 countries and yet still supplies 97% of Egypt's water. Any developments, like a dam, in upstream countries such as Kenya, Tanzania or Uganda, would have serious repercussions on a country like Egypt. The Jordan river basin is a major water source for the four countries of Lebanon, Israel, Syria and Jordan. The problem there is further complicated by the fact that 40% of Israel's present water supply is from areas occupied after the 1967 war. It is also not surprising to learn that water is a major stumbling block in the current peace negotiations between the Israelis and the Palestinians.

However, precarious though the situation is there, the Middle East and North Africa are not the only regions with acute problems. In China the water table is dropping some one to two metres a year, and many cities are showing the strains of having to supply water to an increasing population. Western and southern India and some parts of Pakistan are also facing problems. The Bank forecasts that the worldwide demand for water will double every 21 years, with the resulting shortage in supply affecting ever larger numbers of people.

The problem does not appear to be one of a climatic drought, but more that of increasing demand from all sectors. An increasing population not only needs water to drink, but also water to grow crops to feed itself, and to supply to industry. Statistics show that rainfall stays much the same over the years, but with the world population set to double in 40 years the water needed to cover cropland to grow enough food for ten billion people just will not be there.

The picture painted by the World Bank is shaded darker with references to the lack of sanitation in many of the world's poorer countries and the repercussions it has on their economies. A recent cholera epidemic in Peru is estimated to have cost the country some $1 billion in agricultural exports and services - a figure some three times the amount invested in its water supply in the whole of the 1980s. The cost of cleaning up Shanghai's water pollution was estimated to be so high, that the city chose instead to spend $300 million moving its intake some 45 kilometres upstream. The Bank estimates that 95 percent of the world's sewage goes straight into rivers.

It is statistics like those given above that lead the World Bank to believe that future wars will be about water. So what sort of solutions does the Bank propose to alleviate such threats? A major thrust of its lending policy over the next decade will be in sanitation and water schemes. It wants to see a total of some $600 billion spent in these areas over the same period. Perhaps the most controversial of all the Bank's proposals though is to treat water as an economic product rather than a human right. It believes that private enterprises are best equipped to provide the maximum amount of services at the lowest cost.

Fun today, but what do their futures hold?

The Bank's detractors, however, claim that its focus is too western and technology oriented. Throwing large amounts of money at the problem alone will not solve it, they say. The problem has to be attacked from the bottom up. Investment, they concede, in sanitation and water schemes is important and indeed necessary, for without clean water good health is not possible, and without good health you cannot fight poverty. However, these schemes must benefit the poor and not just the high-tech patent holders of rich western countries.

But what is an article like this doing in the ILEC Newsletter? As a small international NGO, ILEC is playing its part in trying to educate its audience of the importance of water resources. ILEC is an organisation that can provide information on the environmental status of lakes and reservoirs around the world, and in the future hopes to be a position to offer advice on issues that directly affect the world's lake and reservoir management.

ILEC Journal

Lakes and Reservoirs: Research and Management

As a further means of achieving its objectives, ILEC has recently sponsored the publication of a new journal, *Lakes and Reservoirs: Research and Management*. Published by the internationally recognized firm of Blackwell Science, headquartered in Oxford, UK, but with branches worldwide, it is produced by the Melbourne branch of Blackwell's. Its co-editors in chief are Professor S. Matsui of Kyoto, Japan, and Professor W.D. Williams of Adelaide, Australia, and its executive editorial board comprises Professors N.B. Ayibotele of Ghana and S. Jørgensen of Denmark. All members of the ILEC Scientific Committee are members of the editorial board.

Consistent with the aims of ILEC, the journal aims to promote environmentally sound management of natural and artificial lakes in accord with sustainable development policies. To that end, the journal publishes international research on the management and conservation of lakes and reservoirs to facilitate the exchange of results of research and investigation.

Despite the difficulties of launching journals at present, ILEC believes that there is a need for a journal which focuses upon the key question of how best to manage and conserve lakes and reservoirs sustainably within a global perspective. ILEC also believes that there is a need for an international journal in English that provides special support for the publication of work by authors whose first language is not English and which offers international exposure to results of wide applicability.

The first issue, published May 1995, certainly supports ILEC's aims. Six papers were published authored by scientists from five countries (Japan, Brazil, the Czech Republic, India and Australia). Topics covered included inter alia a consideration of the extent to which sustainable development objectives had been met in Lake Biwa, the conservation of freshwater resources, and reservoir system management. River basins, fresh and saline lakes, and reservoirs all received attention.

The second issue, at present in press, is equally comprehensive and international. Its authors are from France, Thailand, Hungary, Italy, Kenya, Brazil and Denmark; and the topics covered include *inter alia* risk assessment strategies in Lake Victoria, Kenya, the effects of insecticides on fish, and state-of-the-art models for the management of lakes and reservoirs. Readers who wish to have further information should write to one of the editors or to ILEC; and authors wishing to submit manuscripts should in the first instance send these to ILEC directly.

Thai Environmental Education Mission

A mission to Thailand took place from 17-25 June, 1995 as part of the ILEC Environmental Education (EE) Project Activities in developing countries. The mission was funded by the National Volunteer Fund of the Japanese Ministry of Posts and Telecommunications.

The objective of the mission was to take stock of the EE activities currently being implemented in Thailand. Professor Kawashima of Shiga University and Mr. Toda of the ILEC Secretariat were the two mission members and they held meetings with the staff from Chiang Mai University and Songkla University concerning the EE projects.

Their tight schedule prevented mission members from visiting Songkla University, and therefore all gatherings were held at Chiang Mai University, where the following staff all contributed towards a successful congregation: Dr. Virat, Associate Dean, Faculty of Education, Associate Prof. Sirmsree, Associate Prof. Unchelee, Mr. Prasarn and others from Chiang Mai University; and Associate Prof. Kanok, Ms. Pan Son from Songkla University.

The meetings were lively and mission members were able to get an understanding of the passion with which the project is being pursued in Thailand. The trip was also used to donate 5 sets of "simple colorimeters" by ILEC to local schools. Finally, members visited an elementary school class at Prince Royal's College and a secondary school class at a demonstration school attached to Chiang Mai University. It was evident that Thai students are as concerned about their environment as their Japanese counterparts.

GEMS/WATER Steering Committee Meeting

The Steering Committee meeting of the Global Environment Monitoring System/Water (GEMS/Water) was held at the Federal Institute of Hydrology in Koblenz, Germany, on 23-24 June 1995. It was convened in conjunction with the "GEMS/Water expert consultation on land-based sources of pollution", and was the first meeting held in two years as the last meeting was convened at WHO, Geneva in June 1993. This Committee serves as the principal coordination, information exchange and forward planning mechanism for the GEMS/Water. More than 25 representatives from relevant organisations, including two representatives from ILEC, attended the two-day meeting.

In the meeting, a wide range of programmes and activities of the GEMS/Water for the 1994/95 biennium were discussed, and the GEMS/Water's future activities for the next 1996/97 biennium were then considered. ILEC's representatives announced, in connection with the biennium activities, the completion of the Lake Database development on RAISON/GEMS, the official data processing software of GEMS/Water, and demonstrated the database to participants during coffee break. Among the discussions, there were marketing GEMS/Water training courses to ADB, supporting the reconstruction of the whole monitoring network in India, coping with the consequences of major reorganisation of US/EPA and the resultant uncertainty concerning future Analytical Quality Assurance/Control activities, possible outcomes of the 1994/95 biennium.

Regarding possible future activities in the next biennium, the Committee agreed among others that ILEC should conduct the water quality assessment of lakes and reservoirs in Asia and the Pacific regions, and GEMS/Water should make efforts to widely distribute the Lake Database on RAISON/GEMS to relevant organisations and developing countries.

ILEC/JICA Follow-up Mission Brazil and Venezuela

Mission members with ex-ILEC/JICA trainees

The polluted Tiete river

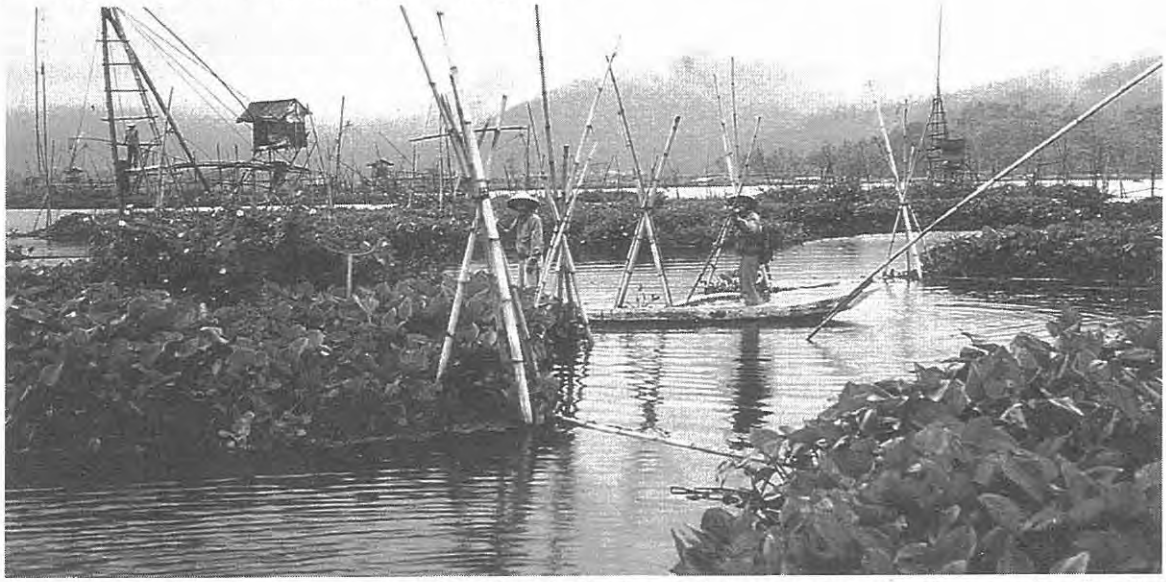
So far 56 trainees from 26 countries have participated in the ILEC/JICA Lake Quality Management Training Course since 1991. The purpose of this follow-up mission was to see how some of these trainees tackle the environmental problems in their countries after the training course. The mission visited former trainees in Brazil and Venezuela in July, 1995 and also surveyed current water pollution problems in those two countries.

Mission members were Professor M. Kawashima of Shiga University, M. Oba of JICA's Osaka Centre, and H. Yamamoto of the ILEC Secretariat. They met 3 trainees in Brazil and 4 in Venezuela. Most of these trainees still worked at the same organization they were affiliated to when they were on the course, but one Brazilian trainee had became an university professor and one Venezuelan an independent technical consultant.

The mission members also examined the notorious water pollution of the Tiete river in São Paulo, Brazil, and Lake Valencia in Venezuela. The pollution was quite unbelievable. A huge amount of bubbles were floating on the Tiete river and blue-green algae appeared to cover the entire shoreline of Lake Valencia. It is hoped that the trainees who come to Japan will be able to use their acquired knowledge in their home countries to help alleviate pollution such as that witnessed in Brazil and Venezuela.

LAKES OF THE WORLD
Indonesiâ's Lakes - Wim Giesen, AWB

Indonesia has more than 5,000 square kilometres of lakes, covering about 0.25 percent of the country's land surface. In all more than 500 lakes have been mapped, but the paucity of data is striking. Hydrological data, for example, are scarce, and information on aquatic fauna mostly consists of lists of commercial species, many of which have been introduced.



Rawa Pening is a eutrophic semi-manmade lake in Central Java that supports a productive fishery. Waterhyacinth must be constantly harvested to keep its waters clear of this noxious weed.

These waters are unevenly distributed throughout the archipelago, as numerous small lakes occur in tecto-volcanically active regions, while relatively few lakes are found on stable land masses and the smaller islands. In terms of lake surface area, two-thirds of Indonesia's permanent lake area is found in Sumatra and Sulawesi. The largest permanent lake is Lake Toba, Sumatra, which measures 112,970 hectares; floodplain lake systems are regularly even larger, and those of the Ogan-Komering in South Sumatra reportedly seasonally attain a size of over 200,000 hectares. Indonesia's deepest lake is Lake Matano, Sulawesi, which reaches a depth of 600 metres; it is the deepest lake in Southeast Asia and the eighth deepest lake in the world. Tecto-volcanic lakes dominate in terms of numbers, but the area covered by floodplain lakes is greater than 55 percent of the total. Less common, though well represented lakes types are dystrophic lakes in peat dome areas (especially in Riau Province, Sumatra), and solution lakes in karst regions (especially Java and Irian Jaya).

Floodplain lakes such as those of the Ogan-Komering (Sumatra), Upper Kapuas (Kalimantan) and Lake Tempe (Sulawesi) form the basis of very important fisheries, which in the case of Lake Tempe are at least as productive as artificial fishponds. Tectonic and volcanic lakes such as Toba (Sumatra), Kelimutu (Flores) and Batur (Bali) are popular tourist destinations, and lake water resources are important for potable water, irrigation and hydropower. Large and ancient lakes often harbour endemic species. Endemics of the Matano-Towuti lake system in Sulawesi, for instance, include more than 20 fish, 12 molluscs and 7 plant species.

A review of 35 large lakes throughout the archipelago (*W. Giesen, Indonesia's major freshwater lakes: A review of current knowledge, development processes and threats.* Mitt. Internat. Verein. Limnol., *24: 115-128, 1994*) shows that many have undergone major changes over the past decades, often resulting in degradation, and development plans threaten to disturb those relatively unaffected up to now. Dams occur in one third of all lakes and have been planned for at least another five. Major changes, usually widespread deforestation or conversion of forests, have occurred in the watersheds of at least one-third of the lakes, and have led to significant changes in lake hydrology. In many instances this has also led to siltation, which has become a significant problem in at least a quarter of all lakes.

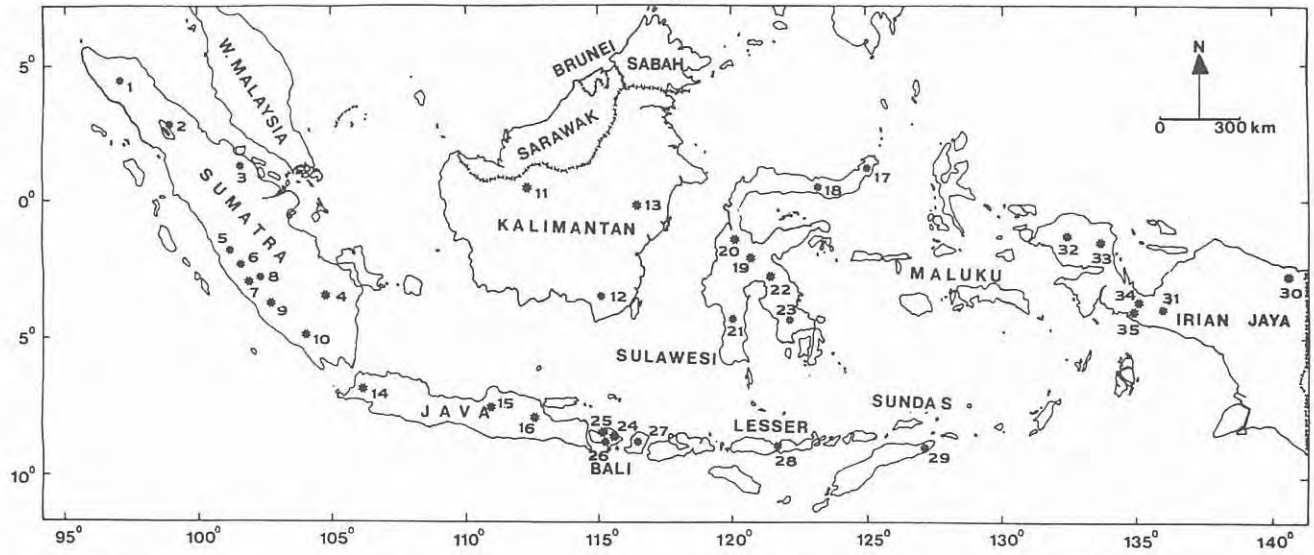
In 14 lakes noticeable changes have occurred in lake flora and vegetation, and in nine cases this has been significant. For instance, clearing and burning of swamp forest has removed most of this original vegetation of the Mahakam and Ogan-Komering lakes, and similar clearing is ongoing at the Siak Kecil lakes. For 11 lakes no information is available. Exotic plants are known to have been (unwittingly) introduced in 20 lakes, or 77 percent of those sites for which information is available. In 40% of the cases with introduced species, weed infestation has become a significant problem. The most commonly introduced exotic weeds that significantly affect lake ecology are *Eichhornia crassipes* (Waterhyacinth), *Salvinia molesta* (Kariba Weed) and *Mimosa pigra* L. (Giant Mimosa). Waterhyacinth and Kariba Weed shade out submerged vegetation, deplete oxygen levels and compete

with indigenous plant species, while Giant Mimosa creates impenetrable thickets.

In the case of fish, introduction of exotic species has been even more general a phenomenon, as this has occurred in 25 lakes, or 90% of all documented lakes. Fish introduction has been a part of the programme of the Indonesian Fisheries Service at least since the 1920s, and has greatly boosted fisheries production in some lakes, such as Lake Tempe. Initially the main introduced species were *Cyprinus carpio* (Common Carp), *Helostoma temmincki* (an anabantid), *Puntius gonionotus* (Silver Carp) and *Trichogaster pectoralis* (an anabantid) while in the last two decades tilapia (*Oreochromis mossambicus* and *O. niloticus*) have become more popular. This policy has resulted in the possible extinction of a number of endemic fish species in Lake Poso and Lake Lindu, and will soon perhaps have similar effects in the Matano-Towuti lakes. Overfishing is significant in a quarter of the documented lakes, and has resulted in a decline of production and possible local extinction of economically important species. The latter has been documented for the Ogan-Komering lakes in South Sumatra, the Upper Kapuas lakes in West Kalimantan, the Bangkau lakes in South Kalimantan, and for the valuable ornamental species *Scleropages formosus*, the Asian Bonytongue or Asian Arowana.

Environmental legislation has made much progress, but awaits effective implementation. Dams are constructed before a thorough, unbiased assessment is made of their environmental impact (i.e. Lakes Ranan and Matano), while pollution abatement is only also slowly being enforced, and often only the easy targets (small companies) are tackled. Solutions considered for mitigating environmental problems may bring new dilemmas. For instance, desktop solutions to siltation problems generally involve high-tech engineering work, and often concentrate only marginally on deforestation, which is almost always the root of the problem.

To prevent further loss of lake resources, their importance to fisheries, tourism, bio-diversity and as sources of potable and irrigation water should be more widely recognized, and taken into consideration when designing developing projects. Lake resources are recognized by individual departments and other government bodies, but an overview of these assets is apparently lost in regional planning processes, where decisions often reflect the current limitations of cross-sectoral planning.



1. L.Laut Tawar
2. L.Toba
3. Siak Kecil lakes
4. Ogan-Komering lakes
5. L.Maninjau
6. L.Singkarak
7. L.Diatas
8. L.Dibawah
9. L.Kerinci
10. L.Ranau
11. Upper Kapuas lakes
12. Bangkau lakes
13. Middle Mahakam lakes
14. L.Rawa
15. L.Pening
16. L.Lamongan
17. L.Tondano
18. L.Limboto
19. L.Poso
20. L.Lindu
21. Tempe lakes
22. Matano-Towuti lakes
23. L.Rawa Aopa
24. L.Batur
25. L.Buyan
26. L.Bratan
27. L.Segara-anak
28. L.Kelimutu
29. L.Surubel
30. L.Sentani
31. Enarotali lakes
32. Ayamaru lakes
33. Anggi lakes
34. L.Jamur
35. Triton lakes

Major Indonesian Lakes

Baseline inventories and ecological studies are required so that data is sufficiently available to assess the regional importance of lakes and their biota, and provide some framework for EIAs. Long-term monitoring studies should be initiated, especially in economically or scientifically more important lakes. Simultaneously, data should be evaluated, and a National Strategy for a wise use of Indonesia's lakes and lake resources formulated, in order to curb further loss of natural assets. This Strategy should be linked to the National Wetland Policy that is currently being formulated by the National Wetland Committee. This Committee, which was established in 1994, is chaired by the Ministry of the Environment and includes representatives from the Department of Public Works, the Fisheries Department, and the Directorate General of Forest Protection and Nature Conservation. All eyes are now on the Wetland Committee, and its willingness and ability to turn the tide of lake degradation.

New ILEC Publications

Compact-size Edition: Data Book of World Lake Environments - A Survey of the State of World Lakes - 2. Africa and Europe

The second in the compact-size edition of the Data Book of World Lake was published in March, 1995. This series is a re-compilation of data from the preceding five volumes of the Data Book of World Lakes Environments (1988-1993) into three volumes on a regional basis.

Although this compact version series has been photographically reproduced from the original Data Book, many errors and defects in the original have been corrected. ILEC has computerised the main data for 217 lakes and reservoirs compiled in the Data Book and this will be available in the near future in CD-ROM format. A demonstration version will be on show at the 6th World Lake Conference in Kasumigaura.

The third and final volume in this series covering North and South American lakes is scheduled for release in 1996.

Lake Biwa and Its Environment - Sub-textbook for Environmental Education

This book is the English version of the Japanese sub-textbook "Aoi Biwako" for junior high school environmental education in Shiga. The subjects dealt with in the book include the nature and history of Shiga prefecture, wildlife in the prefecture and the Aquatic Environment in Lake Biwa.

The book was written by many junior high school teachers who have been engaged in environmental education in Shiga for more than 10 years. It aims to help students learn about their environment and to heighten concern about this most important subject.

For information on both books, please contact the ILEC Secretariat.

Forthcoming Meetings

Experts' Meeting on Information Systems on Environmentally Sound Technologies

Date: 9-11 October, 1995
Location: Paris, France
Convener: UNEP

For details contact Dr. Habib El-Habr, Acting Deputy Director, UNEP/IETC Shiga Office, Kusatsu, Shiga, Japan.

6th International Conference on the Conservation and Management of Lakes, Kasumigaura '95

Date: 23-27 October, 1995
Location: Ibaraki, Japan
Convener: Ibaraki Prefectural Government and ILEC

For registration and other information please contact the Secretariat at the following address:

1-5-38 Sannomaru
Mito, Ibaraki 310, Japan.

Sixth International Symposium on Society and Resource Management: Call for Papers

Date: 18-23 May, 1996
Location: Pennsylvania State University, USA
Convener: Department of Agricultural Economics and Rural Sociology et al

Those wishing to present papers at the conference should contact A.E. Luloff at the following address:

Department of Agricultural Economics and Rural Sociology,
The Pennsylvania State University,
PA 16802, USA

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