



NEWSLETTER

– Save Water, Save Lakes –

International Lake Environment Committee Foundation

This newsletter is also available in Japanese.

One Year to the 16th World Lake Conference (Bali, November 7 - 11, 2016)

The 16th World Lake Conference (WLC16: Bali, November 2016) is approaching in one year. It is estimated that the venue country, Indonesia, has over 840 major lakes and 735 small lakes. Some are natural (e.g., crater lakes, coastal dammed lakes, and oxbow lakes) and others are artificial (e.g., reservoirs for power generation/flood control/irrigation and ponds in urban areas), varying in their characteristics and uses. The Conference will be held in Bali, which is rather known as a popular beach resort.

However, there are a few important lakes in this island; the most notable one is probably Lake Batur located in the north east region of Bali. This crater lake has a stunning panoramic view and is designated as one of the 15 Priority Lakes (to learn more, please read the featured article on the next page) under the conservation policy by the



The Jatiluwih Rice Terrace,
the UNESCO World Heritage Site

Indonesian National Government. This lake is a good example of how deeply the lakes in this country are related to livelihood, mostly in agriculture, especially in connection with “Subak”, or a traditional irrigation system developed in Bali, one of the major rice producing districts of Indonesia. Of course, the Conference should

not miss this interesting local feature in its program.

What makes Subak unique is its relation to the religion. In addition to farming, members of Subak participate and also share expenses in religious events related to water. Each Subak has its own temple that can be seen all around the island. Among which, the prestigious Taman Ayun and Ulun Danu Batur Temples are the UNESCO World Heritage sites, registered as the “Cultural Landscape of Bali Province: the Subak System as a Manifestation of the Tri Hita Karana Philosophy”, together with rice terraces which have socio-economic value maintained by Subak and also with Lake Batur which is believed to be a home of the goddess who generated the headspring to support the Subak system. The Conference participants should have chances to visit some of these attractive sites during the WLC16 excursions.

Hosted in such attractive sites, this upcoming World Lake Conference will be the first one ever held in South East Asia in its 30 year history. Wide range of session and forum topics are expected, from global trends such as climate change and transboundary lake basin issues, to national/regional discussions of Indonesian and South East Asian lakes. We look forward to meeting our readers in Bali next year.



Taman Ayun Temple, the UNESCO World Heritage Site
(Its canal supplies water to the neighbouring paddy fields, is rarely seen in other temples.)

For the latest information of WLC16, please visit the Conference website (www.wlc16bali.com).

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Lakes of the World

The 15 Priority Lakes of Indonesia

Luki Subehi*

Indonesia is listed among the 12 megadiversity countries, ranked as the second in the world (the first in Asia) in the number of freshwater fish species. Moreover, there are 840 lakes, 735 ponds and 162 dams in Indonesia, covering about 21,000 km² of area, retaining approximately 500 km³ of water volume and providing both ecological and economic services. Recently, there is an increasing need to conserve and maintain the ecological balance of inland water system which are subjected to massive pressure.

Upon the endorsement of Konferensi Nasional Danau Indonesia II (KNDI II) conducted during October 13-14, 2011 in Semarang, the Ministry of Environment, Indonesia designated 15 lakes as the national priority to resolve environmental crisis. This decision was to follow up the Bali Agreement on Sustainable Management of Lakes approved in the previous KNDI I in 2009 and unanimously signed up by the nine ministers. It is imperative to develop a plan of management strategy and responsible uses based on comprehensive scientific studies, including mitigation of disasters and involvement of community to maintain the sustainability of Indonesian lakes.

The group of 15 lakes includes Toba (North Sumatera), Maninjau (West Sumatera), Kerinci (Jambi), Rawa (Banten), Rawapening (Central Java), Batur (Bali), Tempe, Matano (South Sulawesi), Poso (Central Sulawesi), Tondano (North Sulawesi), Limboto (Gorontalo), Sentarum (West Kalimantan), Cascade Mahakam – Semayang, Melintang, Jempang (East Kalimantan), and Sentan (Papua). Assessment criteria of the designated priority lakes are as follows:

1. Lake damage: Level of sedimentation, pollution, eutrophication, highly reduced quality and quantity of water
2. Lake utilization: Hydropower plant, agriculture, fisheries (aquaculture/floating cage), usable water, religious and culture values, tourism (including lake uniqueness, accessibility, amenity-infrastructure and society condition)
3. Local government's and society's commitment to wisely manage lakes (master plan, local regulation (perda), managing committee)

4. Strategic lake: Lakes featuring strategic functions of national interest
5. Biodiversity (including endemic fish species, aves and vegetation)
6. Carbon urgency (the challenge against global climate change)

The second phase (2015-2019) consideration for priority lakes are : Diatas, Dibawah (West Sumatera), Ranau (South Sumatera), Dendam Tak Sudah (Bengkulu), Lindu (Centre of Sulawesi), Towuti, Mahalona (South of Sulawesi), Bratan (Bali), Paniai (Papua), Laut Tawar, Aneuk Laot (Aceh), Kelimutu (Nusa Tenggara Timur), Rinjani, Taliwang (Nusa Tenggara Barat) and Zamrud (Riau). It is certainly not an easy challenge to reach our goals for all priority lakes, but worth making efforts to reach sustainable ecosystem of the lakes in the future.

The Integrated Lake Basin Management (ILBM) is a useful conceptual framework to support the management of Indonesian lakes with its six governance pillars (participation, institutions, policies, technology, information and finance). In the hope of fulfilling our common mission, ILEC, the Ministry of Environment and Forestry, Ministry of Public Works and Housing, Indonesian Institute of Sciences (LIPI) - Research Centre for Limnology and Udayana University will organize the 16th World Lake Conference. It will successfully be held in Bali, Indonesia, in November 2016 with the theme of "Lake Ecosystem Health and Its Resilience: Diversity and the Risks of Extinction."



Lake Limboto



Lake Maninjau



Lake Tempe

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Water Blooms in the Three Gorges Reservoir: Responses of the riverine ecosystem to the anthropogenic disturbance

Zhengyu Hu (China)

Water blooms are a rapid increase or accumulation in the population of microscopic pelagic algae in the freshwater ecosystem. Since pelagic algae is a broad term, including organisms of widely varying sizes, growth rates and nutrient requirements, there is no officially recognized threshold level as to what is defined as a bloom. For some species, algae can be considered to be blooming at concentrations reaching millions of cells per milliliter, while others form blooms of tens of thousands of cells per liter. Typically, only one or a small number of algal species are involved, some blooms may be recognized by discoloration of the water resulting from the high density of pigmented cells. The photosynthetic pigments in algal cells determine the color of the bloom, due to the different predominant algal species with different type of pigments contained therein, a wide variety water color such as greenish, yellow, brown or red could be seen when the bloom occurred.

Three Gorges Reservoir (TGR) is the biggest river-type deep reservoir in the world. After the TGR's impoundment, more than 170 tributaries became the typical bay in its mid-downstream, where water blooms occurred frequently

in spring and summer annually. The backwater area was the sensitive area for water bloom and different type of water bloom could be observed, such as dinoflagellates bloom, cryptomonas bloom, diatom bloom, green algal bloom and cyanobacteria bloom, et al., that so many types of water bloom could be observed in the TGR is very amazing and complex. Information on occurring mechanisms of water blooms in the new reservoir (TGR) is very important to forecast and prevent water bloom. After 12 year's investigation, some valuable data was obtained and we found the following spatio-temporal pattern. First, a distinct spatial heterogeneity was the characteristics of the water bloom distribution. Although water bloom occurred in the backwater area, due to many typical bays were formed in one tributary, different type of water bloom could be seen in different bay at the same time, even in the same tributary. On the other hand, different tributary showed significant different variation. The spatial feature of water bloom was the consequence of accelerated eutrophication process and the profound changes of hydrodynamics after the TGR's impoundment. A significant seasonal succession of water bloom was observed, dinoflagellates

bloom and cryptomonas bloom were appeared in spring, diatom bloom was observed in the late spring and early summer, green algal bloom occurred in the early summer, cyanobacteria bloom was founded in summer and the early autumn. Temperature and light intensity was the driving force in the succession of water blooms in TGR.

Before the impoundment of TGR, there was no water bloom could be found in the upper of the Yangtze River. After impoundment, water blooms occurred frequently. Dam and reservoir changed the upper of the Yangtze River markedly. So far, the major conclusion is that water bloom is the response of freshwater ecosystem to the anthropogenic disturbance. The disturbance here could be divided into two parts; physical disturbance and chemical disturbance. The type of water body and hydrological characteristics, especially the hydrodynamics were changed by the Three Gorges Dam, which belong to the physical disturbance; the nutrient loading and its distribution pattern was also changed and the backwater turned to be the eutrophication area, which belongs to the chemical disturbance. The two disturbances resulted in the biological variation, then the structure and function of freshwater ecosystem was changed and water bloom occurred. Though many studies have been published, the occurring mechanisms of water blooms in the TGR are poorly understood. Further studies on population dynamics and phytoplankton structure under specific conditions should screen to illustrate the dynamics of water bloom in detail. At the same time, the treatment technology with high efficiency and long-term effects should be developed.



Dinoflagellates bloom

A Report from a Former JICA Training Participant

Enrique Pacheco Graf (Venezuela)



the end result, we hope to design, promote and implement climate change mitigation and adaptation strategies related to fresh water ecosystems vulnerability, directed to policy formulation at the local, regional and national level.

JICA course he participated has proven to be fundamental in the application of knowledge obtained during the training phase in Japan. Method, discipline and respect for the multiple points of view that may arise during community based actions, are without any doubt, the basis for the much needed human values on

Prof. Enrique Pacheco Graf from the University of the Andes (Universidad de Los Andes) in Mérida, Venezuela participated in the 2012 JICA-commissioned training course on the Environmental Education Focused on Fresh Water Environment. He is currently working in a team based project related to a graduate program in Community Management of Climate Change which will be the first of its kind in Venezuela and possibly Latin America. With it, at CIDIAT-ULA, based upon his ample experience and strong community ties, he and Prof. Esneira Quiñonez of the same institution, are working on the design and promotion of a local community climate change resilience project based on appropriate mitigation actions envisioned for expansion at regional and national scale. They have designed and developed local environmental education for climate change networks, hoping to promote and strengthen community awareness of climate change local processes and scenarios in order to influence public opinion towards the urgent necessity for policy formulation and implementation.

Due to the general lack of public awareness of climate change at the global, regional and local scale, and its possible implications on sustainable development issues, there is an urgent necessity to strengthen at local and national levels, knowledge and building capacities in climate change mitigation and adaptation financing, policy formulation and community resilience. In order to acquire this knowledge and build the necessary capacities, we are convinced of the need to share experiences through feedback processes with other colleagues and community experiences around the world. At

which a prosperous country should be founded. Upon his return from Japan, Prof. Pacheco and his colleague and life project partner, Prof. Quiñonez have been focused on community resilience to climate change based upon fresh water ecosystems vulnerability, management and conservation. This local initiative we hope to have the desired positive implications at the regional and national scales, fundamental to promote a much needed national policy for appropriate mitigation and adaptation actions. Based upon this experience, we have developed strong and durable community ties, and have been involved in the design and development of local environmental education programs and community networks for climate change wise (efficient + effective) mitigation and adaptation. This, we may emphasize, are essential for the project's sustainability. As a result, innovative work on community resilience to climate change has emerged as a possible regional and national reference to be taken into account in terms of a much needed



national policy for appropriate mitigation and adaptation actions.

Immediate and future action plans include the design, development and implementation of a local community climate change resilience projects as the base for a future regional and national level programs envisioned to promote

mitigation and adaptation capacities through the proposed environmental education program for climate change awareness and policy formulation with respect to appropriate mitigation actions. These include low carbon development strategies and infrastructure, source based GHG inventories and fresh water ecosystems vulnerability to climate change.

Recent Progress in ILBM Platform Process in Kenya

ILEC, supported by its African Scientific Committee Members and Research Center for Sustainability, Shiga University, Japan, undertook a project known as “AFSAN” to improve access to water and sanitation in some East African lakes in 2009-2011. The project was financially supported by the Ministry of the Environment, Japan. The AFSAN was pursued by promoting the Integrated Lake Basin Management (ILBM) for Lakes Nakuru, Lake Victoria/Nyanza Bay in Kenya and Lake Chivero in Zimbabwe. In June 2013, ILEC organized an international symposium in Yokohama, Japan to follow up on the project and discuss the next step in promoting the ILBM. In September 2014, on the occasion of the 15th World Lake Conference (Perugia, Italy), ILEC organized a thematic session featuring post-AFSAN activities to further promote the ILBM in broader range of Kenyan lakes.

In March 2015, ILEC organized the Expert Group Meeting in Nakuru City, Kenya in collaboration with the Ministry of Environment, Water and Natural Resources of Kenya and the

Nakuru County Government. The meeting was attended by representatives from major Kenyan lakes, including Naivasha, Baringo, Bororia, and Turkana as well as AFSAN-target lakes, Nakuru and Victoria. Participants shared management issues and challenges of these lakes. Through the discussion, ILEC made a point that lakes and reservoirs had to be managed through a gradual, incremental and long-term process called the ILBM Platform Process that can be infused into more conventional, government-driven water resources management approach like IWRM and IRBM. The ILBM emphasizes the importance of improving the river-lake basin governance with broad participation at the grass-root level. ILEC also introduced the ESSVA (Ecosystem Service Shared Value Assessment), or a methodology to be used in the preparatory process for evolving this ILBM Platform Process. It is aimed at obtaining the perceptual and factual profiles of ecosystem service values and risks shared across the basin.

In August 2015, ILEC organized the ILBM-ESSVA



Workshop in Japan to follow up on the discussion from the previous meeting in Nakuru. The workshop invited representatives from the Kenyan National Government, Nakuru County Government, and from Lakes Nakuru, Victoria and Baringo. Together with ILEC experts, they have successfully refined the ESSVA for use in infusing the ILBM

concept into the IWRM/IRBM framework. The proposed approach will be further refined and applied for the above three lake basins first, and then their outputs will be shared widely at the forthcoming meeting in Kenya scheduled in late November this year for feasible adaptation in other lake basins in Kenya and eventually in other regions of Africa.

Overview of ILEC Activities (April - September, 2015)

April 12-17 Participation in the 7th World Water Forum (Daegu & Gyeongbuk) **[PIC①]**

May 8-13 TWAP Final Technical Meeting at Shiga University and ILEC (Otsu & Kusatsu)

June 3 Delegates from National Hydraulic Research Institute of Malaysia (NAHRIM), headed by its Director, visit ILEC

28 The Ramsar Biwa-Kids Ambassadors Project: 1st Pre-Workshop (Nagahama)

July 1 A JICA partnership program training team from the Vietnam visits ILEC

30 The Ramsar Biwa-Kids Ambassadors Project: 2nd Pre-Workshop (Hikone, Moriyama & Yasu)

August 3-7 ILBM-ESSVA Workshop at ILEC **[PIC②]**

16-21 WLC16 Consultative Visit to Indonesia (Bali, Jakarta and Yogyakarta) **[PIC③]**

22 The Biwa-Kids Ambassadors participate in the Lake Biwa Citizen Conference 2015 (Otsu)

28 Delegates from Hunan Province, China visit ILEC during their JICA training program in Japan

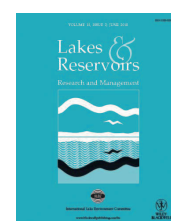
September 7-11 Preparatory visit to the Ramsar Biwa-Kids Ambassadors project sites (Chiang Mai)

11 A JICA commissioned training program, “Integrated Basin Management for Lake Environment” kicks off (- Nov. 6) **[PIC④]**



Scientific Journal of ILEC

Lakes & Reservoirs: Research and Management Latest Issues



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Greetings from the New Secretary General

Dear readers,

I was appointed as Secretary General of ILEC on April 1st, 2015. First of all, I would like to extend my sincere appreciation to all our readers who have been supporting the activities of ILEC. My first involvement in ILEC actually dates back to April 1987; a year after this Foundation was established in 1986. Back then, I was in charge of water quality monitoring and also in making a lake database at the Environmental Division of Shiga Prefectural Government. My work was to design a data collecting format and to obtain lake data from national/international partners of the Government. Almost thirty years have passed since then, during which period I served in the evolving field of environmental administration at the

Shiga Prefectural Government and witnessed ILEC growing and expanding its activities. For example, numbers of international training programs and regional conferences were organized in the aim of promoting the sustainable lake basin management method. ILEC has gained its global recognition through such activities carried out in an attempt to introduce and apply experiences and know-how, which were accumulated nationally and internationally, to the world.

Today, the United Nations' working group on the Sustainable Development Goals (SDGs) proposes to "ensure availability and sustainable management of water and sanitation for all" as one of the Goals. Globally speaking, it is highly required to achieve an integrated water resource

management both in quantity and quality, while in Japan it is rather important to ensure water quality on a high level. I see that it is one of the Foundation's important roles to contribute to the world in this aspect of the global needs. In addition to continuously contributing to developing nations, ILEC also aims to expand its range of activities by enhancing its support for Japanese young generation and enterprises to globally extend their activities and services on lake environmental conservation, and hopefully to improve its national name value. I thank you very much for your continued support for ILEC.

Shigekazu Ichiki



Board Members Reorganized

○ Replacement of Trustee

As of April 1, 2015, Mr. Yasuhiko Hiroi (Director General, Department of Lake Biwa and the Environment, Shiga Prefectural Government) was appointed as Trustee to succeed Mr. Hiromu Sakai.

○ Board of Directors: The 2nd Phase (Since June 5, 2015)

Director General	Hironori Hamanaka	Chair, Board of Directors, Institute for Global Environment Strategies (IGES); Former Vice-Minister for Global Environment, Ministry of the Environment
Deputy Director General	Masahisa Nakamura	Professor, Research Center for Sustainability and Environment, Shiga University; Chair, the ILEC Scientific Committee
Director	Akio Imai	Director, Center for Regional Environmental Research, National Institute for Environmental Studies
	Toru Shinohara	Director General, Lake Biwa Museum
	Yoshihisa Shimizu	Professor, Research Center for Environmental Quality Management, Kyoto University
	Yasuhisa Ishikawa	Director, Environmental Policy Division, Shiga Prefectural Government
	Kazuhiko Takemoto	Director, Institute for Advanced Study of Sustainability, United Nations University (UNU-IAS)
	Kaori Kubo	Professor, Faculty of Education, Shiga University

Biwa-Kids Ambassadors Go to Thailand: Vol.1 Pre-Workshops

This fiscal year 2015, ILEC is conducting the Ramsar Biwa-Kids Ambassador Project commissioned by the Shiga Prefectural Government. The project itself was formerly conducted four times since 2008 by other foundations. In this fifth edition of the project, under its theme; “Learning about Freshwater Food Culture through Experiences”, six selected Ambassadors (children aged from 10 to 12 reside in Shiga Prefecture, Japan) will be sent to Chiang Mai, Thailand to exchange their learning experiences with local children there and also to participate in the field studies.

Prior to the exchange program in Thailand taking place in this coming November, the Ambassadors participated in

two pre-workshops held in their home town, Shiga. They experienced a traditional fishing method in Lake Biwa, and took several cooking lessons using the lake’s endemic fish. One of the recipes they learned was how to prepare Funa Zushi, a fermented sushi made with Funa fish, which tastes like blue cheese. They not only enjoyed delightful taste of the food but also discovered the importance of environmental conservation and the value of local food culture passed down through generations to generations in the Lake Biwa basins. The next issue of this newsletter will feature a report from their Thailand trip.



Hot News :

The World Lake Conference Is Coming Back to Japan

We are pleased to announce that Ibaraki Prefecture is hosting the 17th World Lake Conference (WLC17) in 2018. The WLC is coming back to Japan in 17 years after the 9th Conference (BIWAKO 2001).



INTERNATIONAL LAKE ENVIRONMENT COMMITTEE FOUNDATION (ILEC)

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*The latest issue and back issues of this newsletter are also available on our website above.