THE 16th WORLD LAKE CONFERENCE 2016

November 7-11, 2016
Bali, Indonesia

16th WORLD LAKE CONFERENCE
BALI - INDONESIA

FINAL REPORT OF THE WLC16

Lake Ecosystem Health and Its Resilience: Diversity and Risk of Extinction

Ministry of Environment and Forestry
Ministry of Public Works and Housing
Indonesian Institute of Science
United Nations Educational, Scientific, and Cultural Organization - Asia Pacific Center for Ecohydrology
Bali Provincial Government
Udayana University
International Lake Environment Committee Foundation

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PREFACE
by Director General of Watershed and Protected Forest Management
Dr. Hilman Nugroho

First of all, let us praise God the Almighty for His grace, allowing us to get together on this occasion. Allow me, as Chairman of the Organizing Committee, to deliver a report on organization the 16th World Lake Conference in Bali.

The organization of this conference is based on the MoU between the Deputy of Environmental Degradation and Climate Change Management, Ministry of Environment and the Director General of the International Lake Environment Committee Foundation (ILEC) dated March 17, 2015. A further cooperation arrangement for this conference is the Agreement between Director General of Watershed and Protected Forest Management of the Ministry of Environment and Forestry, Director General of Water Resources of the Ministry of Public Works and Housing, and Deputy for Earth Sciences of the Indonesian Institute of Science.

Lastly, the Steering and Organizing Committees for this conference were established by way of a Minister of Environment and Forestry Decree dated June 8, 2016. We are comprised of:

a. Ministry of Environment and Forestry
b. Ministry of Public Works and Public Housing
c. Indonesian Institute of Sciences (LIPI)
d. International Lake Environment Committee Foundation (ILEC).
e. Bali Government and
f. Udayana University.

The theme of this conference is *"Lake Ecosystem Health and Its Resilience: Diversity and the Risks of Extinction"*.

Meanwhile, the objectives of the Conference, they are:

- First, to promote production and exchange of scientific knowledge and practical experience on lake management those are relevant for implementation.
- Secondly, to promote cooperation between nations.
- Thirdly, to provide a momentum to improve management of the world's lakes, including through provision of references in formulating policies of both central and local governments.
- Fourthly, to raise awareness of all stakeholders to be more actively involved in the preservation of the lake ecosystem.
- And last but not least, from Indonesia's perspective, to promote Indonesia as a laboratory in lake management.

Towards those objectives, the 16th World Lake Conference is held here in Bali, from 8 to 10 November, 2016. The programme is mainly composed of Scientific sessions, and Policy sessions.
Some pre and post conference events are also organized, as follows:

a. A fieldtrip has been organized yesterday, 7 November 2016, to Taman Ayun, Lake Buyan, Lake Bratan, Bali Botanical Gardens and Tanah Lot.
b. At Dasong Village on the shores of Lake Buyan, participants and local people undertook planting of 500 trees, which illustrates a real action in rescuing a lake.
c. At the shore of Lake Batur in Kintamani District, there are community actions on lake conservation and rehabilitation, held on 7 November 2016.
d. Start from 8 to 10 of November 2016, there will be Policy Dialogue, Thematic and Scientific Discussions, Kids Lake Forum, awards presentations, and some other programs.
e. In addition, the conference is flavored with introduction of Indonesia unique culinary, cultural performances, and exhibition on some Indonesia lakes.

I am pleased to report that this conference is attended by over 1,000 participants comprising 650 from Indonesia and 350 from overseas.

We would like to assure you that we have done our best, but we are aware there may still be any inconvenience that you experience, and we apologize for that.

Thank you very much.

REMARKS
By The Minister of Environment and Forestry
of the Republic of Indonesia
Dr. Siti Nurbaja

As we are aware, the World Lake Conference is an international forum for sharing and exchange of knowledge and experience related to lakes, which was initiated by the *International Lake Environment Committee Foundation* (ILEC) which is based in Japan. I am pleased that after over 30 years, the World Lake Conference has finally taken place in Indonesia, which is rich in lakes.

Indonesia has over 800 lakes of different sizes, which puts the country fifth in terms of the number of lakes. In Indonesia's National Medium Term Development Plan, 15 lakes have been designated as priority lakes for management. They are Lakes Toba, Maninjau, Singkarak, Kerinci, Rawa Danau, Rawapening, Batur, Tempe, Matano, Poso, Tondano, Limboto, Sentarum, Cascade Mahakam (Semayang, Melintang, Jempang) and Sentani. The biggest one is Lake Toba in Sumatera Island, with the dimensions of 1,130 square km in area, 530 m in depth, and 240,000 million cubic-meter in volume. It has also been designated top priority for tourist destination development. I believe Lake Toba will be much discussed in this conference, particularly during the national as well as international policy fora.

I am pleased to learn that after focusing on the science aspect, the Conference also address the policy aspect. This is important because we understand that lakes play very important roles in supporting human life such as providing source of drinking water, providing water for households and industries, agricultural irrigations, supporting fisheries, tourism, transportation and hydro-electric power plants. Beside those economic values, lakes also support local cultures through strengthening local wisdoms in sustainable lake management.

However, lake management is facing problems. Among others, complexity of modern development due to high population growth has increased cage-culture fishery and industrial and domestic waste, which cause disruption to the lake ecosystem functions, decrease of environmental quality and disturbance to community livelihood. Considering such conditions, I deem the theme of this conference is approriate, that is *"Lake Ecosystem Health and Its Resilience: Diversity and the Risks of Extinction"*. I hope that the conference will give lessons learned and advice on improved lake management, gain more knowledge and understanding through *inter alia* sharing of experience and best practices from various stakeholders. Through the conference, we hope that we can reinvigorate and reignite the zeal and passion we have for the issue of lake management. Conservation of lake ecosystems is something that we cannot avoid to. It is a must. That said, we are of the view that there are a number of areas whereas international lake community might consider to pursuing collaborative global actions in order to save lake ecosystems.

My view is that the World Lake Conference series could do more to contribute response to the existing challenges, through the following:

1. First, providing recommendation on policies and measures on lake restoration for implementation by governments.
2. Second, promoting community participation in utilizing and managing lake while maintaining balance between conservation and economy. Lakes should become source of income for the local people and govenment.
3. Third, promoting opportunities for researchers to review and to analize lake management.
4. Fourth, promoting transfer of knowledge, experience, and solutions in lake management.
   In addition, I think that more attention should be given to tropical lakes. I understand this will be addressed during the National and International Policy Fora, and I look forward to hear of good outcomes.

In this regards, Indonesia would welcome the use of Indonesia's lakes as field laboratories, and by so doing promoting them as tourism attractions.

Once again I thank you all for making this conference a reality, including all the steering and organizing committees members.May God bless all of our endeavours for the benefits of the people. Let us be firm in our conviction. Let us be bold to take action. Our support for the lake conservation and rehabilitation is imperative for the future of our ecosystem, our people and for the destiny of the next generation. We should not stop here, but we need to continue our works and deliberation in years to come.

REMARKS
By The Minister of Public Works and Housing
of the Republic of Indonesia
Dr. Basuki Hadimoeljono

First of all, let me convey my sincere appreciation to all of you for attending this conference, the 16th World Lake Conference. Secondly, I would like to express my gratitude to all speakers that delivered their presentation in the WLC16. I believe all of us intend to share our experience as well as common mission, which is to pursue better living standards for now and for the next generation.With respect to this conference, it is my great pleasure to share my points about Sustainable Infrastructure Development based on River Basin for Lake Regions in Indonesia.

We understand that lake is a water basin formed naturally along with water and ecosystems, including the border surrounding it.Lake is also one of primary sources of water that store water from rainwater, groundwater, springs and rivers. A lake with remarkable natural scenery may also be used to be a livelihood for the citizens living in the surrounding environment. A lake has some functions, such as ecosystem for environment conservation, fishing, water sport, and tourist destination. In addition, it also technically serves as a source of raw water, regulating water management, flood control, a source of electric power, and water transport.

We are proud that Indonesia has more than 840 small and big lakes spread over the country. Their total area of 8,400 km^2 is equivalent to around 840 km^3 of water provision.Unfortunately, some of the lake functions are decreasing due to damage of ecosystems, eutrophication, siltation, sedimentation and pollution. Moreover, about 15 lakes are categorized as critical lakes, because their quality and quantity are deteriorating.The problems related to the lake are not separated from the water catchment area since the lake is integrated with river basin area.The condition of the lake is the product of a river basin where the lake is located. Thus, the lake's water quality reflects the management in the river basin. In order to preserve and to manage the lake properly as well as to improve its function for the welfare of society, it is necessary to conduct lake management program based on the river basin.

Sustainable Infrastructure Development based on River Basin for Lake Regions in Indonesia, includes some programs of lake conservation, lake utilization and control of water destructive force.Lake conservation program is done through protection and preservation of the lake, its water quality, as well as the control of water pollution.Lake utilization program is conducted through the use of the lake as water resources and the quality development of the lake region. It should be based on an understanding of the nature and characteristics of the lakes within the river basin entity. Therefore, planners must consider the water balance of the river basin.Whilst, control of water destructive force is implemented through reducing the flood risk.

The activities we are doing within two years, either by construction and non-construction ways are:

- Improvement of watershed;
- Monitoring of erosion and sediment transport;
- Arrangement of Lake Management Plan;
- Determination of the lake border;
- Setting the water level of the lake supported by infrastructure development;
- Dredging the lake.

Regarding some 15 lakes categorized as critical lakes, recently we are conducting a revitalization program to restore the functions of the lakes. Within the programs, some activities are being executed, such as water reservoir reconstruction, sedimentation reduction, water hyacinths extermination, flood control construction, and lake protection.We are conducting infrastructure development within two approaches. The first, it is in order to maintain the water cycle remain natural and to supply raw water needs.

For the purpose, in 2016 we allocated about Rp 187.5 billion to conduct restoration project on 7 lakes. The second approach, it is in order to support tourism priority programs. This approach aims to create the framework for the tourism and recreation development based on lake's resources;to improve tourism development following Spatial Plan direction;to support investments in the lake development; and to show support for important business development and unique business ideas.For the purpose, in the beginning 2016 we allocated about more than Rp 735 billion for infrastructure development. In line with the function of Ministry of Public Works and Housing, we focus on infrastructure development at Toba Lake and its surrounding, such as toll road construction, lake restoration, and bridge design.

In order to manage the lake successfully, one sector can not handle alone, but it must be thoroughly involve various stakeholders integratedly. As a closing of my speech, I believe you are all water resourceexperts, therefore I invite your sincere contribution and action to the sustainability of our lakes and their environment. I hope our discussion could propose the best solution for our lake problems, and to achieve beneficial consensus that we can implement it now and the future. I believe that we can improve our excellent cooperation in the future in order to achieve and to bring a better prosperity to our people.Lastly, I would like to thank all participants for your presence and kind attention, and I do hope you enjoy your stay in Bali.

Thank you.

REMARKS
By The Chairman of Indonesian Institute of Sciences
Prof. Iskandar Zulkarnain

Water is the source of all lives on earth and is a resource indispensable for our social and economic activities. Without sound water resources management, human activities can potentially destroy the delicate balance between water resources and environmental sustainability.

Lakes are part of inland waters which very closely related to people's lives. Multifunction of the lake becomes part of everyday life, ranging from basic needs, livelihood, to the center of culture and local wisdom. Lakes play a significant role to provide ecological services, not only to provide water sources, but also to regulate climate and hydrological systems such as,nutrient's cycle; and home for various aquatic fauna and flora. Lake and river systems provide energy sources, vehicle for research, and sociocultural activities for the communities.

The 16th World Lake Conference (WLC) is one of the international forums to share and exchange knowledge and experience which contribute to a better management of the lake. This event is organized by joint committee consist of the Ministry of Environment and Forestry, Ministry of Public Works and Housing, and Indonesian Institute of Sciences. The joint committee is the reflection of our efforts in the management of lakes and its related systems.

Since 1990s, water pollution has worsened in almost all lakes and rivers in Latin America, Africa and Asia. The main causes include increases in untreated wastewater loading to freshwater bodies, and unsustainable land use practices which enhance erosion and lead to increased nutrient and sediment loading. This trend is driven by population growth, urbanization, and the related increasing number of industrial and agricultural structures that are not always well-managed and generate untreated waste water.

Climate change is also believed to have a multitude of long-term impacts on water resources. Both global climate change and anthropogenic activities have potentially devastating impacts on ecosystems and communities, ranging from economic and social impacts to health and food insecurity, all of which threaten the continued existence of many lakes in the world.

Although water pollution is a serious and worsening in many part of the world, there aregreat opportunityfor reversing the trend. This entails taking action to mitigate further pollution, restore the degraded ecosystems, and adopt a holistic approach toward wastewater management. Monitoring and assessment of water quality are also essential in order to understand the intensity and scope of the global water quality challenge and to implement proper correctives actions that sustain ecosystem health.

Indonesian Institute of Sciences through its Research Centers takes part in managing lakes& rivers in Indonesia by conducting basic and applied research. Indonesian Institute of Sciences as a national focal point of International Hydrological Programme (IHP) UNESCO supportsregional scientific research, and encourage further investigation of the effect of human activities and climate change on different lakes and rives.

LIPI also hosted the Asia Pacific Center for Ecohydrology, a center category II under UNESCO, focuses on ecological approach onwater resources management by harnessing science and technology, education and culture. APCE contributes in overcoming current and important issues of national, regional and global interests such as., poverty, climate change adaption, and disaster risk reduction.

With those roles,LIPI offer collaboration and knowledge exchange to support sustainable management of lake resources globally.

The World Lake Conference is an excellent platform for scientific and policy dialogues. We hope that in this event, we could build communication among those who are concern with lake systems, especially to get support and increase partnership among scientists, businesses, and academics for a better sustainable lake resources management.

Without further due, on behalf of Indonesian Institute of Sciences, we wish to express our earnest thank to all speakers who agreed to share their valuable knowledgeand experience. As such, the collective wisdom gathered here will contribute to the quality of deliberations and outcomes of this conference.

Finally, I would like to express my sincere thank to both national and international committees for their hard work to prepare this conference, and wishing all the participants to have an interesting discussion, good work and pleasant stay in this beautiful island, Bali.

Good luck for the conference, and thank you.

REMARKS
By Director General of International Lake Environment Committee Foundation (ILEC)
Prof. Hironori Hamanaka

I am honored to be in the 16th World Lake Conference. On behalf of the International Lake Environment Committee Foundation or ILEC, I would like to celebrate the opening of the 16th World Lake Conference. Also, I would like to express my special thanks to our host organization of this conference, the 16th World Lake Conference Program Committee and Indonesian Government, and their members who have done a great effort to organize this important international event.

The history of the World Lake Conference dates back to the Shiga Conference on Conservation and Management of World Lake Environment of 1984, known as LECS'84. The aim of the LECS' 84, which was to contribute to promoting scientific approaches in the world lake basin management, has been inherited to the World Lake Conferences held in various parts of the world including USA, Hungary, China, Italy, Argentina, Denmark, Kenya, India and Japan. Today, the Conference is globally recognized as a place for multi-sectoral participants (i.e., academia, government, citizens, NGOs and enterprises) to exchange their views and experiences on the sustainable management of lakes and their basins.

This year, we are in Bali, Indonesia. The World Lake Conference is held for the first time in Southeast Asia. It is estimated that more than 840 major lakes and 735 small lakes spread throughout Indonesia. Indonesian lakes vary in their ecosystems, morphogenesis, morphology and social-economic conditions, and are rich in biodiversity, culture and local wisdoms. In that respect, I believe, Indonesia is one of the best places where we gather together and exchange our opinions.

In 2016, international community will definitely need to enhance work to put the globally important agreements achieved in 2015 into action toward a transition to sustainable and resilient society. One of these agreements is the 2030 Agenda for Sustainable Development, which includes the Sustainable Development Goal and targets for the availability and sustainable management of water. Another important agreement is the Paris Agreement, a new and universal climate change regime for the period beyond 2020 applicable to all Parties, both developing and developed, to the UN Climate Change Convention.

This time, the Conference is organized under the theme of "Lake Ecosystem Health and Its Resilience – Diversity and Risk of Extinction." Based on the recognition that lakes contain 90% of liquid surface freshwater resources of the earth and provide the broadest range of ecosystem services to human beings compared with any other water-bodies, we at ILEC, working in collaboration with our partners across the world, are taking actions for the management of lakes and their basins for sustainable use of their ecosystem services for humanity and the environment. And yet, I believe we share the understanding that we have to improve the Lake Basin Management in more effective and efficient way.

In 2005, ILEC developed a new conceptual framework called "the Integrated Lake Basin Management (ILBM)" based on its global study about learning lessons from lake basin management practices in the world and on its specific characters of lentic water. ILBM maintains that good governance in lake-basin management is essential to the successful implementation of lake management plans, and that lake basin governance can be gradually improved through "the ILBM Platform Process."

Lake Basin Management will form a basis of the discussion in this conference. Since ILBM is an evolving concept, I hope to see this concept further improved through your contributions in thematic sessions and policy fora.

I hope the 16th World Lake Conference will serve as an occasion to deepen the discussions on measures to improve the Lake Basin Management and on the various roles that stakeholders can play.

I would like to conclude my remarks by expressing my sincere hope that all the participants will have a good time to enhance mutual understanding and partnership during the conference, and enjoy your stay in Bali, an island rich in nature and cultural heritage.

Thank you very much for your kind attention.

BALI DECLARATION

Introduction

Water is a fundamental requirement for all life, unifying all living organisms, flora, fauna and humans. Lakes, reservoirs, wetlands and other lentic water systems represent the most important sources of freshwater, with lakes and wetlands collectively containing more than 95% of the liquid freshwater on the surface of our planet. The essential role of freshwater in mainstreaming the aquatic and terrestrial landscape that provide life-supporting ecosystem services, diversity and health is also fundamental to human existence. However, the global distribution of this fundamental resource is uneven, and our human water demands are growing faster than our capacity to address the negative impacts resulting from multiple needs of water for food production, industrial processes, human, domestic and wildlife consumption, navigation, hydropower and other uses. The result is serious alternation of freshwater ecosystems, environmental degradation, local climate modification, and other anthropogenic changes, collectively leading to such water-related disasters as large-scale land subsidence and drastically changed river morphology, sometimes bringing about droughts and floods of unprecedented magnitude.

Lakes are facing multiple stresses on their environments, including increasing effluents from point and nonpoint sources, artificial alterations of lake basins, excessive water use, invasions of alien organisms, global climate change, and changes in human priorities. These stresses have resulted in significant degradation of the life-supporting ecosystem services provided by these freshwater bodies. Lakes, reservoirs, wetlands and other lentic water systems are the last frontiers in the survival and resilience of our society, in that they provide us not only with freshwater resources and other ecosystem services, but the health of lake ecosystems reflect how we value our present civilization and the future wealth and conditions for our descendants.

Against this background, the 16th World Lake Conference, held in Southeast Asia for the first time in the beautiful island of Bali, Indonesia, has chosen the theme, "Lake Ecosystem Health and Its Resilience: Diversity and the Risk of Extinction." To better relate the Bali World Lake Conference discussions and conclusions, multiple actions are needed to address an increasing wave of environmental degradation and overexploitation of lakes, reservoirs and other lentic water systems, particularly in Indonesia and other countries around the world.

Preamble

- Realizing that lakes and other lentic water systems provide the widest range of aquatic ecosystem services essential for human livelihoods, health and well-being, including resource provision services (drinking water supply, agricultural irrigation, fisheries, recreation, transportation, hydropower generation), regulating services (flood and drought mitigation, self-purification, climate mediation, shoreline ecotone buffering, diverse food-chains) and cultural services (aesthetics, spiritual, anthropogenic and historical values);
- Noting that the ecological integrity of many lakes and reservoirs around the world has been altered in recent decades through the modification of hydrology and fluxes of pollutants;

- Recognizing that aquatic ecosystems are typically part of a larger network of linked upstream and downstream lentic and lotic water systems;
- Acknowledging that on the basis of their basin characteristics, transboundary lakes exhibit great human water security and biodiversity threats;
- Noting that human activities in a lake will have impacts on the environmental and socioeconomic aspects of the lake, and that proper ordinances related to lake operations and resource extraction should be developed and appropriately disseminated so that lake stakeholders will have thorough knowledge and understanding of the importance of lakes in human lives and for making informed lake management decisions; and
- Realizing that cultural values can play vital roles in lake management, but that several interrelated factors that include motivation, communication, commitment, consistent participation of communities, proper mentoring, and decisiveness of the local government is necessary for successful implementation.

The participants at the 16th World Lake Conference reached the following consensus:

- There is a need to better understand lake ecosystem processes to shape effective and sustainable management strategies;
- In term of lake management, social network analysis can help identify existing social structures and possible intervention points for increasing the problem-solving capacity of governance networks;
- Maintaining forest cover and land use management is essential to reduce sedimentation, with the areas contributing most to sedimentation should be priority areas for rehabilitation;
- Domestic wastewaters should be treated before these effluents are discharged into lakes and reservoirs, and that such treatment can be facilitated by integrated wastewater treatment plants built by the government;
- Introduction of exotic and invasive species is a major problem threatening fish diversity, including endemic species in lakes of several countries, examples being Lake Biwa in Japan, Lake Lanao in the Philippines, and Lake Matano in Indonesia, and efficient and effective actions are needed for their possible eradication;
- Local wisdom can also play an important role in lake management, examples being the Tri Hita Karana of Balinese Hindhu philosophy, and help illustrate the relationship between people to people, people to nature and people to gods;
- Because unsustainable aquaculture practices negatively influence lake water quality, implementation of rules to address this issue should be developed and enforced;
- Children and the young generation should be made aware of the importance of the aquatic ecosystems and undertake actions to clean their lakes and maintain healthy environments;
- Ecohydrology, ecotechnology and palaeolimnology can play valuable roles in addressing many lake issues including risk management and disaster preparedness;
- Spatial, temporal and online monitoring of lake ecosystems and their services are very important;
- Since they fundamentally affect one another, lentic (standing water) and lotic (flowing water) water management should be addressed with an integrated approach such as Integrated Lentic-Lotic Basin Management (ILLBM), which is also consistent with many objectives of the Sustainable Development Goals (SDGs);
- Science-based conservation taxes can play important roles in supporting efforts to improve lake water quality, such as that exemplified by Lake Kasumigaura in Japan;

and agreed to make the following specific recommendations:

- Achievement of ecosystem health must be emphasized and ensured as the main goal in utilization of lakes by government, local communities, industry, agriculture and other stakeholders;
- For Indonesian conditions, it is important to have fundamental regulations and propose specific bodies for coordinating lake management, with concrete actions for 15 priority lakes being needed to cover zoning regulations, assess carrying capacity and alternative livelihoods for local communities;
- It is important to have public-private partnerships in lake management, including sustainable financial support;
- To prevent invasive species threats, national and local legislation can play important roles through authorization of government financial support and facilitation of public participation;.
- Integrated Lentic-Lotic Basin Management (ILLBM) should be promoted as a useful conceptual framework to complement the conventional Integrated Water Resource Management (IWRM) and Integrated River Basin Management (IRBM) frameworks for managing aquatic ecosystem;
- Collaborative research, both nationally and internationally, should be strongly pursued to develop accurate and useful databases, particularly for tropical inland water systems;
- Regional networks for collaborative research should be developed to increase knowledge and promote sharing of experiences in managing lake basins;
- Direct all the above actions in some manner toward achieving the Sustainable Development Goals (SDGs) that related to lakes and lentic-lotic water systems;
- As for the need to accelerate international cooperation in lake basin management in Asia, those having been successfully pursued over the past decades on various subjects between Indonesia and Japan provide many useful hints for future collaborations.

INTRODUCTION

Lakes, whether natural or artificial, fresh or saline, are an important and dramatic feature of our global landscape. They have been centers of human cultural development worldwide throughout the centuries. By providing their services in terms of increased food supply, safe drinking water and satisfying other water needs for human health and wellbeing, these ecosystems have become landscapes of inspiration, creativity and spiritual manifestations that constitute the 'heartware' that enriches and elevates human existence. Thus, lakes constitute a global heritage that must be restored and continuously protected to enhance their life-supporting ecosystem services, including those resulting from their linkages to other aquatic ecosystems. These linkages also have important scientific and governance implications.

It is pertinent that each and every lake has different characteristics; be in terms of its morphogenesis and morphology or in terms of social and economic condition of its surrounding community. Accordingly, they have certain specific problems and uniqueness from the socio-economic, cultural and ecological point of view. Like in many other countries, lakes in Indonesia have numerous purposes related to human life. They are not only function as water resources, but also serves, among others, as an important element to balance ecosystem, control of flood, drought and climate change, and as a habitat for biodiversity. Along with their freshwater plants and animal's richness, lake has advantages for developing ecotourism, research and development, as well as an energy sources. In addition, lakes have also important role in cultural preservation.

On the other hand, we are all aware that, as a result of increased population, intensified use of surface waters, exploitation of shoreline properties and other human pressures, lakes are increasingly being threatened. Declining water quality, nuisance algae blooms, excessive weed growths, deteriorating fisheries, sediment infilling, contamination, shoreline erosion and so forth are common problems being experienced due to human activities. Consequently, it may influence socio-economic condition of the lake's surrounding community, which in turn may impact economic and social development of the country and the world. It is no doubt that collaboration and coherence among relevant stakeholders, both governments and non-government actors, should be strengthened and further developed with the view to coping with the emerging challenges of lake management.

About the World Lake Conference

The history of the World Lake Conference (WLC) dates back to the Shiga Conference on Conservation and Management of World Lake Environment of 1984, known as LECS'84, which was held on the shore of Lake Biwa, Japan. The aim of the LECS' 84, which was to contribute to promoting scientific approaches in the world lake basin management, has been inherited to the World Lake Conferences held in various parts of the world including USA, Hungary, China, Italy, Argentina, Denmark, Kenya, India and Japan.

Today, the Conference is globally recognized as a place for multi-sectoral participants (i.e., academia, government, citizens, NGOs and enterprises) to exchange their views and experiences on the sustainable management for lakes and their basins, and to enhance collaboration in sustainable lake management.

The Previous WLC: WLC15

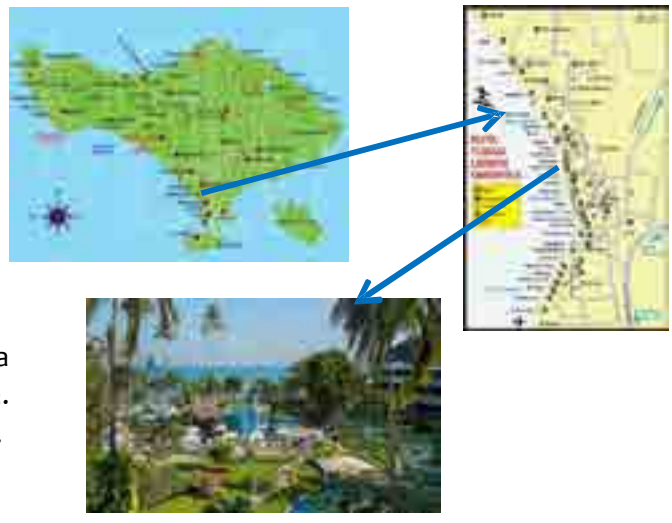
With this perspective in mind, the 15th World Lake Conference (WLC 15) in Perugia, 1-5 September 2014 has manifested the Perugia Declaration. This declaration acknowledges that freshwater is fundamental for all life, being finite in quantity, extremely vulnerable to human activities, and irreplaceable in its many uses. As in the Perugia Declaration, the participants agreed that sustainable lake management is role and responsibility of all stakeholders including government and local community; socialization and education are important parts of sustainable lake management; lake management is an important road to achieve the sustainability of aquatic ecosystem as in "Rio+20" dan "Goal 6.6"; lake is climate change barometer; and Integrated Lake Basin Management (ILBM) as an important approach and platform in lake management.


Indonesian Lakes

It is estimated that more than 840 major lakes and 735 small lakes spread throughout Indonesia. These lakes are able to accommodate approximately 500 km2 of water or 72% of the total surface water supplies in Indonesia. Three of the twenty lakes in Indonesia: Lake Matano 590 m, Lake Toba 529 m, and Lake Poso 450 m, are ones of the deepest lakes in the world. Indonesian lakes vary in their morphogenesis, morphology socio economic condition, culture and local wisdoms, and biodiversity. Each lake has its own characteristics, problems and challenges. However, in general, we have identified that based on the occurrence of the problems. They can be found in 3 areas: in the catchment area, the riparian zone of the lake, and the water body. The desired ideal condition of lake ecosystem is needed to be realized through an improvement management with emphasis on balance of the lake ecosystem health and the socio economic of the local community.

In 2009, the Ministry of Environment Indonesia conducted the First National Conference on Indonesian Lake Management. As a significant recommendation is that 9 Ministers: Minister for Agriculture, Minister of Energy and Minerals Resources, Minister of Home Affairs, Minister of Forestry, Minister of Culture and Tourism, Minister of Public Works, Minister of Marine and Fishery Affairs, and Minister of Research and Technology – agreed that based on their condition and problems, 15 lake ecosystem in Indonesia have to be prioritized - to avoid further critical environmental damages.

WLC16 IN GENERAL: CONFERENCE VENUE, DATE, ORGANIZER, THEME, TOPICS AND PARTICIPANTS



Conference venue and date

Conference venue of the WLC16 is Discovery Kartika Plaza Hotel in Kuta, Badung District, Bali, Indonesia. Conference date is from 7 to 11 of November 2016.

Organizer

WLC16 is organized by Ministry of Environment and Forestry of the Republic of Indonesia, Ministry of Public Works and Housing of the Republic of Indonesia and Indonesian Institute of Sciences (LIPI), in collaboration with International Lake Environment Committee Foundation (ILEC), and supported by Government of Bali Province and Udayana University.

Theme and topics

Theme of the WLC16 is Lake Ecosystem Health and Its Resilience: Diversity and Risks of Extinction.
Topics:

1. Climate change and water crisis (hydrological change impacts, hydrodynamic changes impacts, lakes as carbon sinks & carbon stock capacitors, adaptation and mitigation of lakes under climate-change threats).
2. Lake environments under stress and their restoration challenges (dying lakes and their rehabilitations, land- based pollution and sedimentation, euthrophication related phenomena and restoration measures, etc.).
3. Lake & lake basin management & policies (catchment management, shoreline management, in-lake-measures, river-lake-estuary systems, lentic-lotic complexes, lake basin governance, legal and regulatory practices, integrated lake basin management (ILBM), ecosystem service frameworks, best management practices.
4. Multiple water use purposes (hydropower generation, bottled waters, irrigation, public water supplies, etc.)
5. Water education, ecotourism, culture (awareness campaigns, community participation, local knowledge/wisdom, heartware approaches, etc.).
6. Data base and knowledgebase systems, informatics, monitoring technologies (geo-spatial technologies and mapping, GIS and Remote Sensing techniques and applications, data inventories and metadata sources, modeling and analytical tools, etc.).
7. Biodiversity and conservation (biodiversity assessment, biodiversity restoration techniques; freshwater fishery issues, challenges and prospects; indigenous species of flora and fauna, assessment and management of invasive species of fish and vegetation, etc.).
8. Ecotechnology and ecohydrology (ecosystem restoration and restoration ecology, ecosystem-based water quality improvement, assessment of ecosystem health; litoral zones and ecotones, etc.).
9. Manmade lakes (limnology of man-made lakes; reservoir operations and management, dams and their impacts, urban lakes, disused mining pools, etc. waste mining ponds).
10. Limnology and limnological science fundamentals (limnology of tropical lakes; brackish lakes and its limnology, lake-river interactions, physical limnology and sediment transport; paleolimnology etc.).

Participants

The 16th World Lake Conference (WLC16) was attended by 1064 participants from 35 countries.

No	Country	Number of Keynote Speaker/ Invited Discussants	Number of paper presenters (oral/poster) But not Keynote Speaker/ Invited Discussants	Participant	Number of participants
1	Australia	-	1	-	1
2	Bangladesh	-	1	-	1
3	Brazil	1	-	-	1
4	Cambodia	-	1	-	1
5	Chad	-	2	-	2
6	China	-	17	-	17
7	Croatia	-	1	-	1
8	Estonia	-	8	-	8
9	Ghana	1	-	-	1
10	Guatemala	-	1	-	1
11	India	-	22	-	22
12	Indonesia	30	53	726	809
13	Iran	-	2	-	2
14	Japan	6	45	84	135
15	Kenya	2	-	-	2
16	Korea	-	1	-	1
17	Malaysia	-	13	-	13
18	Mesir	-	1	-	1
19	Mexico	-	2	-	2
20	Myanmar	-	1	-	1
21	Nepal	-	1	-	1
22	NIgeria	-	3	-	3
23	New Zealand	1	-	-	1
24	Netherlands	-	1	-	1
25	Pakistan	-	3	-	3
26	Philippines	-	19	1	20
27	Rusia	-	4	1	5
28	Senegal	-	2	-	2
29	Singapore	-	1	-	1
30	Thailand	-	2	-	1
31	Turki	-	1	-	1
32	Ukraina	-	1	-	1
33	United Kingdom	-	1	-	1
35	Vietnam	-	1	-	1
	Total				1064

DAILY PROGRAM

Date	Time	Agenda	Detail/Keynote Speaker/ Main Paper Speaker	Place
Sunday, 6 November 2016	09.00 – 17.00	Registration		Pre-function Room
	09.00 – 16.00	Special Workshop	"LAKESIII" Knowledgebase Workshop by ILEC (limited)	Alaya Resort Kuta
	19.00 – 21.00	Welcome Reception		The Ponds Restaurant
Monday, 7 November 2016	08.00 – 20.00	Fieldtrip and Tree Planting	Taman Ayun, Lake Buyan, Lake Bratan, Bali Botanical Garden, Tanah Lot	
	09.00 – 17.00	Kids' Lake Forum I	"Save the Lake, Take Action"	La Cucina Garden & Bali Rani Hotel
	09.00 – 17.00	Community Forum	· Community Activities for Lake Batur Conservation · Dr. Ni Luh Kartini, Ms. Erna Witular and other	Lake Batur, Kintamani
Tuesday 8 November 2016	08.30 – 10.45	Opening Ceremony	· DG of Watershed and Protected Forest Management: Dr. Hilman Nugroho · Governor of Bali: Made Mangku Pastika · DG of ILEC: Prof. Hironori Hamanaka · Chairman of Indonesian Institute of Sciences: Prof. Iskandar Zulkarnain · Minister of Public Works and Housing: Dr. Basuki Hadimuljono · Minister of Environment and Forestry: Dr. Siti Nurbaja	Kharisma Ballroom
	10.45 – 12.05	Keynote Lecture	· Dr. Fauzan Ali (Director of Research Center for Limnology): Research Center for Limnology and the efforts to cope the inland water problems	Kharisma Ballroom
			· Prof. Walter Rast (Chairman of ILEC Scientific Committee, Texas State University): Integrated Management of Lentic and Lotic Water Systems: Application to Indonesian Priority Lakes	
			· Mr. Taizo Mikazuki (Governor of Shiga Prefecture Japan): Passing our Bountiful Lakes to the Next Generation with Local Efforts	
	13.30 – 18.00	National Policy Dialogue I	"Policy Improvement in Lake Management"	Kharisma Ballroom
	13.30 – 16.30	Scientific and Thematic Discussion	Lake Management and Policies Main paper speaker: Dr. Ni Luh Kartini	Room A
			Limnology	Room B
			Biodiversity and Conservation Main paper speaker: Dr. Mashhor Mansor	Room C
			Water Education, Ecotourism and Culture Main paper speaker: Prof. Kosuke Mizuno	Room D
	13.30 – 16.00	Kids'Lake Forum II	"Save the Lake, Take Action"	Bali Rani Hotel
	16.30 – 18.00	Technical session	Managing Land Use System Main paper speaker: Prof. Ryohei Kada	Room B
	16.30 – 18.00	Expert Meeting and Discussion	Lake Toba Management	Room C
	16.30 – 18.00	Technical Session	ILBM Heartware Main paper speaker: Prof. Masahisa Nakamura	Room D
	19.30 – 21.30	Special Meeting	Preliminary Meeting for International Policy Forum	Room B

Date	Time	Agenda	Detail/Keynote Speaker/Main Paper Speaker	Place
Wenesday, 9 November 2016	09.00 – 09.30	Keynote Lecture	· Prof. Soon Tak Lee (IHP – UNESCO): Sustainable Water Management with AP-HELP and IWRM	Kharisma Ballroom
			· Prof. David Hamilton (GLEON – University of Waikato, New Zealand): Lake Restoration in New Zealand, with Implications for Lakes Globally	
	09.30 – 12.30	National Policy Dialogue II	"Community Engagement and Multiparties Partnership in Lake Management"	Kharisma Ballroom
	09.30 – 12.30	Scientific and Thematic Discussion	Lake Management and Policies	Room A
			Limnology	Room B
			Climate Change and Water Crisis Main paper speaker: Prof. Hidayat Pawitan	Room C
			Ecotechnology and Ecohydrology Main paper speaker: Dr. Nyoman Suryadiputra	Room D
	13.30 – 16.30	International Policy Forum	"Developing Network and Collaboration Platform on Sustainable Lake Management" Facilitator: Dr. Efransjah and Prof. Masahisa Nakamura	Kharisma Ballroom
	13.30 – 16.10	Scientific and Thematic Discussion	Biodiversity and Conservation	Room A
			Lake Under Stress	Room B
			Database	Room C
			Limnology	Room D
	16.40 – 18.00	MoU Signing, Book Launching and Discussion	"Southeast Asian Network Initiative on Inland Water Science and Management"	Yudhistira Room
	19.00 – 21.30	Gala Dinner, Award and Art Performance	· DG of Water Resources: Mr. Imam Santoso · Representative of Bali Province · Governor of Ibaraki Prefecture: Mr. Masaru Hashimoto	Kharisma Ballroom
Thursday, 10 November 2016	09.00 – 09.30	Keynote Lecture	· Prof. Takehiko Fukushima (University of Tsukuba, Japan): Lake environments under stress and their restoration challenges	Kharisma Ballroom
			· Dr. Aloe Dohong (Peatland Restoration Agency, Indonesia): Multipurpose water use	
	09.30 – 12.10	Scientific and Thematic Discussion	Database Main paper speaker: Dr. Bunkei Matsushita	Room A
			Lake Under Stress Main paper speaker: Dr. Cynthia Henny	Room B
			Water Education, Ecotourism, Culture & Manmade Lake Main paper speaker: Dr. Anurak S.	Room C
			Ecotechnology, Ecohydrology Main paper speaker: Prof. Gadis Sri Haryani	Room D
	09.30 – 11.30	ILBM Workshop	Facilitated by Prof. Masahisa Nakamura	Kharisma Ballroom
	13.30 - 15.30	Closing Ceremony	· Conclusion of Scientific Discussions and Policy Dialogue by Chairman of Indonesian Scientific Committee, Prof. Gadis Sri Haryani · Presentation of Bali Declaration by Deputy DG of ILEC: Prof. Masahisa Nakamura · Speech toward the WLC17 by Governor of Ibaraki Prefecture: Mr. Masaru Hashimoto · Closing remarks by DG of ILEC: Prof. Hironori Hamanaka · Closing speech by Deputy Chairman of Indonesian Institute of Sciences	Kharisma Ballroom
Friday, 11 November 2016	09.00 – 18.00	Open Tour	Optional: Lake Batur, Pura Besakih, Pura Uluwatu, Pura Ubud, Ubud Monkey Forest, Tampak Siring Palace, etc.	

WELCOME RECEPTION AND ONSITE-REGISTRATION

Welcome Reception
The Ponds Restaurant – Open, November 6, 2016, 19.00 – 21.00




Welcome reception is conducted for hospitality to all of participants. It is attended by almost all of overseas participants and some domestic participants. There is no special agenda in the reception, just welcoming, having snack and drink, and introducing the organizer and some institutions.

On-site Registration
Pre-function Room, Discovery Kartika Plaza Hotel, November 6-10, 2016

On-site registration is organized from November 6 to 11, 2016.


OPENING CEREMONY

Kharisma Ballroom, November 8, 2016, 08.00 – 11.05

Time	Program
08.00 – 08.50	Registration
08.50 – 09.00	Welcome Dance (Sekar Jagat Dance)
09.00 – 09.05	Opening by MC
09.05 – 09.10	Indonesian Anthem
09.10 – 09.15	Praise by IB Alit Suryana (Official of Bali Provincial Government)
09.15 – 09.25	Film documentary of Indonesian lake
09.25 – 09.35	Messages from Kids Japan Kids represented by Ms. Yuna Mochizuki, and Indonesian Kids
09.35 – 09.45	Report by Director General of Watershed and Protected Forest Management, Ministry of Environment and Forestry, Dr. Hilman Nugroho
09.45 – 09.55	Welcoming Speech by Governor of Bali Province, Mr. Made Mangku Pastika, delivered by Head of Environmental Agency of Bali Province, Mr. I Gede Suarjana
09.55 – 10.05	Welcoming Speech by Director General of the International Lake Environment Committee Foundation (ILEC), Prof. Hironori Hamanaka
10.05 – 10.10	Choir Voice of Bali (Pohon Cintaku Song)
10.10 – 10.20	Speech by Chairman of Indonesian Institute of Sciences (LIPI), Prof. Iskandar Zulkarnain, delivered by Deputy Chairman for Earth Sciences, Dr. Zainal Arifin
10.20 – 10.30	Speech by Minister of Public Works and Housing, Dr. Basuki Hadimuljono, delivered by Director of Operation and Maintenance of Water Resources Infrastructure, Directorate General of water Resources, Ministry of Public Works and Housing, Ms. Lolly Martina Martief
10.30 – 10.35	Delivering Tree Sheed from Minister of Environment and Forestry, Dr. Siti Nurbaja, to: 1. Representative of Kids: Sho Kajiwara (Shiga, Japan) 2. Representative of Local Community: Mr. I Wayan Besar (Bali, Indonesia) 3. Representative of Overseas Participants: Ms. Olga Derevenskaya (Rusia)
10.35 – 10.50	Opening Speech by Minister of Environment and Forestry Opening the 16th World Lake Conference (WLC16) by "Kulkul" together: Minister of Environment and Forestry, Deputy Chairman of Indonesian Institute of Sciences, Director of Operation and Maintenance of Water Resources Infrastructure Ministry of Public Works and Housing, Head of Environmental Agency of Bali Province, and Director General of ILEC.
10.50 – 10.55	Choir Voice of Bali (Janger Song)
10.55 – 11.05	Dance Performance (Cenderawasih Dance)









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THE 16TH WORLD LAKE CONFERENCE
Diversity and Risks of Extinction"
2016 Discovery Kartika Plaza Hotel Bali - Indonesia

KEYNOTE LECTURES

1. **Dr. Fauzan Ali (Director of Research Center of Limnology, Indonesian Institute of Sciences)**
   "Research Center for Limnology and the Efforts to Cope the Inland Water Problems""

- Research Centre Multidisciplinary studies Study of physical, chemical, geological and biological interactions in Inland waters (Rivers, Lakes, Wetlands, Ponds and Reservoirs)
- Function: Research institute and government partner to provide the references for policy making on inland water ecosystems in Indonesia; and Providing technical guidelines, planning and evaluation on limnological research
- Research groups: Conservation & the potentials of inland water; Water quality and pollutant control on inland water; Inland water engineering; Disaster mitigation aquatic environment
- Unit for Technology Transfer of Lake Restoration – at Lake Maninjau
- Asia Pacific Centre for Echohydrology (APCE): Serves as a center category II of UNESCO focusing on ecological approach for water resource management
- Demosite, Theme: Advanced Development of Ecohydrology Demonstration Site in the Saguling Reservoir; Upper Citarum River Basin, Indonesia for *"Improvements of water quality and quantity using ecohydrological approach and local community-based participation"*

- Indonesian Inland water: Comprising 521 natural lakes, over than 100 reservoirs; Covering about 21,000 km2 of area; Resettling approximately 500 km3 of water volume; and Functioning for both ecological and economic services
- Lake Toba
  - Concerns: Loss of endemic and/or local fish species; Water pollution (i.e floating cages, industrial and agricultural activities); Deforestation of the catchment area
  - Research: Recommendation on fish conservation zones; Modelling of pollution fate and transport; and Technopark hatchery and aquaculture
- Lake Maninjau
  - Concerns: Floating cages; Eutrophication; Mass Fish Kill; Environmental awareness; and Conflict among stakeholders
  - Research: Online monitoring water quality; Recommendation on the maximum number of floating cages; The establishment of unit for technology transfer of lake restoration; and Floating wetlands

2. Dr. Walter Rast (Chairman of ILEC Scientific Committee)

"Integrated Management of Lentic and Lotic Water Systems: Application to Indonesian Priority Lakes"

- Environment Programme (UNEP) conducted a global-scale Transboundary Waters Assessment Programme (TWAP), focusing on five major types of transboundary water systems (rivers, lakes, aquifers, large marine ecosystems, open oceans). The purpose was to make a baseline assessment of their status and trends, and to determine the relative threats to them in order to establish priorities regarding needed management interventions for the most threatened systems. Noting that more than 90% of all the liquid freshwater on our planet's surface is located in lakes, wetlands and other lentic water systems, the International Lake Environment Committee (ILEC) conducted the transboundary lakes component of TWAP.

  Originally comprising more than 1,600 lakes, the study list of transboundary lakes was subsequently reduced to 156 transboundary lakes, using GIS-based spatial analysis of NASA global-scale databases. Fifty transboundary lakes in developed countries also were included for comparison purposes. The transboundary lakes analysis comprised 30 lakes in the South America and Caribbean region, 34 in Africa, 70 in the European region, 52 in the Asia region, and 20 in North America.
- Very scarce uniform data for the large majority of the transboundary lakes precluded direct comparison of in-lake conditions. Accordingly, the characteristics of the transboundary lake basins were used to estimate their relative threats, rather than in-lake conditions. Basin-scale data from a previously-completed global-scale study on Incident Human Water Security (HWS) and Biodiversity (BD) threats to river drainage basins (V□r□smarty et al. 2010) were adapted for this purpose. This latter study comprised 23 basin-scale drivers grouped under the thematic areas of catchment disturbance, pollution, water resource development, and biotic factors. Superimposing the transboundary lake basins over the drainage basins indicated many of the most threatened lakes, expressed in terms of Incident Human Water Security (HWS), were located in developed countries. A similar, though not as markedly distinctive, pattern was seen for the Biodiversity (BD) threats. It was further determined that the computed HWS threats alone did not necessarily provide an accurate picture of the relative lake threats because they did not consider how technological investments could reduce these threats. Accordingly, an 'investment benefits factor' was used to derive an Adjusted Human Water Security (Adj-HWS) threat,reflecting the ability of lake basin countries to undertake needed investments for such goals as water supply stabilization, improved water services, and access to waterways. Developed countries, initially exhibiting high HWS threats, exhibited lower Adj-HWS threats because of their ability to significantly invest in water infrastructure. Based on this Adj-HWS criterion, the African lakes as a group exhibited the greatest relative risks (11 of the 13 most threatened lakes), followed by Asia and South America, while those in the economically-wealthier European and North American countries exhibited lower relative risks.
- The transboundary lakes analysis also considered use of the derived threat ranks for developing and implementing management interventions. Integrated Water Resources Management (IWRM) is defined as a process promoting the coordinated development and management of water, land and related resources, in order to maximize the resulting economic and social welfare

equitably without compromising ecosystem sustainability (Global Water Partnership, 2000). ILEC experiences around the world, however, indicated it is difficult to 'operationalize' IWRM for lentic water systems such as lakes, reservoirs and wetlands (ILEC, 2005; Nakamura and Rast, 2014). Accordingly, ILEC developed an integrated management framework called Integrated Lake Basin Management (ILBM), focusing on the holistic management of lakes and their basins through gradual, continuous and holistic improvement of basin governance, including ecosystem services shared value assessment (ESSVA), to facilitate sustainable ecosystem services. The ILBM governance framework focuses on six major management elements,including policies, institutions, participation, technology,information and finances.

- Several major conclusions and recommendations arose from the TWAP transboundary lakes assessment. Lack of uniform lake data makes it difficult to accurately assess the status, trends and relative risks of transboundary lakes on a global scale. Thus, the international water community must undertake significant development of knowledge bases focusing on lakes, their basins and other lentic water systems. Further, based on their basin characteristics, African transboundary lakes as a group exhibited the greatest Adjusted Human Water Security (Adj-HWS) threats, followed by Asia and South America. In contrast, transboundary lakes in developed countries exhibited the greatest biodiversity threats, with those in developing countries exhibiting comparatively better conditions. It also is clear that accurate assessment of transboundary lake threats requires indicators translatable into contextually-determined weighted scores, based on factors and preconditions most important to the user of the results. An Integrated Lentic-Lotic Basin Management (IL2BM) framework for lake basins and their interlinked water systems through gradual, continuous improvement of basin governance can be infused within the widely-used IWRM framework to facilitate better understanding and management of these linked water systems.
- Further details on the rationale, data development, methodology, results and recommendations can be found in the TWAP Lake Final Report (ILEC and UNEP, 2016a) and the Summary for Policymakers (ILEC and UNEP, 2016b).
- References
  - Global Water Partnership. 2000. Integrated Water Resources Management. Background Paper No. 4, Technical Advisory Committee, GWP, Stockholm. 71 p.
  - ILEC. 2005. Managing Lakes and Their Basins for Sustainable Use. A Report for Lake Basin Managers and Stakeholders. International Lake Environment Committee (ILEC), Kusatsu, Japan. 174 p.
  - ILEC and UNEP. (2016a). Transboundary Lakes and Reservoirs: Status and Trends. United Nations Environment Programme (UNEP), Nairobi, Kenya.
  - ILEC and UNEP. (2016b). Transboundary Lakes and Reservoirs: Status and Trends. Summary for Policymakers. United Nations Environment Programme (UNEP), Nairobi, Kenya.
  - Nakamura, M. and W. Rast. 2014. Development of ILBM Platform Process. Evolving Guidelines through Participatory Improvement (2nd Ed.). Research Center for Sustainability and Environment, Shiga University (RCSE-SU) and International Lake Environment Committee (ILEC), Kusatsu, Japan. 85 p.
  - V□r□smarty, C.J., P.B. McIntyre, M.O. Gessner, D. Dudgeon, A. Prusevich, P. Green, S. Gliddens, W.E. Bunn, C. A. Sullivan, C. Reidy Liermann and P.M. Davies. 2010. Global threats to human water security and river biodiversity. Nature. 467:555-561. (Supplemental Information available online as doi:10.1038/nature09440).

3. Mr. Taizo Mikazuki (Governor of Shiga Prefecture, Japan)

"Passing our Bountiful Lakes to the Next Generation with Local Efforts"

- Express joy at the opening of the 16th World lake Conference in Bali, and extend gratitude to Indonesian Government and those responsible for their efforts in organizing this conference. Shiga Prefectural Government proposed this World Lake Conference about 30 years ago, with the hope that government officials, researchers and citizens from regions that have lakes could meet together and discuss issues regarding the lakes. The 1st World Lake Conference was held in Otsu City in Shiga in 1984. Since then, the conferences have been held in many countries around the world and attended by around 20,000 people.
- This 16th World Lake Conference is being held in Southeast Asia for the first time, with the theme, "Lake Ecosystem Health and Its Resilience: Diversity and Risks of Extinction."
- Amidst concerns that lake environments around the world are getting worse, expect that our discussions will be beneficial for future initiatives in participating countries.

- Shiga is home to Lake Biwa, the largest lake in Japan, which supplies water for 1,450 million people. Historically, Shiga's citizens, government, and researchers have collaborated on efforts addressing environmental problems in Lake Biwa, including the occurrence of freshwater red tides. Shiga Prefectural Government is continuing efforts for the lake with initiatives such as the Lake Biwa Comprehensive
  Conservation Plan, Mother Lake 21 Plan and the Law for the Conservation and Restoration of Lake Biwa.
- Regions with precious water resources, such as lakes, play an important role in the world and shoulder a great deal of responsibility.
- Call upon this year's participants to continue their efforts towards lake conservation. Beginning on the local level in regions with lakes, hopefully can expand our efforts and contribute to the solution of water problems around the world.

4. Prof. Soon Tak Lee (IHP – UNESCO)

"Sustainable Water Management with AP-HELP and IWRM"

- Global water issues: Only 2.5% of World's water is freshwater; Less than 1% of all freshwater is available for use; Today, around 3,800km3 of freshwater is withdrawn annually from the world's lakes, rivers and aquifers; Over the next 25 years, one-third of the world's population will experience severe water scarcity.
- Present and future water issues: Future demand increase water stress causes human water use up to 40 percent over the next two decades increased; Climate change affects future water availability causes human emissions of greenhouse gases change global and regional climates; Water resources become a limiting factor and its management increasingly complex task; Primary goal of future water resources management must be to maximize the long-term economic and social benefits to be gained from freshwater, while at the same time conserving ecosystem processes and biodiversity.
- Sustainable water management is a concept that emphasizes the need to consider the long-term future as well as the present. Water resource systems that are managed to satisfy the changing demands placed on them, now and on into the future, without system degradation, can be called "sustainable."
- Sustainable water resource systems are those designed and managed to fully contribute to the objectives of society, now and in the future, while maintaining their ecological, environmental, and hydrological integrity (ASCE, 1998; UNESCO, 1999).

- Ecologically sustainable water management protects the ecological integrity of affected ecosystems while meeting intergenerational human needs for water and sustaining the full array of other products and services provided by natural freshwater ecosystems. Ecological integrity is protected when the compositional and structural diversity and natural functioning of affected ecosystems is maintained.
- The ultimate challenge of ecologically sustainable water management is to design and implement a water management program that stores and diverts water for human purposes in a manner that does not cause affected ecosystems to degrade or simplify.
- Ecologically sustainable water management is an iterative process in which both human water demands and ecosystem requirements are defined, refined, and modified to meet human and ecosystem sustainability now and in the future, rather than a single, one-time solution. This implies an aggressive and continual search for compatibility between ecosystem and human water needs, and requires a commitment from all parties to ongoing participation in an active dialogue.
- Six Step Framework for Ecologically Sustainable Water Management (Richter et al, 2003): Estimate ecosystem flow requirements; Determine the influence of human activities on the flow regime; Identify incompatibilities between human and ecosystem needs; Foster collaborative dialogue to search for solutions; Conduct water management experiments to resolve uncertainties; and Design and implement an adaptive management plan.
- HELP (Hydrology for the Environment, Life and Policy): to deliver social, economic and environmental benefit to stakeholders through sustainable and appropriate use of water by directing hydrological science towards improved integrated catchment management basins (http://www.unesco.org/ihp/help).
- The central strategy of Global-HELP is to put in place a global network of catchments and presently 91 basins in 67 countries have been established, dealing with a large number of different research topics in hydrology and water resources.

- IWRM for Better River Basin Management with AP-HELP IWRM Definition is "A Process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems": A continuum of PROCESS as a way of avoiding or resolving conflicts over water(not as a finished & inviolate set of projects) and as a way of achieving 3 key goals (equity, efficiency, sustainability).
- A river basin approach in the implementation of IWRM is being recognized as a comprehensive basis for managing water resources more sustainably and will thus lead to social, economic, and environmental benefits. However, actual progress towards implementing IWRM varies enormously and depends on the area, capacity, political will, and the understanding of IWRM concepts and their implementation.
- In this model, water resources development in a basin, along with management principles and objectives, evolves over time as new demands and needs emerge, and innovative solutions are added at each stage. The spiral model is a convenient graphical conceptualization of the iterative, evolutionary, and adaptive management process, adjusting to new needs, circumstances, and societal goals. The spiral evolutionary model reflects progressive positive changes in historical water resources development and management.

5. Prof. David Hamilton (GLEON, University of Waikato, New Zealand)

"Lake Restoration in New Zealand with Implications for Lakes Globally"

- Reductions in external loading are fundamental to effective control of eutrophication. Diffuse sources now represent the greatest challenge to external nutrient load reductions.
- Mitigation bundles for N and P

Easy	Optimum Olsen P	P
	Low-P near stream areas and efficient pastures	P
	Low solubility P fertiliser	P
	Increased effluent application area	N P
	Reduce N inputs	N
Moderate	Strategic grazing of winter forage crops	N P
	Better irrigation management	N P
	Deferred irrigation (pond storage)	N P
Hard	Constructed/Facilitated wetland	N P
	Decrease stocking rate	N
	Change supplementary feed to Low N feed	N
	Restricted grazing over winter	N P
	Restricted grazing over winter and autumn	N P

- Despite many years of theoretical, empirical and modelling studies, we have often failed to adequately capture and quantify nutrient loads, particularly storm-loads.
- Ecological processes in lakes will generally not follow linear trajectories expected from linear changes in external forcings (e.g. catchment nutrient loads).
- Opportunities exist to revolutionise temporal and spatial monitoring of lake ecosystems but require lake ecologists to adopt increasingly flexible, interdisciplinary communication linkages that may not necessarily initially be fully productive.
- Can we reverse the trend and improve the current state?
  - o > 20% native vegetation in catchment (threshold for regime shifts?)
  - o > 5% of catchment in wetlands (N, P and SS removal)

- Koi carp and invasive macrophyte removal (biological effects)
- Re-engineering (physical effects)
- Sediment treatment in some cases (addressing legacies)

- New Zealand has National Policy Statement (NPS) for Freshwater Management ("Te Mana o te Wai").
- The local wisdom of "Te mana o te wai":
  - "The lakes are tāonga (treasures)"
  - "Exercising kaitiakitanga (environmental stewardship)"
  - "Sustaining mahinga kai (food resources; eels, whitebait, etc.)"

6. Prof. Takehiko Fukushima (University of Tsukuba, Japan)

"Lake Environments under Stress and Their Restoration Challenges"

- Focus on the environmental problems in tropical lakes in Southeast Asia. There are two types of lakes. One is shallow lakes, and another is deep lakes. At first, we look shallow lakes. They are perfectly mixed by relatively strong winds. We call them warm polymictic lakes. They have many periods of circulation annually. In addition, sediment is an important part of lake system.
- Lake Tonle Sap in Cambodia is the representative of this kind of lakes. Its size and depth change with the seasons. We developed the method distinguishing the area covered by cyanobacterial bloom, macrophyte and water itself using remote sensing method. And then, applied to this lake. This figure shows the changes in their distributions based on MODIS images during 15 years.
- Cynobacteria bloom affects our lives. For example, the production of toxic substances such as Microcystin resulted in unavailable waters for drinking. Decomposed blooms brings about bad smell etc., and then cause degradation of water amenity. In addition, blooms probably deteriorate ecosystem.
- In smaller lakes, mocrophytes sometimes cover lake surfaces. We used Landsat images for estimating the covered areas.
- Lake Limboto (North Sulawesi) and Lake Rawapening (Central Java) are covered by several kinds of macrophyts.
- In contrast, deep lakes in Tropical Southeast Asia are usually meromictic. "Meromictic" means never complete mixing. The vertical distribution of water density in Lake Matano, which is the deepest lake in Indonesia, around 590 m, with stable stratification, results from the distribution of ionic materials. This is probably attributable to the release of dissolved materials from sediments.
- There have been several previous reports investigating Indonesian lakes. The first is done by German Sunda-Expedition researchers. They investigated 15 lakes from 1928 to 1929, around 90 years ago. Ruttner reported the results. Second, UNDP & Indonesian team have the survey on 3 lakes in 1977 and the third, the Finnish and Indonesian team did on 24 lakes and 14 reservoirs from 1992 to 1993. In addition, there were a few individual researches on a specific lake. Recently, Japanese and LIPI group have done the survey on 12 lakes and 3 reservoirs from 2011 to 2016. We used this kind of water quality profiler through falling down in the investigated lakes. Then, we compare our results with the previous ones in 7 lakes, particularly focus on the vertical distribution of dissolved oxygen (DO).
- In Lake Toba (North Sumatera), Lake Matano (North Sulawesi), Lake Maninjau (West Sumatera),

Lake Batur (Bali), Lake Buyan (Bali) and Cirata Reservoir (Wast Java), there are tendency of the upwelling of DO deficient layer.

- Restoration challenges
  - Regular monitoring and understand the problems
  - Prohibition of excessive fish culture
  - Injection of oxygen-rich waters (expensive)
  - Withdraw of oxygen-deficit waters (influence on downstream rivers)
  - Adaptive management of lake water use.

7. Dr. Alue Dohong (Peatland Restoration Agency Republic of Indonesia)

"Multiple Water Use Purposes: Peatlands as a Water Source"

- Scale Levels of Water Uses: The household or homestead level (For example, domestic use or small-scale productive uses such as livestock, micro- enterprises, etc.) and The water system level (This is the level of certain infrastructure, such as water distribution scheme. For example, an irrigation canal for filling village reservoir for domestic supply, or provide water for fish
- Key Role of Peatlands as a Water Source: Globally 10% of all fresh water; Source areas of many rivers; Important for water storage and supply; Crucial for mitigation of droughts; and Crucial for mitigation of floods.
- In the Context of Sustainable Peatland Management, Water Management needed to remove excess water during the rainy season; to control water; to keep peatland wet; to conserve the water during the dry season; and to reduce or avoid subsidence.

THEMATIC-SCIENTIFIC SESSIONS

Room A, B, C, D, November 8-10, 2016
Presented Papers and Session Topics Summary

1. Climate change and water crisis

- Water security: water environment under stress in changing climate, water supply, policy, infrastructure investment, capacity building (education). Solution for urban water (Jakarta): upstream (conservation areas), midstream : buffer and utilization for downstream, downstream area
- Impact climate change on lake ecosystem use water quality, hydrology and hydrodynamic input used global climate prediction model.
- Studies on paleolimnology has given some evidences that climate change phenomena has been occurred since long time ago, giving impacts on inland water ecosystems. Mostly, climate changes generated increasing temperature which affected hydrological regimes and shifted up landscape and live being over there. A long term oscillation landscape changing had been reported included community adaptation, such as shifting up life based from fisheries (aquatic based) to paddy cultivation (terrestrial based).

- Presented papers on "Climate change and water crisis"

No	Presenter	Title
1	Hidayat Pawitan (Main Paper Speaker)	Water environments under stress in changing climate : ecohydrology and ecotechnology solutions
2	Ignasius D. A. Sutapa	Mobile Drinking Water Treatment Plant (Type IG5M30) for Disaster Emergency Response
3	Rudra Raya	Climate Change Impact on Water Quality of Phewa Lake, Nepal
4	Jajnaseni Rout	Climate Change Impacts on Natural Resources and Communities: A Geospatial Approach for Management
5	Phuong Thanh Doan	The Application of Sedimentary Pigments for Understanding Lake Ecosystem Response to Climate Change and Human Impacts in Southeast Australian Catchment
6	Shin-Ichi Nakamura	Living by the Waterside: Human Adaptation to Global Warming During the Holocene Climatic Optimum in China
7	Pradipta	Source and Sink of CO_2 and Trophic Switchover in the Chilika Lake India
8	Virgilio Antonio Miniño	Rise in Water Level of Lake Enriquillo, Dominican Republic
9	Peeter Noges	Estonian Climate and Water - Trying to Guess the Future

2. Lake environments under stress and their restoration challenges

- Transformation of zooplankton assemblage is observed after Lake Recovery Programs
- Tilapia Cage Culture influence water quality of Temengor Reservoir, Malaysia
- There is a need to better understanding of lake ecosystem processes to shape effective and sustainable management strategies

- Securing local economy, particularly in managing floating fish cage, complicates the effort in restoring lake water quality although fish kills incidence due to surface water hypoxia frequently occurs.
- Multi elemental analysis of trace elements in undisturbed sediment cores can be used to investigate the origin of sediments, the diagenetic process in recent sediments and the redox history of the lake as an insight for the assessment of recent trends in anthropogenic influence in the system.
- Methyl mercury bioaccumulations were identified in organs of various fishes in lake with traditional gold mining activities.
- Accumulation of sediment that mixed with wastes from industrial, domestic, and fish culture operations in the water bodies have threatened the sustainability of reservoir infrastructures, disrupting hydropower operation and other environmental services.
- The role and the evolution of cyanotoxins is still an open question therefore it is necessary to initiate cyanotoxin network studies to challenge the all unknown as well as to reduce the cost in the analysis.

- Presented papers on "Lake environments under stress and their restoration challenges"

No	Presenter	Title
1	Azusa Hashimoto	Influence of Dissolved Oxygen Concentration Change on Musty Odor Production by Actinomycetes
2	David Mark Taylor	Environmental Change and Ecological Resilience: Sedimentary Evidence From Crater Lakes in the Phillipines
3	Olga Yurjevna Derevenskaia	Transformation of Zooplankton Communities Due to The Lakes Recovery Programs
4	Ari Anggara	Bioaccumulation of Copper (Cu) in Organs of Orechromis niloticus at Buyan and Tamblingan Lake Bali
5	Yonghong Bi	Characteristics of Water Blooms in The Three Gorges Reservoir
6	Putu Oktavia	Challenges in The Restoration of Lake Maninjau : Bridging Actors' Interests for Sustainability
7	Xiao Feng Cao	Different Triggers Inducing Algal Bloom between Plain And Plateau Eutrophic Lakes
8	Hafrijal Syandri	The Increase of Floating Net Cages, Aquaculture Area and Water Quality in Maninjau Lake West Sumatra, Indonesia
9	Dmitri Gudkov	Radioactive Contamination and Fish Health in Lakes Within The Chernobyl Zone: 30 Years after Accident
10	Mamoru Terada	Creeping Water-Primrose Threats Akanoi Bay Which inside of the Lake Biwa, the Reservoir of Kansai Region
11	Cynthia Henny (Main Paper Speaker)	Impact of cage aquaculture on prolonged lake eutrophication and frequent lake hypoxia : Lake Maninjau, Indonesia
12	Nevenka Mikac	Trace Elements as Indicators of Environmental Processes and Anthropogenic Pressure on Protected Marine Lakes
13	Mehdi Raissy	Determination of Mercury in Freshwater Fish from Gandoman and Sooleghan Lagoons and Potential Limits for Human Consumption
14	Suwarno Hadisusanto	Bioaccumulation of Methyl Mercury in Lake Taliwang, Nusa Tenggara Barat: Impact of Traditional Gold Minning
15	Niranjan - Sarang	Trophic and Pollution Status of Jawahar Sagar in Southern Rajasthan, India Based on Water Quality and Macroinvertebrate Fauna
16	Eka Fibriantika	Increasing Human-Environmental Stresses on Jatiluhur Reservoir in the Past Decades
17	Sandra Azevedo	Is Abiotic Factors Main Driving Force for Cyanobacterial Bloom Occurrence?
18	Shen Jian	Eutrophication Development and Control Technology of Plateau Lake – Lake Erhai
19	Ricardo Jr Ferando De Leon	Assessment of Cyanotoxins in Sediments and Water At Laguna de Bay Philippines Using Elisa and q- pcr

3. Lake and lake basin management and policies

- Cultural values approach can play vital roles in the management of lake. However, in the implementation it takes several interrelated factors include motivation and participation of community, proper mentoring and decisiveness of the local government.
- There are three main messages from transboundary lakes assessment are
  - Lack of uniform lake data makes it difficult to accurately assess the status and trends of transboundary lakes on a global scale
  - Based on basin characteristics, transboundary lakes in developed countries exhibited the greatest Incident Biodiversity threats, with those in developing countries exhibiting comparatively better conditions.
  - Integrated Water Resource Management (IWRM) can best assess and manage lakes & other lentic water systems for sustainable ecosystem services with infusion of an Integrated Lentic-Lotic Basin Management (ILLBM) framework for lake basins and their interlinked water systems, through gradual, continuous improvement of basin governance.
- Lakes and other lentic water systems provide widest range of ecosystem services directly/ indirectly related to human livelihoods, health and well-being, including resources provision services (drinking water supply, agricultural irrigation, fisheries, recreation, transportation, hydropower generation), regulating services (flood and drought mitigation, self-purification, climate mediation, shoreline ecotone buffering, diverse food-chains) & cultural services (aesthetics, spiritual, anthropogenic, historical values).
- Various people's activities in the lake will have impacts on the environment and socio-economics aspects of the lake. Therefore, proper dissemination on ordinances relative to lake operations and resource extraction should be made so that the people will have a thorough knowledge of the importance of lake in human life.
- Ecosystem Health Report Card is a transformative assessment that compares scientific and environmental data for tracking of the ecosystem health of lakes and basin.
- There are several barriers on applying negotiated approach in Lake Maninjau, which are the lack of a comprehensive implementation of all the different IWRM and environmental policies and regulations, lack of education, the need for a united civil society, credibility of local government, a thought that lake management is only development project, and data sharing problem.
- In term of lake management, social network analysis can help to identify existing social structures and points for interventions to increase the problem solving capacity of the governance network.
- Wealth Accounting and the Valuation of Ecosystem Services (WAVES) is a global partnership led by the World Bank. This program has aims to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts and thus guide policy makers to better manage natural resources
- In spite of having limitations, it will be better that if the abandoned quarry will be converted to lakes so that not only the utilization of the land will be there, it will boost the economy through many reasons particularly through fisheries.
- Based on in Ibaraki prefecture, the implementation of conservation tax and the existence of environmental science play important role in supporting efforts to improve water quality of Lake Kasumigaura.
- Community empowerment such as community participation, training program and involvement of scientific and educational institution, is important aspect in watershed governance
- Sponge city is city or town which is more flexible to adapt to changing environment, the six key functions of sponge city is infiltration, storage, purification, circulation, discharge and retention. Sponge city can reduce the runoff and pollutant directly into river and lake, increase the retention time and treatment time for the runoff, decrease the risk of flood, decrease the water treatment cost of the central treatment, and replace the grey infrastructure to the green infrastructure. It is very important to China reconstruction their city in ecological way.



- Presented papers on "Lake and lake basin management and policies"

No	Presenter	Title
1	Ni Luh Kartini (Main Paper Speaker)	Lake and Lake Basin Management and Policies in Bali
2	Walter Rast	Ranking Transboundary Lake Threats : A Global-Scale Assessment
3	Serapion Nudalo Tanduyan	People's Activities in Lake Danao, Pacijan Island, Cebu, Phillipines
4	Salif E. Diop	Sustainable management of lakes water's systems and the need for an ecosystem approach and a comprehensive integration of waters bodies
5	Ajit Kumar Pattnaik	Ecosystem Health Report Card: A Tool for Effective Tracking of the Ecosystem Health of Chilika Lake & Its Basin
6	Syarifah Aini Dalimunthe	Questioning Negotiated Approach in Managing Multi-Purposed Lake Maninjau
7	Evi Irawan	The Governance of Lake Rawapening, Indonesia: An Inter-Organizational Network Analysis
8	Alvin Arban Faraon	Valuation of Ecosystem Service of the Laguna Lake Basin: Erosion Control and Flood Water Retention
9	Rajiv Das Kangabam	Assessment of Ecosystem Health Status of Loktak Lake – The Largest Fresh Water Lake in North East India
10	Bhatu Kumar Pal	Strategies for Conversion of Abandoned Quarries to Lakes for Land Use and Fisheries -- Case Studies
11	Yoshihisa Shimizu	An Operational Framework to Evaluate Ecosystem Services and Disservices in a Biosphere Reserve Integrating Local Insights
12	Kunika Soma	Efforts to Improve Water Quality in Lake Kasumigaura by the Ibaraki Prefectural Government
13	Rajiv Das Kangabam	Assessment of Ecosystem Health Status of Loktak Lake – The Largest Fresh Water Lake in North East India
14	Pramod Bhagwan Salaskar	Strategy for Conservation and Management of Urban Lakes in Mumbai
15	Tiina Noges	Potential Cross-Sectorial Trade-Offs in River Basin Scale Water Management
16	Saburo Matsui	The Sustainable Development Project around Lake Victoria with Water, Ecological Sanitation & Agriculture
17	Noboru Okuda	Toward the Adaptive Watershed Governance to Enhance Biodiversity-Driven Nutrient Cycling and Human Well-Being
18	Jiang Xia	Ideas and Suggestion for Ecological Environment Protection of Fresh Macrophtic Lake –Keluke Lake
19	Yoshimura Chihiro	Establishment of Environmental Conservation, Platform of Tonle Sap Lake
20	Marijan Ahel	Assessment of Anthropogenic Pressures on the Visovac Lake, Croatia – Steps Towards Improved Protection and Management
21	Xiao Shang	Summary of Efforts to Maintain the Water Environment Quality of the Lake Fuxian, China
22	Naoki Komatsu	The Effort for The Conservation and Restoration of Lake Biwa in Shiga, Japan

4. Water education, ecotourism, culture, and manmade and urban lake

- CSR can maintain better management on improving the health of student because of drinking water contamination. The way it is by introducing better water management, social behavior of student e.g. clean/wash hand, better cooking style etc.
- Students introducing manual cleaning of Lake Biwa from aquatic plants. It is really needs take actions and doing the simple thing.
- Some urban lakes around Jakarta were observed and managed by local people, then the local people created the scale among the urban lakes. Later the worst lake will learn from the better one or the best one to manage the lake. This new water concept has been mentioned as "Tirta budaya Situ".



- Presented papers on "Water education, ecotourism and culture" and "Manmade and urban lake"

No	Presenter	Title
1	Kosuke Mizuno (Main Paper Speaker)	Rewetting and Paddy culture as a solutiom to rehabilitate degraded Peatland in Indonesia-Local knowledge, community and local Economy
2	Darma Putra	Bottom up Tourism Development: The Emergence of Community Based Tourism In Recent Developments of Bali Tourism
3	Adelina C. Santos- Borja	The Laguna de Bay Ecosystem Health Report Card: An Assessment and Communication Tool for Stakeholders
4	Sarmistha/Chittaranj an	Community Participation in Integrated Sustainable Environmental Management of Lake Bindusagar: Famous Natura Heritage of India
5	Nagesh Shankarrao Tekale	Water Education: an Awarness Campaign in Tribal Belt of Western Part of India
6	Nishide Yusei	Nationwide Cooperation of University Students in Removal of Invasive Aquatic Weed in Lake Biwa, Japan
7	Ami A. Meutia	A New Water Culture Concept "Tirta Budaya Situ"
8	Vanessa Mercee Diamante V	Evaluating Indicators for Use in Report Cards for Lake Ecosystem Health
9	Ramadhan Hamdani	Capacity Buliding of Lake Toba Ecosystem Management Based on Socio Cultural
10	Naoko Hirayama	Impacts of Participating Measures for Reduction of Alien Fishes in Lake Biwa
11	Satoru Yamakawa	Kabata
12	Anurak S. (Main Paper Speaker)	Effect of Saltwater Intrusion in Chao-Phraya River and Mitigation Measures
13	Wan Maznah Wan Omar	Phytoplankton Community Dynamics as Bioindicators to Assess Aquatic Ecosystem Health: a Case Study of a Tropical Reservoir
14	Octyviana Arum	Pollution of Level Penjalin Reservoir Paguyangan Sub District Brebes Regency Determined From The Plankton Community Structure
15	Koshi Yoshida	Evaluation of Flood Mitigation and Water Purification Effect in Urban Lake, Jabodetabek
16	Nugroho Hari Anggoro	Water Pollution Load Capacity and Reservoir Zoning as an Attempt to Maintain the Sustainability Function of Wadaslintang Reservoir
17	Cathelya Yosephin Silaen	Identification of Lake Toba Potention to Support Geopark Toba Caldera Development
18	Leodionus Mwebembezi	Role of Water User Associations in Ensuring Water Security of Uganda
19	Nagamine Hiroki	Practice of Water Environmental Education in Kasumigaura Watershed by Tsuchiura City

5. Database and knowledgebase systems, informatics, monitoring technologies

- SWAT hydrology model can used to manage fertilizer in agricultural watershed. Model 1D also develop for manage reservoir to decrease sedimentation, and Spatial regression model to improve lake water management.
- Lake Sentarum have anthropogenic pressure, land use change in catchment area: deforestation, expansion of oil palm, urban growth impact of development in boundary area.
- Monitoring water quality and build database by time series satellite data, such as; chlorophyll, suspended solid, DOM, water transpiration.
- Many techniques and models can be used for interpreting satelite imaginery for estimating run off, TSS, and other hydrological applications.

- Presented papers on "Database and knowledgebase systems, informatics, monitoring technologies"

No	Presenter	Title
1	Tosiyuki Nakaegawa	Web application for examining climate data of global lake basins : CGLB using ILEC's World Lake Database
2	Tuuli Soomets	Primary productivity in Lake Geneva: a view from space during a decade
3	Seiko Yoshikawa	SWAT applications to assessing effects of different fertilizations on water qualityin an agricultural watershed
4	Tiit Kutser	Monitoring Lake Water Quality Changes with Time Series of Satellite Data
5	Emeline Righetti	Meromixis in Deep Mine Pit Lakes – Simulating Persistence of Stratification
6	Iwan Ridwansyah	Land Use Change on Sentarum Catchment Area, West Kalimantan-Indonesia
7	Apip	Dam Operation Model Aided for Assessment of Water And Sediment Cycles at Newly Constructed Cascade Regulated Dams: Case Study in the Upper Nakdong River Basin, Korea
8	Janet M Anstee	Systematic Analysis of Inland Water Quality Using Datacube Concepts
9	Reinart Anu	Estimation of the lakes optical properties from Sentinel 2 and Sentinel 3 satellites for ecological and managements applications
10	Faris Zulkarnain	Coupling of GIS and HEC HMS for flood discharge hydrograph estimationin a proposed reservoir (case study : sindangheula reservoir)
11	Sambou Djiby	Assessment of hydrologic alteration in a sahalien shallow lake within its ecosystem; Lake guiers, Senegal
12	Bashirah Fazli	Development of Spatial Regression Model to Improve Lake Water Quality Management in Malaysia
13	Bunkei Matsushita (Main Paper Speaker)	Generating a long-term database for Indonesian lakes from Landsat satellite data
14	Brian Alan Johnson	A Land Cover Map Accuracy Metric for Hydrological Applications
15	Fajar Setiawan	Estimating Water Clarity for Indonesia Lakes Using Landsat Imagery
16	Yuli Sudriani	Integration of Self Organizing Map (SOM) and Fuzzy Logic as Modelling for Analysis of Algal Blooms Risk in Maninjau Lake
17	Kaire Toming	Mapping Lake Water Quality Parameters with Sentinel-2 Multispectral Instrument Imagery
18	Bambang Tri Sakti	Monitoring of Limboto Lake Waters Quality during the Period 2015-2016 using Multi-Temporal Landsat 8 Data
20	Rob Uittenbogaard	Numerical Simulation of the Vertical Migration of Cyanobacteria in Lakes
21	Isao Endo	Relationship between Land Cover Changes and Water Quality Changes in Laguna De Bay, the Philippines, Over The 2007-2015 Period
22	Hidayat	Estimating Lake Extent and Water Volume of Floodplain Lakes of Kalimantan Using Radar Images
23	Klaus D. Joehnk	Sensing, Simulating, Predicting Algal Blooms in Inland Waters
24	Harini Santhanam	Voil{, Schrodinger's Cat - Non-Equilibrium Ecology for Adaptive Management: the Case of Pulicat Lagoon, Southeast India

6. Biodiversity and conservation: biodiversity assessment, biodiversity restoration techniques

- Rewetting and Paddy culture, Sago cultivation as a solution to rehabilitate degraded peatland in Indonesia. It is important to reduce the risk of fire and to improve the yield.
- For local people, tourism object initiative by local community is much more giving benefit to local people rather than organized by local government.
- Laguna bay in Philippine has a similar problem with in Indonesia, but there was a good example to create a grade level of water condition. The grade is from A (good condition) to D (bad condition). By declaring the condition e.g A, B, C or C condition will give a good warning for local people for better attention.
- It should be four speakers but only three doing presentation.
- Important to converted and manage freshwater dolphin (Irawadi dolphin) in Southeast Asian lake included in Mahakam river.
- Native and endemic fish species must be conserved in Lake Singkarak
- to activate the control of invasive alien species, national and local legislation has played an important background rule through authorization of government financial support and facilitation of public participant
- Effect of environmental conditions associated with anthropogenic pressure in developmental stability of goby population

- The distribution of bird show the status of aquatic ecosystem in around the museum lake in government zoological garden, India.




- Presented papers on "Biodiversity and conservation: biodiversity assessment, biodiversity restoration techniques"

No	Presenter	Title
1	Mashhor Mansor (Main Paper Speaker)	Biodiversity and conservation of Southeast Asian Lakes
2	Zhengyu Hu	Responses of Phytoplankton Structure Communities in the Xiangxi River to the Regulation of the Three Gorges Reservoir
3	Atsushi Numazawa	Distinctive Fluctuation in Water Quality and Plankton in The Center of Lake Kasumigaura, Japan Since 2001
4	Ainul Mardiah	Fish Diversity of The Singkarak Lake, Indonesia : Present Status and Conservation Needs
5	Priit Zingel	Protozoan Grazing in a Shallow Eutrophic Lake: Comparison between Littoral and Pelagial
6	Siti Norasikin	A Behavioural Study of Golden Apple Snail Pomacea Canaliculata at Tropical Lake with Special Reference to Chenderoh Reservoir Malaysia
7	Anila P Ajayan	Avifaunal And Riparian Vegetation Composition in And Around The Museum Lake in Government Zoological Garden Thiruvananthapuram, Kerala India
8	Lorenz Javier Fajardo	Fluctuating Asymmetry Using Geometric Morphometrics in *Glossogobius Giuris* (Hamilton, 1822) from Laguna Lake, Philippines
9	Misael M. Sanguila	Towards Sustainable Fisheries in Lake Lanao, the Philippines: Focus on the Dwindling Endemic Cyprinids Population
10	Kanako Ishikawa	A Basic Idea of Guidelines for Controlling Submerged Macrophyte Overgrowth to Benefit Ecosystem and Biodiversity
11	Wilma Solomon Urmeneta	Species Diversity of Finfishes and Crustaceans of Buguey Lagoon
12	Katsuki Nakai	Legislation and Stakeholders's Involvement in Controlling Invasive Alien Species in Lake Biwa, Japan
13	Syahroma Husni Nasution	Biodiversity and Distribution of Ichthyofauna in Lake Matano, South Sulawesi
14	Nail Gosmanovich Nazarov	The Fish Communities of Abkhazian Lakes
15	Umi Wahidah	Rotifer Composition and Biodiversity in Tropical Mesotrophic and Eutrophic Lakes
16	Toshiya Sano	Impact of Exotic Fish Removal on Biota in a Lagoon Linked to Lake Biwa
17	Habiba Gashaw	Review of Conservation Practices on Lake Tana, Ethiopia
18	Majariana K.	Preference of Microalgae as Planktonic or Periphytic Community in Cileungsi Karstic Sin kholes, West Java, Indonesia
20	Pinatthinee Jitkham	Prevalence of Trematode Metacercariae in Cyprinoid Fish from Nong Luang Wetland, Chiang Rai Province, Thailand
21	Endang Wulandari	Effect of Seasonal Change on Spatial Distribution of Bacterial Pathogens in Tilapia (Oreochromis Niloticus) in Batur Lake
22	Dina Mingazova	Zoobenthos of Lakes of Republic of Abkhazia under Various Trophic, Spatial and Salinity Conditions
23	Azma Hanim	A Preliminary Study of Zooplankton Distribution in Bukit Merah Lake, Perak, Malaysia

7. Ecotechnology and ecohydrology

- Ecohydrology approach is needed to manage lake ecosystem for restoration or development purposes.
- Highlight the lake restoration with risk and future uncertainty. Impact reduction remains at the core of seamless reconciliation between development and aquatic environmental conservation efforts. 15 priorities lake pointed by government. Indonesia have many lakes, and also the Deepest is Matano; the largest isToba, and the most unique is Sentarum. Tambllingan is a pristine lake in Bali. Lake is not always have a river like lake Bratan, Buyan, Tamblingan have no outlet.
- some problems occur in 15 Lake priorities:
- Lake Matano: Climate change increase the temperature., also influence water level.
- Lake Limboto: Water hyacinth covered about 60% surface area, it cause sedimentation
- Lake maninjau: KJA occur too much, it make accumulation of organic matter in the bottom, Sometimes it caused lethal of fishes when up welling happen in this lake.
- Submerged vegetation and chlorofil value have been used to reveal the status of lake Bayangdian, China
- Ecofiltration Bank is one alternative solution to supply the clean water demand in urban area. Convention method will consume electricity.
- Deposition process by adding iron to the river water contained high concentration of P is an eco-friendly method that can be implemented to the contaminated river .
- Development of Ecohydrology for Plantation area in peatland area is strategic and important to overcome the water pollution in Indonesia.
- It is important to manage water & drainage in urban area based on ecohydrology & ecotechnology concept.
- Micro algae have been used for mitigate the run off from agriculture area that contained fertilizer. Immobilization heavy metals is a new technical model for water treatment.
- Development of lake buffer zone and restoration should be improved to manage lakes in Indonesian.
- Presented papers on "Ecotechnology and ecohydrology"

No	Presenter	Title
1	I Nyoman Suryadiputra (Main Paper Speaker)	Ecotechnology in wetlands restoration: a case study of restoring degraded peatland area in Central Kalimantan, Indonesia
2	He Ping	Using Submerged Vegetation and Chlorophyll a Define the Alternative Stable States of a Shallow Lake, Baiyangdian, China
3	Sayali Sandeep Joshi	Ecotechnology for Urban Water Security (A Case Study of Indradhnushya Center, Pune-the Nawatech Initiative
4	Krupasindhu Bhatta	Impact of eco-restoration of Chilika Lake through hydrological intervention on Fisheries output and salinity dynamics.
5	Naozo Fukuda	Eco-Friendly Large Scale Tests to Reduce Phospherous in River Water by Eluting Iron Ion System
6	Ayao Hori	Fish Cradle Paddy Field Project
7	Tsuyoshi Kinouchi	A New Method to Estimate Concentrations of Phosphorous, Nitrogen and Cod in Eutrophic Rivers
8	Mohapatra	Constructed wetland for Sewerage Treatment for multiple water use to avoid pollution at Bhubaneswar.
9	Benjamin Cruz Villa	Challenges in Raw Water Quality, a Case Study in Putatan Water Treatment Plant
10	Rahmah Elfithri	Development of UNESCO ecohydrology demosite card for integrated catchment management of Putrajaya Lake and Wetland, Malaysia
11	Gadis Sri Haryani (Main Paper Speaker)	Lake Restoration in Indonesia : A Risk-Based Ecohydrology Approach
12	Katsunori Aizawa	Mitigation of Fertilizer Runoff by Using Terrestrial Algae
13	Ayesha Akter	Immobilization of Heavy Metals towards Alleviation of Ecosystem Health Risk: a Green Hydrothermal Treatment Approached
14	Susi Abdiyani	Restoring Indonesian Lake Buffer Zones Using Native Plant Species
15	Nakamoto K	Possibility of Sediment Microbial Fuel Cells Technology for Monitoring Water Quality
16	Normaliza Noordin	Ecohydrology Management of Lake and Wetland in Putrajaya Urban Ecosystem
17	Djamhuriyah S. Said	Integrated Multitrophic Aquaculture for Environmentally Safe Fish Production in Small Reservoir
18	Tatsuro Akiba	Development of Water Column Sampler for the Studies of Micro-Sclae Vertical Structure in the Lake Process
19	Yusuke Shimada	Impact of Cresols in the Ammonium Rich Wastewater on Anammox

8. Limnology and limnological science fundamentals : limnology of tropical lakes

- Paleolimnology could be a better option of proxy used in ecosystem assessment in lakes.
- There is a need for better outlook in water quality management in urban lakes.
- Phytoplankton and zooplankton assemblage can be used in trophic state measure.
- There is a strong indication of lakeeutrophication caused by floating cage aquaculture.
- Interspecies competition may occur in zooplankton vertical migration in lake.
- Multinational research project on biogeochemical and geomicrobiological investigation in Lake Towuti attempts to reveal reconstruct paleoclimate condition.
- The hypereutrophic Lake Maninjau accumulates CO_2 and CH_4 in which these gases are readily to emit as greenhouse gases.
- Stable isotope technique can be used as a proxy to identify source of nitrate.
- A unique of lake nomenclature can be used as a new insight in lake classification.
- Riparian vegetation has important role to keep the balance of the ecosystem. There is strong relationship between rainbow fish of Lake Sentani and the riparian vegetation, however the higher the riparian vegetation not always related with the higher fish number. In Lake Sentani there are 27 species of riparian vegetation within 17 families.
- Eutrophic lake with high rate of primary production does not promote Green Houses Gasses sink, but act as a source instead.
- Fishery load capacity of Lahor and Sutami reservoir were determined using chlorofill-a concentration, in several point. The average of fish production in sutami 73, 18-166. meanwhile in lahor 10,7-16,6 tons/year.
- In the clear Lake, Benthic rimary Production and hytoplankton Primary Production were almost equal. In the dark lake only phytoplankton contribute to the whole lake primary production. In clear lake (CL), the production was very strong., and in dark lake (DL), the production is stop in 1m.
- Heavy metals in mollusks was observed in Maninjau Lake. The mollusks are corbicula, malanoides, and Anodonta, which are most abundant inLake Maninjau. Environmental factors regulating the dominance species of phytoplankton in lake Maninjau, West Sumatera, Indonesia.
- Aral Sea is the fourth largest lake but now is already shrunk and shallowed owing overwhelmingly to irrigation withdrawal, it separated and become lake.

- Presented papers on "Limnology and limnological science fundamentals: limnology of tropical lakes"

No	Presenter	Title
1	Tri Retnaningsih S.	Diatoms, Water Quality of Toba Lake and its Management
2	Suzanne Mcgowan	Palaeolimnology for Ecosystem Assessment in Tropical and Temparate Floodplain Lakes
3	Takao Ouchi	Water Quality Characteristics in the Planktothrix Dominant Years in Shallow Lake Kasumigaura
4	Manisha N Desai	Water Quality Assessment of Vastrapur & Sola Lake of Ahmedabad City, Gujarat, India
5	Wu Xingqiang	Regime shift of plateau shallow Lake Dianchi (enclosure experiments in Caohai Bay as an example)
6	Mc Jervis S Villaruel	Trophic Status Assessment of Tadlac Lake in Los Baños, Laguna Philippines using Phytoplankton and Zooplankton
7	Niken Tunjung Murti Pratiwi	Relationship between Trophic States and Nutrients Load in Waters Surround Samosir Island, Lake Toba

No	Presenter	Title
8	Zati Sharip	A trophic state index for Malaysian Lakes
9	Dilip Shaligram Dabhade	Limnological Monograph of Lonar Lake, India
10	Dwinda Mariska Putri	Zooplankton Diel Vertical Migration in Danau Laut Tawar, Aceh
11	Zhaosheng Chu	Driving Factors Affecting Dynamics of Phytoplankton Functional Groups in Erhai Lake
12	Jens Kallmeyer (Main Paper Speaker)	Biogeochemical and geomicrobiological investigations on ferruginous sediment of Lake Towuti, Sulawesi, Indonesia
13	Cynthia Henny	Carbon Dioxide and Methane Accumulation in A Highly Eutrophic Tropical Lake, Indonesia
14	Yada Saeko	Identifying Sources of Nitrate in An Irrigated Rice Paddy Watershed,Tsukuba, Japan
15	Hisao Kuroda	Study on the Nitrogen Leaching Mechanism From Agricultural Lands
16	Rizal Khoiru Umam	Evaluation of Lake Water Quality in Klang Valley (Malaysia) using Multivariate Statistical Techniques
17	Rohit Prajapati	Water Quality in Coastal Wetland And its Impacts on Macrofauna At Gulf of Kachchh, Gujarat, India
18	Suzanne Lydia Undap	Water Quality Impact on Fish Cultured in Lake Tutud in North Sulawesi, Indonesia
20	Nafisa Mingazova	Original Classification Method Lakes in the World Using A Formula and Results of Application
21	I Gusti Ayu Agung Pradnya P	Riparian Vegetation and its Relationships with Rainbow Fish of Lake Sentani, Papua
22	Arianto Budi Santoso	Does Eutrophic Lake Promote Greenhouse Gas Sink?
23	Kamsiyah	Study of Fishery Load Capacity in Sutami-Lahor Reservoir Using Clorofil-a and Zoning Methods
24	Fabien Cremona	Pelagic to Benthic Primary Production Ratios in Two Lakes with Contrasting Light Conditions
25	Saroja Kumar Barik	Influences of Macrophytes on Spatial Variation of Phosphrous Species in Sediment of the Chilika Lagoon
26	Ahmed Parvez	Ecosystem Resilience: The Role of Microalgae Based Nutrient Recycling
27	Shuhang Wang	Calculating Metal Background Levels of Sediments from Taihu Lake, a Large and Shallow Lake in China: an Approach Based on Sediment Stratification
28	Nikolai Aladin*) – Absentee	Current Status of Lake Aral – Challenges and Future Opportunities
29	Sulastri	Environmental factors regulating the dominance species of phytoplankton in Lake Maninjau , West Sumatera, Indonesia.
30	Sigid Hariyadi/Syawal	Heavy Metals Content of Sediment and Mollusc in Lake Maninjau, West Sumatera
31	Alo Laas	Under ice and early spring ecosystem metabolism in two contrasting lakes

*) Distribution of the materials

WORKSHOPS FOR SPECIAL TOPICS, COOPERATION INITIATIVE AND POSTER SESSION

1. LAKESIII Workshop

Alaya Resort Kuta, November 6, 2016, 09.00 – 16.00

- The workshop was convened by Research Center for Sustainability and Environment (RCSE-SU) and the International Lake Environment Committee Foundation (ILEC) under the following objectives:
  1) Review and discussion on the following general areas: ILBM - Knowledgebase/Database linkages in lake-river basin management and Discussion on the availability of lake basin management knowledge in the form of publications;
  2) Introduction to the LAKES-III (the third generation of Learning Acceleration and Knowledge Enhancement System) ; and
  3) Development of a pilot project concept on the use of LAKES-III and other knowledgebase – database tools for regional and global cross-fertilization of experience and lessons-learned on lake basin management Morning session: Why LAKES III is important.
- It was attended by nearly 25 participants including experts invited from Japan, China, Nepal, Malaysia, India, Philippines, USA, Guatemala, Brazil, and Senegal.

2. Managing Land Use System

Room B, November 8, 2016, 16.30 – 18.00

- Presented papers on "Managing land use system"

No	Presenter	Title
1	Bustanul Arifin	Introduction: Managing Land Use System in the Catchment Area of Upper Sekampung Watershed in Sumatera, Indonesia
2	Hanung Ismono	The Economics of Coffee Agroforestry System in Upper Sekampung Watersheds
3	Irwan Sukri B	Multiple-Crop Modeling of Coffee Farming System in Upper Sekampung
4	Hiroaki Somura	On the Relationship between Land Use System of Catchment Area and Water Quality in Batu Tegi Dam of the Sekampung Watershed
5	Slamet Budi Y.	Sustainable Water Resources Management in Way Betung, Lower Sekampung Watershed

3. ILBM Heartware

Room D, November 8, 2016, 16.30 – 17.40

- Presented papers on "ILBM Heartware"

No	Presenter	Title
1	Masahisa Nakamura	Introduction - Heartware : A Typological Analysis and Prospective Integration Into ILBM
2	Zeeda Fatimah M.	Community-based Shared Value as the Heartware Driver for Integrated Lentic Lotic Basin Management
3	Meas Khov	The Heartware Aspect For Strategic Plan of Tonle Sap Authority
4	Katsura Nakano & Naoki Umezawa	Formation, maintenance, transformation of Heartware: Experiences in Lake Biwa

4. Integrated Lake Basin Management (ILBM)

Kharisma Ballroom, November 10, 2016, 9.30 – 11.30

- Presented papers on "Integrated Lake Basin Management (ILBM)"

No	Presenter	Title
1	Shailendra Kumar Pokharel	Integrated Lake Basin Management of Gaidahawa Lake, Rupandhi in Western Nepal
2	Juan Skinner Alvarado	Developing leadership for the future sustainable use and management of Lake Atitlán, Guatemala.
3	Zati Sharip	Stakeholder Participatory Role in Malaysian ILBM Initiatives – Research Perspective
4	Jackson Akama Raini	Promoting Integrated Lake Basin Management in Lake Nakuru Watershed, Kenya
5	Kshamadevi Khobragade	Integrated Lake Basin Management- Sarowar Samwardhini of Lonar Crater Lake, India
6	Carmelita Garcia Hansel	Limnology of Lake Lanao, Mindanao Island, Philippines: Inputs for an Integrated Lake Basin Management
7	Alejandro Juarez Aguilar	ILLBM Program of the Coahuayana River Basin, Mexico
8	Mazlan Idrus	Integrated Management Approach of Serlangor DAM and Ex-Mining Pond to Mitigate The El Nino Effect on Water Resources in Selangor, Malaysia

5. Lake Toba Forum

Room C, November 8, 2016, 16.30 – 18.00

- This forum aims to enhance policy in Lake Toba Management base on all stakeholders participatiowith involvement of all stakeholders.
- Main problem in Lake Toba is domestic waste and water pollution from several sources such as hotels, households, livestocks and aquaculture.
- To address the problems, Research Center of Limnology is conducting research on hydrodinamics multilayers modelling of aquaculture in Lake Toba, to formulate the optimum use of Lake Toba, especially related to the aquaculture.

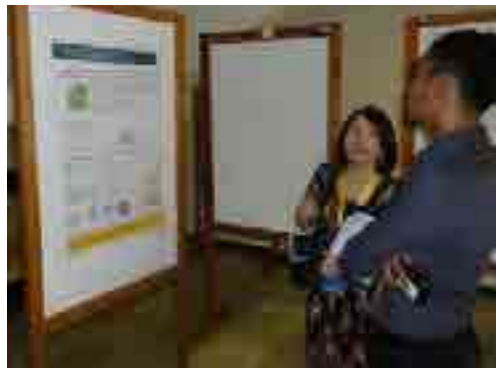
6. MoU Signing and Book Launching: "Southeast Asian Network Initiative on Inland Water Science and Management"

Yudhistira Room, November 9, 2016, 16.30 – 17.40

- For enhancement collaboration in inland water management, Indonesian Institute of Sciences (LIPI) developed collaboration. Name of the collaboration is SEALNET (South East Asia Limnological Network)
- Vision of the collaboration is to be a host at their own region in the science of tropical limnology development.
- Mission of the collaboration is: Promoting research collaboration, training and knowledge exchanges; Developing information systems; and Creating solid bond among scientists within Southeast Asian region on tropical limnological studies.
- The program is: Establishment of official SEALNet website; Expansion of SEALNet members
- Identification of the priority projects among members -> to open the possibility of research collaboration (joint research); Publishing serial book and journals based on research collaboration of SEALNet program; planning Seminar/workshop on SEALNet 2017.

7. Poster Session

Discovery Kartika Plaza Hotel, November 8-10, 2016



Poster session is participated by 94 participants.

No	Name	Title of the Poster
1	Aan Dianto	Distribution And Diversity Of Diatom Abundance In Sediments Of Shallow Lake In Cibinong Botanical Garden
2	Agatha Sih Piranti	Determination Of Utilization Zoning For Ecosystem Sustainability Of Wadaslintang Reservoir
3	Alejandro Juarez Aguilar	Territory Diagnosis Using Landscape Units On Lake Zapotlan And River Coahuayana Basins, Mexico.
4	Ali Mashar	Biodiversity Of Non-Cultivated Fishes In Cirata Lake West Java
5	Aliati Iswantari	Dissolved Oxygen And Phosphate Condition Of Post-Hypolimnetic Aeration In Lake Lido, Bogor, West Java
6	Andri Warsa	Monofillament Gillnet As A Control Of Midas Cichlid (Amphilophus Citrinellus) At Waduk Ir. H. Djuanda, West Java
7	Annisa Dwi S	Situbuntu And Ecology Park Lake Water Quality Asessment In Bogor
8	Ardo Ramdhani	Biological, Physical And Chemical Properties Of Penjalin Reservoir Implications For Assesing Long-Term Monitoring
9	Ardo Ramdhani	Preliminary Limnology Profile Of Cibeureum Urban Lake In Bekasi
10	Ari Anggara	Biomonitoring Cadmium (Cd) Using Orechromis Niloticus As Bioindicator Species In Buyan - Tamblingan Lake Bali
11	Arif Wibowo	Evaluation Of Genetic Relationship Among Select Six Fish Species Using The Partial Fragment Of Mitochondrial Cytochrome C Oxidase Subunit-1gene (CO1)
12	Astria Nugrahany	Assessment Of Water Quality Monitoring In The Toba Asahan River Basin
13	Aynie Mohammad	Gut Content Analysis Of Puntius Tumba Taken From The Rivers Of Lanao Del Sur
14	Azrita	Water Quality And Tropic Status In Lake Maninjau West Sumatra, Indonesia
15	Benjamin Cruz Villa	Laguna Lake As Drinking Water Source : An Assessment Of Its Water Quality

No	Name	Title of the Poster
16	Christiani	Microzoobenthic Community Structure In Relation With Concentration Of Tss In Banjaran River Of Banyumas, Indonesia
17	Dewa Gde Tri Bodhi Saputra	Analysis Of Water Quality Based On Total Suspended Solid, Turbidity And Water Clarity In Telaga Tunjung Reservoir
18	Diana Retna Utarini Suci Rah	Physical-Chemical Environmental Factors Freshwater Crabs Caught In The River Mengaji, District Banyumas
19	Ellis Mika Trino	Biodiversity Assessment Of Littoral Macrozoobenthos In Laguna De Bay, Philippines
20	Endah Nur H	Cultural Insight On Managing Common Pool Resources In Lake Maninjau
21	Erica Silk Perez Dela Paz	Mesocyclops Sars, 1914 And Thermocyclops Kiefer, 1927 (Copepoda: Cyclopidae) In The Philippine Lakes
22	Evi Susanti	210 Pb And 210 Po Trophic Transfer Within The Phytoplankton – Zooplankton – Nile Tilapia/ Common Carp Food Web: A Case Study From The Cirata Reservoir, Indonesia
23	Fachmijany Sulawesty	Phytoplankton Community At Littoral Zone Of Lake Matano In Relationship To Water Quality
24	Fareha Bt Haji Hilaluddin	DOMINANCE OF CYANOBACTERIA FROM TROPICAL MAN-MADE LAKES IN MALAYSIA
25	Fifia Zulti	Relationship Between Spectral Optical Properties And Optically Active Substances In Lake Maninjau.
26	Gutomo Bayu Aji	The Role Of Local Communities In Reservoir Management In Jakarta, Indonesia
27	Hataypat Viratkaseam	Cadmium Contamination In Environment Along Mae Tao Creek, Mae Sot District, Tak (Thailand)
28	Humaira Qadri	The Changing Ecology Of Dal Lake, Kashmir
29	I Gusti Ayu Novie Sidaningrat	Fertility Waters Based On The Abundance Of Phytoplankton In Batur Lake, Kintamani, Bali
30	I Wayan Restu	Potential Identification Of Flora And Fauna Lake Buyan As Basisfor Tourism Development Strategy Based On Aquatic Ecosystems
31	Ikuyo Makino	Changes In The Chemical Ecology Of Blue-Green Algae During Periods Of Active Growth
32	Imroatusshokhihah	Benthic Macroinvertebrates Community Structure Of A Shallow Oxbow Lake Hanjalutung, In Central Kalimantan
33	Inna Puspa Ayu	Diversity Of Plankton In Water Velvet Bloomed Waters (Case Study: Situ Perikanan, Bogor, West Java, Indonesia)
34	Ivana Yuniarti	Identification Of Lake Sentarum's Potential Ecosystem Services, Social And Institutional Profiles To Support Ecotourism Development (A Review Paper)
35	Jimeng Feng	The Analysis Of Typical Non-Point Source Pollution Loads In Lake Erhai Basin
36	Jojok Sudarso	Community Sturucture Analysis Of Chironomid Larvae On Lake Matano's Litoral Zone
37	Joudy Ruddy Rizal Sangari	Physical And Chemical Parameters Recorded During Drought Of 2015 In Lake Tondano, Minahasa, North Sulawesi Province, Indonesia
38	Kannan Santhanaraj	Geospatial Analysis Of Ecological Changes In Wetland Urban Tanks In The Context Of Sustainable Development
39	Kaoru Yoshida	Foreshore Reproduction And Utilization Activities By Community
40	Kenji Nakamoto	Effectiveness Of The Coal Ash For Improvement Of Water Environment
41	Khursheed Ahmad Parray	The Geological Processes In And Around Manasbal Lake, Kashmir
42	Kitti Moolla	Effects Of Water Quality And Quantity On Macroinvertibrates In Temporary Stream At Hariphunchai Educationcentre, Thailand
43	Kiyoto Kurakawa	A Case Study On The Simple Floods Observation And Mapping System By Smartphones
44	Lisa Rosalia Prayuda	The Effect Of Nitrate (No3) On The Growth Of Water Hyacinth By Wet Biomass In Batur Lake
45	Luki Subehi	Analysis Of Water Quality Profiles And Their Utilization With Special References To Several Lakes In Indonesia
46	Lukman	Configuration Of Lake Toba Management Based On Presidential Decree No. 81/2014
47	M Badjoeri	The Abundance Of Heterotrophic Bacteria In Several Oxbow Lakes In Central Kalimantan, Indonesia
48	M. Fakhrudin	Online Monitoring And Early Warning System For Mass Death Of Fish In Maninjau Lake
49	Maria Lourdes	Plankton Diversity In An Aquaculture And Capture Fisheries Site In Laguna De Bay, Philippines
50	Mark Louie Diwatin Lopez	Microcrustacean Zooplankton Fauna Of Philippine Lakes: Updated Taxonomy And Distribution Records
51	Mc Jervis S Villaruel	Lead (Pb) Detection In Knife Fish (Chitala Ornata Gray,1831) From Laguna Lake Philippines
52	Miratul Maghfiroh	Occurrence Of Water-Borne Pathogens In Lake Matano, Indonesia
53	Mohd Azril Hilmi	Physico-Chemical Characteristic In Different Lakes Of Malaysia
54	Naoko Kimura	Ecosystem Service Awareness – Conceptual Framework Toward Disaster Risk Reduction And Resilience

No	Name	Title of the Poster
55	Nazma Dadayan Eza	Fecundity Of Three Spot Gourami Trichogaster Trichopterus Pallas In Lake Lanao, Lanao Del Sur
56	Ni Putu Vivin	Impact Of Agricultural Activities On Eutrophication Level And Phytoplankton Diversity At Lake Buyan, Bali
57	Ni Wayan Desy Wahyudiati	Community Structure Of Phytoplankton And The Trophic Status Of Telaga Tunjung Reservoir
58	Nichell Merino Villarta	Phytoplankton Based Assessment Of Trophic State Of Tikub Lake In Tiaong, Quezon, Philippines
59	Niu Yuan	Introduction On General Plan Of Ecological Environmental Protection Of Clean Lakes
60	Nyoman Sunarta	Relationship Pattern Between Actor And Nature Based On "Tri Ning Danu" In Bedugul Tourism Region, Bali
61	Paulus Hengky A	The Sustainable Centre Of Lake As Path Way For Collaborating All Stake Holders And Government
62	Ping Yang	Changes Of Farming Life And The Lake Environment
63	Pullanna Vidyapogu	The Politics Of Lake-System Conservation: The Case Of Mission Kakatiya In Telangana, India
64	Putri Maudy Kusumah	Simulator Development For 2d Phosphorous Concentration Distribution In Lake Mahoni Using Resource Modeling Associates (Rma) Program
65	Rahmi Dina	A Preliminary Study Of Flowerhorn Fish's Stomach Content In Lake Matano, South Sulawesi
66	Reliana	ZOOPLANKTON SPATIAL DIVERITY IN LAKE TONDANO, INDONESIA
67	Rikho Jerikho	Early Detection Of Ichthyofauna Alien Species At Gadjah Mungkur Reservoir, Wonogiri, Central Java, Indonesia
68	Riky Kurniawan	Aquatic Macrophytes In Several Priority Lakes For Conservation 2010-2014
69	Rungpailin Wongphutorn	Water Quality And Diversity Of Aquatic Insects In Hight Land Agricultural Area, Chiang Mai Thailand
70	Sanjay D Vediya	Water Quality Status Of Singarva Lake At Ahmadabad, Gujarat, India.
71	Sekar Larashati	Habitats Characterisation For Ihan (Neolissochilus Sp.) Conservation Planning Around Lake Toba, North Sumatera, Indonesia
72	Serapion Nudalo Tanduyan	Cage Culture And Lake Management Practices In Lake Danao, San Francisco, Central Philippines
73	Shahid Ahmad Wani	The Ecology Of Nilnag Lake, Kashmir
74	Shakri Adibah	Isolation And Identification Of Microcystis Sp. In Putrajaya Lake
75	Shao Yang	Change Of Phytoplankton Community Of Erhai Lake And The Driving Force During The Past Century
76	Shunichi Ohyama	Study On Availability Of Oxygen Productive Electrode (Ope) For Improvement Of Anaerobic Condition At The Bottom Layer Of Lake
77	Siti Aisyah	Analysis Of Lake Tempe Sediment Characteristic By Statistical Approach
78	Songyot Kullasoot	Water Quality And Trophic Status Of Mae Klong River, Western Thailand
79	Sulung Nomosatryo	Biogeochemistry Of Tropical Karst Lakes: Study Case In Lake Ayamaru, West Papua, Indonesia
80	Supisara Suwunprasert	Water Quality And Cadmium Contamination In Mae Tao Stream, Mae Sot District, Tak Province, Thailand
81	Syahroma	Mapping To Distribution Of Endemic And Invasive Fish Species In Some Lakes In Sulawesi
82	Taofik Jasalesmana	Thermal Stratification And Stablity Of Lake Maninjau, West Sumatera
83	Ternala Alexander Barus	Management Of Water Resources In North Sumatera (Case Study : Lake Toba And Asahan River)
84	Tharinya Tewapuchom	Water Footprint Assessment Of Strawberry Cultivation In Bor Keaw Sub- District, Chiang Mai Province, Thailand.
85	Tjandra Chrismada	Phytotechnology Application To Control Lake Water Quality: A Preliminary Trial In A Small Lake Of Situ Cibuntu, Cibinong, West Java,Indonesia
86	Tosiyuki Nakaegawa	Web Application For Examining Climate Data Of Global Lake Basins: Cglb Using Ilec's World Lake Database
87	Tri Suryono	Nutrien Characteristics And Trophic Status Of Lake Sentani , Papua Indonesia
88	Triyanto	Considerations For The Tropical Eel (Anguilla Spp.) Resources Management In Cimandiri River, Sukabumi West Java
89	Upendra Dattatraya Kulkarni	Surface Water Quality Monitoring Of Water Bodies In Nanded District, Maharashtra, (India) Using Gis
90	Varaphan Marueng	Effects Of Check Dam On Macroinvertebrates In Huai Ton Kok Watershed, Chiang Mai Province, Thailand
91	Vipin Vyas	Indigenous Fish Fauna Of Upper Lake (Bhoj Wetland, Central India) With Reference To Biodiversity Conservation And Livelihood.
92	Yeshwant Sadashiv Kulkarni	Successful Public- Private Model For Ecological Restoration Of Kham River, Aurangabad, Maharashtra, India
93	Yuki Jikeya	Nitrogen Load Inflow To Large Scale Reservoirs In The Citarum River Basin, Indonesia
94	Yustiawati	Impact Of Climate Change On Dissolved Organic Carbon And Dissolved Inorganic Carbon Composition In An Oligotrophic Lake

NATIONAL POLICY DIALOGUE

National Policy Dialogue I: Policy Improvement in Lake Management

Kharisma Ballroom, November 8, 2016, 13.00 – 18.00

Component	Detail
Objective	Improvement of National Policy on Lake Management
Output	Concept of Recommendation for the Policy Improvement
Discussion subjects	1. Integrating/internalizing effort in National/Sectors/Regional Policy 2. Institution and Administrative Scheme 3. Lake Conservation, Degradation Control and Rehabilitation/Restoration
Facilitator of Session I	Dr. Imam Prasodjo (Senior Adviser to the Minister of Environment and Forestry, Indonesia)
Panelists of Session I	Indonesia 1. Prof. Winarni Monoarfa (Secretary of Gorontalo Province): Lake Limboto Management 2. Mr. Gede Suarjana (Head of Environmental Agency of Bali Province): Integrating Lake Management in Tourism, Education and Culture Program in Bali 3. Dr. Hilman Nugroho (Director General of Watershed and Protected Forest Management, Ministry of Environment and Forestry): Lake Management Challenges 4. Mr. Agung Kuswandono (Deputy Minister for Natural Resources and Services, Coordinating Ministry of Maritime): Lake Management 5. Ms. Nita Kartika (National Development Planning Agency): Lake Management Funding 6. Dr. Agus Suprapto (Director of Water Resources Management, Directorate General of Water Resources, Ministry of Public Works and Housing): Lake Infrastructure Development 7. Mr. Sigit Reliantoro (Secretary of Directorate General of Pollution and Degradation Control, Ministry of Environment and Forestry): Water Pollution Control 8. Mr. Antung D. Radiansyah (Director of Essential Ecosystem Management, Directorate General of Natural Resources and Ecosystem Conservation, Ministry of Environment and Forestry): Ecosystem Conservation in Lake Management 9. Mr. Husaini Syamaun (Head of Forestry Agency of Aceh Province): Sedimentation Control in Forest and Land Preservation and Rehabilitation of Lake Laut Tawar, Aceh Province 10. Mr. Daryatmo (Member of Indonesian Parliament, Committee VII) Japan 1. Mr. Yasumasa Watanabe (Director of Water Environment, Ministry of Environment Japan)
Facilitator of Session II	Dr. Sabrina (Adviser to the Minister of Environment and Forestry, Indonesia)
Component	**Detail**

Panelists of Session II	Indonesia 1. Mr. Asrizal Asnan (Head of Environmental Agency, West Sumatera Province): Lake Maninjau and Lake Singkarak Management 2. Mr. Yantje W. Sajow (Major of Minahasa, North Sulawesi Province): Lake Tondano Management 3. Ms. Tuti Hendrawati (Director General of Domestic and Hazardous Waste Management, Ministry of Environment and Forestry) 4. Ms. Diah Indrajati (Director General of Regional Development, Ministry of Home Affairs) 5. Mr. Agus Priyono (Director of Fish and Environmental Health, Directorate General of Aquaculture, Ministry of Marine and Fishery) Japan 1. Mr. Naoki Komatsu (Director of Lake Biwa, Shiga Prefectural Government)
Participants	1. Ministries/National Institution 2. Local governments of 15 Priority Lakes I and 15 Priority Lakes II 3. NGO, community and enterprises 4. University and Researcher
Other participants	1. Participants from other countries 2. International organizations

Summary of discussion in the National Policy Dialogue I

Session I

1. Dr. Hilman Nugroho (DG of Watershed & Protected Forest Management MOEF):
   - Need 1 lake 1 management
   - Diversity of lake condition
   - The dominants ministry in lake management should be the leader
   - Integrating of lake management in development plan is important
2. Mr. Husaini Syamaun (Head of Forestry Agency of Aceh Province): forestry authority in catchment area
3. Ms. Nita Kartika (National Planning Agency):
   - integrating lake management into development plan
   - The leading institution should not technical ministry
4. Dr. Agus Suprapto (Director of Ministry of Public Works and Housing):
   - integrated water resources management, lake is included
   - presidential decree for lake management as a tourism area
   - multi sectors role in lake management and integrated assessment for enhancing lake management
   - Formulating Act on water resources management
5. Mr. Daryatmo (Indonesian Parliament, Commission VII)
   - Coordination of ministries, provinces and districts in lake management is important.
   - Political will in lake management is important
   - Needed of leader for initiating and continuing the effort
   - The Grand Design of Lake Management already formulated; now the action should be implemented.
   - Law for Water Resources Management, including for lake, is important
6. Prof. Winarni Monoarfa (Secretary of Gorontalo Province)
   - Support of National Planning Agency and other ministries in province effort for lake management
   - Province authority in cooperation forum, involving community
   - Coordinating Ministry for Economy could be the coordinator
   - Budget balance for upstream and downstream collaboration
   - Encouraging public participation
   - Considering many sectors involved in lake management, the leader should be coordinating

ministry

7. Mr. Agung Kuswandono (Deputy Minister for Natural Resources and Services, Coordinating Ministry of Maritime):
   - Considering role of many sectors → need 1 management
   - Presidential Decree on Lake Toba Tourism, not clearly focused on ecosystem preservation
8. Mr. Sigit Reliantoro (Secretary of Directorate General of Pollution and Degradation Control MOEF)
   - Pollution prevention, from the pollution sources
   - Cooperation of government and community in pollution control
9. Mr. Antung Dedy Radiansyah (Director of Essential Ecosystem Management):
   - Need regulation and coordination on ecosystem conservation
10. Mr. Yance W. Sajow (Major of KabupatenMinahasa)
    - Leader of the lake management in regional level is depend on the lake characteristic and conditions
11. Mr. Gede Suarjana (Environmental Agency of Bali Province)
    - Cooperation betweenuniversity and the local government for sustainable lake center is important
    - Carrying capacity and water quality should be considered in lake management
    - Papua Province
    - Need authority on ecosystem (forestry) conservation

    - Conclusion
    - Lake management in Indonesia needsimprovement of management
    - Main improvement needed are regulation, initiating institution, leader/coordinator and task force

    - Practical Follow up:
    - For sounding the agenda in central government
      - Ministry of Environment and Forestry take initiative to raise the issues and the strategic solutions including initiation on coordinating body for Indonesian Lake Management.
      - Some key persons from MoEF (Dr. ImamPrasodjo andDr. Efransjah) will do communication with Presidential Staff (KSP)
      - Ministry of Home Affairs should support developing of Working Group of 13 Provincial Secretary
      - Secretary of Gorontalo Province coordinate all (13) provincial secretary, supported by Ministry of Home Affairs
      - Parliament should take role in supporting the agenda
    - For strengthening the local action
      - Identify the most strategic entry point/ program of lake conservation in 15 areas
      - Communicate with civil society should be developed.
      - All stakeholders should make effort to change of talking the action to taking action.

Session II

1. Ministry of Home Affairs
   - Effort in lake management should be linkaged to government function at central and regional level
   - Governor Decree on zonation is in progress of policy formulation
   - Funding sources and permit regulation for reducing the lake problems is urgent.
   - Provision of special allocation fund for lake management is provided.
2. Ministry of Fishery
   - Environmentally friendly fishery
3. West Sumatera Province

- There is Singkarak Management Board for Singkarak lake management
- Urgency of spatial planning in lake management

4. Major of Kabupaten Minahasa
   - Program for water pollution and hyacinth control is important.
5. DG of Waste and Hazardous Waste
   - Carrying capacity and watershed health as basic of situation mapping
   - Law enforcement needed for mining surrounding the lake
6. Salingka Maninjau Community Forum
   - Do the effort for the lake health first, then think the economy
   - Need to be focused for lake restoration
   - Development of Lake Maninjau as tourism destination should be followed by provision of waste treatment and sanitation facilities, and enhancement of community awareness
   - Degrading of biodiversity in Lake Maninjau has been occurred due to un-environmentally friendly-fishery
   - There is local program called "Save Lake Maninjau"
7. Central Java
   - Dependency of local people to the lake and needed of funding alternative
   - Technical solution: Zonation and quota for fishery and waste management
   - Take action, concrete
8. Gajah Mada University
   - Commitment is important
9. Singkarak Community Forum
   - Major problems: waste, degradation of catchment area, and conflict of interest among parties
   - Need 1 coordinating body, especially for lake restoration
10. North Sumatera
    - Lake Toba as a Geopark is more valuable than the fishery
11. Shiga Prefecture
    - Citizen movement, participation and collaboration in lake management
    - Long history of commitment

Conclusion

a. Developing government regulation or presidential decree on lake management should be the agenda.
b. Considering the effort on lake preservation, business environmental risk assessment is important.
c. Local people need income substitution for reducing the un-environmentally friendly activities such as aquaculture with fish cages, mining surrounding the lake, etc.

National Policy Dialogue II: Community Engagement and Multi-parties Partnership in Lake Management

Kharisma Ballroom, November 9, 2016, 09.30 – 12.30



Component	Detail
Objective	Enhancement of Community Participation and Strengthening of Multi-parties Partnership in Lake Management
Output	Concept of Initiation on Community Participation and Strengthening of Multi-parties Partnership in Lake Management
Discussion subjects	1. Enhancement of community participation, increasing of people awareness, and education 2. Stakeholders commitment 3. Funding scheme in the partnership
Facilitator	Dr. Nyoman Suryadiputera (Director of Wetlands International Indonesia Programme)
Panelists	Indonesia 1. Dr. Apik Karyana (Secretary of Directorate General of Social Forestry and Environmental Partnership, Ministry of Environment and Forestry): Community Empowerment 2. Ms. Fainta Susilo Negoro (Senior Manager of Water Stewardship and Sustainability PT Aqua Danone): Company's Role on Water Sustainablity 3. Mr. Edi Rahman (Director of PT Krakatau Tirta Industri): Company's Role on Payment for Environmental Services 4. Dr. Ni Luh Kartini (Head of Organic Agriculture Laboratory, Faculty of Agriculture, Udayana University): Community's Role in Lake Conservation 5. N. P. Rahadian (Executive Director of NGO Rekonvasi Bhumi): Community's Role in Lake Conservation 6. Mr. Parlindungan Purba (Member of Indonesian Parliament, Committee II) Japan 7. Mr. Shigekazu Ichiki (Shiga Prefectural Government) 8. Mr. Mamoru Terada (Managing Director of the Environmental Citizen Initiative) 9. Mr. Atsushi Numazawa (Lake Kasumigaura Citizen Association)
Participants	1. Ministries/National Institution 2. Local governments of 15 Priority Lakes I and 15 Priority Lakes II 3. NGO, community and enterprises 4. University and Researcher
Other participants	1. Participants from other countries 2. International organizations

Summary of discussion in the National Policy Dialogue II

1. Dr. Parlindungan Purba (Member of Parliament)
   - Promoting Lake Rehabilitation Agency (Badan Rehabilitasi Danau)
2. Dr. Apik Karyana (DG of Social Forestry and Environmental Partnership)
   - Strategy of Community involvement and empowerment
   - Lake as part of watershed management
   - Interdisciplinary approach in lake management
   - Reward for citizen participation
   - Community is subject, not object
   - Increasing of environmental awareness index
   - Community independency and access to the forest, linkage to poverty
   - Public Private Partnership in lake management
   - There is no one institution manage lake comprehensively
   - Agree to develop one specific institution for lake management
3. Ms. Fainta Susilo Nugroho (PT Aqua)
   - Environmental sustainability as a basic of business sustainability
   - Business contribution in community action and education
   - Collaborative action is important
4. Dr. Ni Luh Kartini (Faculty of Agriculture, Udayana University)
   - Research base action
   - Lake management including spiritual management and governance

- Coordination among sectors has not solved the problems, not clear management
- Condition between law enforcement and concern on community income
- Hope that commitment and spirit not only in project
- Concern need to be started at home

5. PT. Krakatau Tirta Industri
   - Water management by community, supported by company as the coordinator of the partnership
   - Community base management
   - Implementation of "PES" (Payment for Environmental Services): community as a "seller" (conserve the watershed), and industries as "buyer" (use the water)
   - PT KTI provide tree seeds for the conservation
   - Watershed management cost is not CSR, but included in the business cost.
6. NGO Rekovansi Bhumi
   - Less of commitment in watershed forum
   - Loss and benefit sharing in the implementation of Cidanau "Payment for Environmental Services"
   - Community forum and industry develop work-plan and benefit sharing.
7. Mr. Shizekagu Ichiki – Secretary General ILEC
   - Community Engagement in Shiga
   - Soap Movement or Housewives movement for using of powdered soap than detergent.
   - Residents involvement in water pollution control quality of Lake Biwa
   - Many stakeholders involved in Lake Biwa Day, as Beautification Campaign
   - Voluntary action by industries association included training on environmental and risk management.
   - Mother Lake 21 Plan not only involve government/decision maker but also residents and industries
   - Mother Lake Forum
   - Community, Communication, and Commitment
8. Mr. Mamoru Terada – Managing Director for Lake Biwa Management
   - Purpose to improve and maintain water quality and goal to revive beautiful scenery
   - Structure of organization
   - Investigation and improve group ; water quality research, mode rover work, school river, expedition of Akanoi Bay, water living things research etc.
   - Enlightenment and public relation
9. Mr. Atsushi Numazawa-Lake Kasumigaura Citizens Association
   - Lake Kasumigaura has beautiful cherry blossom, traditional sailing, source of water
   - Since the separation of water area and land by embankment, no more flood damage
   - 1995 WLC 6th in Kasumigaura
   - Lake Kasumigaura Citizens Festival towards restoration of swimmable lake water involve 5.000 people
   - Test Approval of community knowledge on Lake Kasumigaura
   - Community activities: Publication by citizens; Water quality monitoring do by children and municipal official; Housewives group participating on water quality monitoring; Simple test to monitoring water quality done by children; Water quality map, Collecting garbage, Exploration rivers activity by citizens 5 May; Special cruise for children in collecting plankton; Lake environmental science center; Observing plankton in seminar room.

Discussion

1. Dr. Nyoman Sunartha (Udayana University)
   - Lakes in Bali as tourism destination
   - Lake water become brackish

- Different treatment for each lake, by 3 actors: Theologist, Ecologist, Hollyist
- Traditional wisdom more obeyed than formal regulation

2. Dr. Agus Suprapto (Ministry of Public Works and Housing)
   - Lake is part of water resources
   - Policy in national level, watershed forum and commitment for action
3. Mr. Anggoro (BPDASHL Kapuas)
   - Urgency of coordination
   - Forum has no power but very important
   - Forum identify who doing what
   - In conservation area, lake management is under authority of the conservation agency.
4. Mr. Guntur (Faculty of Geological Engineering, Soedirman University)
   - Coordination and integration in action among stakeholders
5. Mr. Safoan (BPDAS Asahan Barumun)
   - Developing new agency takes time
   - Lake management is Governor authority
   - Need agent for community awareness
6. Mr. Daryatmo (Member of Parliament)
   - Need Law for environmental services
7. Mr. Dadang Hilman (Climate Change Unit)
   - Comprehensive background for coordination
   - Climate change issue is important
8. Mr. Jasman (Lake Singkarakk)
   - Power-plant industry not so contribute, only through CSR
   - Potential program is climate change adaptation and mitigation
9. Lake Rawa Pening
   - Power-plant industry is not so contribute to the effort of lake conservation and rehabilitation
   - Analogue of IWRM in lake management
   - Alleviate develop new agency, back to one integrated management
   - Grand Design of Lake Management and "Germadan" are needed to be implemented
   - Government regulation on lake needs to be coordinated by Coordinating Ministry for Economy
   - Synchronize for budgeting and program
10. Dr. Lukman (LIPI)
    - Enhance capacity of local agency/local government
    - Sometimes local government has no concern to the lake.
    - Commitment of all stakeholders for better coordination is needed.
11. Ms. Poppy (Lake Maninjau Forum)
    - Hope for Lake Rehabilitation Agency
    - Conflict of interests among sectors
    - Community hope for self-provide drinking water
12. Mr. Ahmad Fadli (Gorontalo University)
    - Lake Limboto Information Center
    - Nusantara Lake Forum

CONCLUSION AND RECOMMENDATION OF NATIONAL POLICY DIALOGUE 16th WORLD LAKE CONFERENCE

1. In national level, regulation for Lake Conservation and Rehabilitation, and Working group to prepare the fundamental regulation and specific body for lake management is needed. In order to formulate the regulation and management model on lake management, working group which is coordinated by Coordinating Ministry and membered by technical ministries should be developed.

2. Simultaneously, each province prepare budget for lake management, coordinated by Secretary of each provincial government, and integrated in Work Plan of the local government. Secretary of Gorontalo Province will coordinate the all Provincial Government Secretary.
3. Concrete action for 15 Priority Lakes.
4. In technical level, zoning regulation, assessment of carrying capacity, economic alternative for local people and law enforcement, need to be developed and implemented.
5. Important: community, communication and commitment.
6. Scheme of stakeholder participation in lake management and funding mechanism is needed to be developed.

Facilitator of National Policy Dialogue:

No	Photo	Name, background and experience
1.		Dr. Imam Prasodjo • Senior Adviser to the Minister of Environment and Forestry • A sociologist who currently teaches in the Department of Social and Political Science at the University of Indonesia. • Pursuing Bachelor's degree at the University of Indonesia, continued by Master's degree from Kansas State University and a PhD from Brown University, United States. • Member of the General Elections Commission (from 2001 and resigned in April 2003); member of the Higher Education Tribunal Council, Ministry of Education (2009-2013); member of the Advisory Council for Correctional Institution, Ministry of Law and Human Rights (2007-present); and Senior Advisor to the Minister of Environment and Forestry (2015-present). • Served as a member of the selection committee for several high profile institutions, such as the Anti Corruption Commission, the General Elections Commission, and the Elections Monitoring Body.
2.		Dr. Sabrina • Adviser to the Minister of Environment and Forestry • Bachelor's Degree in Social Economy of Agriculture from Bogor Agricultural University, continued by Master's Degree in Environmental Science from North Sumatera University, and PhD in Regional Planning from University of Sains Malaysia. • Secretary of North Sumatera Province (2015), Assistant of Secretary of North Sumatera Province for Economic and Development (2012-2015), Adviser to the Governor of North Sumatera for Economic, Natural Resources and Finance (2009- 2015), Major of Kabupaten South Labuhan Batu (2009), and Chair Person of Investment and Promotion Board of North Sumatera Province (2007-2009).
3.		Dr. Nyoman Suryadiputera • Director of Wetlands International Indonesia • Managing wetlands restoration project in many parts of Indonesia • A limnologist by training at the Austrian Academic of Science • Attend Environmental Management Course of Technical University Dresden Germany • Graduate from Faculty of Fishery, Bogor Agricultural University

INTERNATIONAL POLICY FORUM

Exploration of Networking and Knowledge Sharing Opportunities in Lake Management

Kharisma Ballroom, November 9, 2016, 13.30 – 16.30

Component	Detail
Introduction	• Lakes, reservoirs and other lentic water systems unquestionably influence human health and economic well-being, providing many life-supporting ecosystem services. The Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) recognize this fundamental role, noting many other sectors also will fail without adequate water supplies. The overall water situation, however, is especially acute in the Asian and South East Asian region, which contains the greatest density of humanity on our planet, as well as some of the most degraded water systems, particularly lakes, reservoirs and other lentic waters. • Although many UN, funding and other international organizations are involved in relevant activities in this region, the value and usefulness of such efforts are seriously hindered by lack of a common platform for systematic development and sharing of information, experiences and lessons learned from such activities. This cripples the possibilities for cross-fertilization and practical inter-linkages between these various bilateral and multilateral efforts, including their relevance to achieving the SDG goals. • Accordingly, the Indonesian Ministry of Environment and Forestry, Ministry of Public Works and Housing, and Institute of Science-Indonesia, in cooperation with the International Lake Environment Committee Foundation (ILEC), is convening the 16th World Lake Conference during 7th-11th November, 2016, as an international forum to discuss these important issues. • This International Policy Forum (IPF) will discuss systematic development of means for sharing the ever-increasing lake basin management and governance knowledge base. The IPF will include assessment of status reports on lake basin management from several countries in Asia/South East Asia, followed by review of current international technical programs by international organizations and agencies. An interactive Round-table discussion session is anticipated towards the concluding part, particularly to cultivate ideas on the needed regional collaboration framework and networking platform.
Objectives	IPF participants to actively engage in the IPF plenary discussions, as well as actively expressing their views on the pre-selected subjects in a round-table format, focusing on assessment, management and governance of lake, reservoir and other lentic water basins, including: 1. Discussing and sharing knowledge, experiences, and lessons learned on lake and reservoir management and governance in Asia/South East Asia Region; 2. Developing a practical and sustainable means/structure for networking on lake management issues in Asia/South East Asia region; 3. Developing an interactive platform for regional collaboration in lake management, including assessing and strengthening governance of lakes, reservoirs and other lentic water systems, and their hydrological and jurisdictional linkages, the sustainability of their ecosystem services, and the relevance to SDGs
Prospective Outputs	1. An agreed comprehensive and practical concept for developing a Platform on Lake Management for regional collaboration and elaboration 2. An agreed approach for Initiation of Networking on Lake Management (science, assessment, management and governance) throughout the Asia/South East Asia region. 3. Initial schedules, timelines, possible activities, and major agencies and individuals for guiding/ undertaking such actions and activities. 4. Elaboration of conclusions and recommendations for appropriate incorporation into the Bali Declaration.
Discussion subjects	Related issues on lake management, Identifying needed cooperation, and Developing collaboration platform on lake management
Facilitator	Dr. Efransjah (Senior Adviser to the Minister of Environment and Forestry) and Prof. Masahisa Nakamura (Deputy Director General of ILEC)

Component	Detail
Discussants	1. Mr. Shri Brijesh Sikka, Advisor-Vice Minister, Ministry of Environment, Forest and Climate Change, India; 2. Dr. Agus Suprapto, Director of Water Resource Utilization – Ministry of Public Works and Housing, ASEAN Working Group for Water Resources Management, Indonesia; 3. Dr. Richard Kipsang, Minister for Environment, Natural Resources and Energy, Nakuru County, Kenya; 4. Dr. Fatimah Md. Yusoff, University Putra, Malaysia, and National Academy of Science, Malaysia; Lank Bahadur Shahi, Executive Director National Lake Conservation Development Committee – NLCDC, Nepal; 5. Dr. Zhengyu Hu, The Institute of Hydrobiology, Chinese Academy of Sciences, People's Republic of China; 6. Prof. Salif Diop, University of Senegal, National Academy of Science, Senegal; 7. Dr. Yoshiaki Kobayashi, Senior Water Resources Specialist, Asian Development Bank; 8. Ms. Joana AKROFI, Programme Officer, Divison of Early Warning and Assessment-DEWA United Nations Environment Program; 9. Representatives from Asian Major Lakes: Tonle Sap (Cambodia), Laguna (Philippines) and Chilika (India); 10. ILEC resource person and Scientific Committee Members included Dr. Sandra Azevedo (Brazil), Dr. Juan Skinner (Guatemala); Dr. Walter Rast (USA), Dr. Ajit Patnaik (India), Ms. Lennie Santos-Borja (Philippine), assisted by Ms Yasue Hagihara from ILEC Secretariat; 11. Indonesian resource persons included Mr. Hermono Sigit (MOEF), Dr. Imam Prasodjo (MOEF), Dr. Sabrina (MOEF), Dr. Nyoman Suryadiputera (Wetlands International Indonesia Programme), Dr. Fuad Ali (LIPI), Dr.Luki Subehi (LIPI) and Dr. Muhammad Rizal (MOPWH); 12. Interested WLC16 Participant Observers including those from Indonesian national and local governments, as well as Shiga and Ibaraki Prefectures, Japan.
Program	
13.30 – 13.45	Introduction by Facilitator
13.45 – 14.30	Keynote Presenters: 1. Dr. Agus Suprapto On the need for an ASEAN Working Group on Water to mainstream lake basin management to ensure lake issues will be duly mainstreamed in the ASEAN IWRA and IRBM activities; 2. Dr. Fatimah Md. Yusoff On the need for greater collaboration among Southeast Asian lake basin management scientists and policy-makers, supporting a proposed initiative by LIPI, USM and others on the need for the South East Asian limnologists to establish a network on tropical limnology; 3. Mr. Shri Brijesh Sikka On the challenges facing the South Asian region in regard to lake basin management, particularly with respect to restoration of rapidly-degrading high-altitude and coastal wetlands, urban and semi-urban manmade lakes, and other highly-stressed lakes and wetlands that were constructed many centuries ago that ubiquitously exist in the region serving for a vast range of water resource needs. The need to touch on the subject of South Asia – Southeast Asia collaboration for sharing many similar challenges and solution approaches also may be mentioned; 4. Dr. Yoshiaki Kobayashi On the Asian Development Bank (ADB) initiatives, particularly with regard to large lakes in various parts of Asia, and the need for greater cross-fertilization of mutual experiences in Asia as a whole; 5. Ms. Joana Akrofi On the global challenges facing transboundry water systems, particularly lakes and other lentic waters intricately interlinked with rivers, ground-waters and marine ecosystems, being addressed through global initiatives such as the Transboudary Water Assessment Program (TWAP) being spearheaded by UNEP. The emerging challenges facing lakes and other lentic water issues within the framework of SDG also could be mentioned.
14.30 – 15.30	Round-table Discussions by Thematic Groups
	Roundtable A: Development and Implementation of National Programs (i.e., Planning framework; Laws & regulations; Institutional Models; Resource Mobilization, etc., to be accelerated with greater regional and international collaboration) • Dr. Agus Suprapto or Dr. Sikka and Dr. Yasumasa Watanabe as lead discussants • Facilitated by Dr. Aji Pattnaik • Dr. Fatimah Md. Yusoff, Dr. Richard Kipsang and Lank Bahadur Shahi joint this table.

Component	Detail
	Roundtable B: Capacity Development Challenges (Human-resource Development) (i.e., Technical and Managerial Knowhow; Acquisition of Basic and Advanced Skills and Knowledge; Technological Options; Limitations and Prospects, etc., to be accelerated with greater regional and international collaboration) • Facilitated by Ms. Adelina Santos Borja • Representatives from Lake Tonle Sap and other major Asian lakes, responsible government agencies, NGOs,international technical collaboration institutions & agencies joint this table.
	Roundtable C: Stakeholder Participation (i.e., Including NGO Involvement, Citizen Science, Education and Communication, etc., to be accelerated with greater regional and international collaboration) • Some LGD key resource persons as lead discussants • Facilitated by Dr. Aji Pattnaik • Representatives from governments, research and educational institutions joint this table.
	Roundtable D: Scientific Collaboration on Tropical Limnology (to be accelerated with greater regional and international collaboration) • Facilitated by Prof. Sandra Azevedo • Representatives from research and educational institutions, etc, joint this table.
	Roundtable E: Regional, International and Global Lake Basin Management Challenges (i.e., with respect to SDGs, and particular reference to transboundary implications, to be accelerated with greater regional and international collaboration) • Ms. Joana Akrofi and Dr. Yoshiaki Kobayashi • Facilitated by Prof. Salif Diop • Representatives from national, regional and international agencies, research and educational institutions, etc., joint this table.
15.30 – 16.00	Presentation on Thematic Group Conclusions
16.00 – 16.30	Synthesis Discussioin

Presentation for Sharing Knowledge and Experiences

Prof. Masahisa Nakamura started the forum by inviting some speakers to present their experience in lake management, collaboration and global challenges.

1. Dr. Brijesh Sikka

(Adviser of the Ministry of Environment, Forest and Climate Change, Government of India) "An Overview of Initiatives in Conservation of Wetlands and Lakes in India"

- Wetlands – lifelines of society: Water and food security, Regulate water regimes, Buffer extreme events as floods and storms, Support livelihoods, Recreation, Cultural identity, Yet, continue to be degraded and impacted by sectoral development.
- Major threats: Fragmentation of hydrological regimes, Catchment degradation, Conversion for alternate use, Pollution, Over – harvest, and Invasive species.

- Wetlands in India: National Wetland Atlas, 2011 by SAC, Ahmedabad (1: 50,000 scale), 15.26 m ha. of which 10.56 m ha, inland wetlands (7.57 lakh wetlands), and 4.63 % of total geographical area of the country.
- Wetlands and Biodiversity: Loktak - last natural habitat for Manipur Swamp Deer, Chilika - one of two lagoons in the world with resident Irrawaddy Dolphin population, HAW of Ladakh - only known Indian breeding site for Black necked crane, Important part of Central Asian Flyway: Habitat to nearly 250 of known 870 migratory waterbird species.
- Wetland conservation: Financial assistance to State Governments since 1986 under National Wetland Conservation Programme (NWCP), National Lake Conservation Programme (NLCP) introduced in 2001 to address pollution issues in wetlands located with urban, peri-urban settings, Over 175 sites identified as priority under NLCP and NWCP, and NLCP and NWCP merged into a unified scheme 'National Plan on Aquatic Ecosystems' (NPCA) in February, 2013.

- Key management challenges: Sectoral approaches (Full range of wetland values rarely integrated in developmental planning and Wetlands not recognized as land use category in most States), Adhoc approach to implementation of management plans (Management Plan based on annual cycles rather than integrated landscape scale planning, Sub- critical funding, No/meager allocation for wetlands in State budgets, Post project sustainability not worked out), Governance mechanisms at State level need strengthening (Only few States have constituted Wetland/Lake Authorities), Insufficient capacity for integrated management, and Limited research management interface.
- NPCA (National Plan on Aquatic Ecosystems) Objectives: Developing policy guidelines for conservation and sustainable management of wetlands and lakes, Restoration of prioritized wetlands and lakes, Developing a national inventory, setting up information and decision support system, Framing guidelines for formulation and implementation of integrated management plans, Strengthening capacity of managers and stakeholders for effective management, and Strengthening implementation of international commitments.
- Strategy: Integrated management (Integrated management plans as a basis of investment), Funds convergence (Funding largely through developmental sector schemes. NPCA will only provide core funding required for integrated management and 40% costs of projects to be borne by States, 10% for North Eastern & hill States), Cross sectoral governance (State Wetland/Lake Authority to be constituted), Complementing regulation (Notification of sites prioritized for management. Investment in site management will complement regulation), and Mission mode implementation (as Target oriented implementation of the plan).
- Role of Ministry of Environment, Forest and Climate Change in India: Providing national policy framework, including achievement of SDG targets, Providing funds for core activities of DPR (cost sharing basis), Supporting State Governments in leveraging funds from other Central Government schemes, including CSR funding, Conducting regional capacity building programmes, Financing research to support integrated management, and Periodic evaluation of interventions.
- Role of State Governments: Identifying priority wetlands, Notifying wetlands under Wetlands (Conservation and Management) Rules, 2010 *(under revision)*, and Constituting State Wetland/ Lake Authority (Chair: Chief Minister/Minister of Environment & Forest, Steering Committee,, Chief Secretary, Capable of implementing projects).
- Wetlands Conservation & Management Rules, 2010: Recommends prohibited and regulated activities within wetlands and their zone of influence, Enforced by Central Wetland Regulatory Authority, Provides for protection of notified wetlands (presently limited to Ramsar sites), Required leadership of State Governments not emerging, Concerns (Concentration of powers in Central Wetland Regulatory Authority, Threshold of 500 ha. too large for most wetlands under threat, Uniform regulation, no reference to site characteristics, Ambiguity in case of coastal wetlands).
- Proposed Revisions: State Wetland/Lake Authorities as the nodal agency for notification, regulation and management, Regulation based on site characteristics while barring conversion into non-wetland uses and alteration of inflows and outflows, Mandatory boundary delineation, specification of ecological character and regulation thresholds, Regulations of wetlands under protected areas, notified forests and coastal zones as per respective laws and rules, management on wise use principles.
- Conclusion: Success of programme for conservation of wetlands linked with proactive role of States, State Wetland Authorities to provide the institutional framework for regulation and management, Integrated management plans based on 'wise use principles' needed for all wetlands, Strengthening science-management interface, improved database/inventory, monitoring, capacity building and research, Networking & collaboration with other countries & international organizations for sharing best practices in sustainable conservation of wetlands.

2. Dr. Agus Suprapto

(Ministry of Public Works & Housing Indonesia, & ASEAN Working Group on Water Resources Management) "Ministry of Public Works and Housing c.q. DG of Water Resources in Lake Management in Indonesia"

- Lake is part of surface water. Ministry of Public Works and Housing is mandated by Law 11/1974 to manage surface water, as part of water resources. In order to manage the water resources properly, we follow the common approach in the world that is to manage the water resources based on river basin.
- Water is flowing resources, thus cannot be managed by territorial bases or district bases. Since every activities in the upstream area will have an effect to the downstream area, management of the water resources should be done in integrated manner concerning the whole stream of rivers included lakes in some cases, and also it should also involving multi sectors that directly or indirectly influence the water resources. Water resources cannot be separated from environment. I believe that the better the environment, the better the water resources would be.
- One of the problem of Indonesia is that the population is growing rapidly, meanwhile the economic condition is also improving, which is good in one side but on the other side the growing economics also increase the need for water and also spaces, therefore that tends to give more burden to the environment. New areas are opened for housings, industrial areas, and tourism facilities (i.e, hotels, villas etc.) that change the land uses in area that used to be green area or forests.

- Spatial planning has been set ideally, but it sometimes difficult to follow in the implementation due to many different interests that may sometimes make the authority difficult to control the implementation. All of this situation may also have a bad impact to the water resources, unexceptionally also to the lakes.
- Indonesia has divided the whole area into 128 River Basin Territories, of which 64 are under the authority of central government, 52 are under the authority of provincial government and 12 are the authority of district government. For every River Basin Territories, Strategic plan (POLA) should be prepared, followed by the masterplan (Water Resources Management Plan), that covers conservation, utilization and destructive potential management of water. The preparation of those plans, involving related stakeholders which are represented in the water resources councils for every river basin territories.
- From our view points, lake management will covers
  - lake conservation (protect and revive the lake, lake water quality management, i.e. water pollution control/communities, industry, agriculture; safeguarding the greenbelts, control mining in the upstream rivers, building check dams to control sediment, i.e)
  - lake water utilization (lake zoning, i.e., water tourism, water sports, and water allocation, i.e. for raw water and energy generation)
  - use of lake for flood controls
  - lake maintenance (cleaning lakes from plants, i.e. enceng gondok/water hyacinth)
- For a good lake management, there are number of actions need to be undertaken, i.e:
  - monitor and evaluate the condition of the lake
  - integrated action from related stakeholders (among ministry and also with local government)
  - empower the community around the lake
  - clear rules and strictly implement the rule.
- All stakeholders have role to save the condition lakes that have been in critical condition and also to manage the others that are still in better condition properly.
- During the Indonesia National Conference of Lake in 2009, there are 15 lakes have been declared in

critical conditions, 4 in Sumatera Island, 2 in Java Island, 1 in Bali, 2 in Kalimantan, 5 in Sulawesi and 1 in Papua. Since then, the DGWR, has conducted some actions to revitalize some lakes, i.e, Limboto, Tondano, Tempe in Sulawesi; Maninjau, Singkarak in Sumatera. Meawhile, some studies were also undertaken for Lake Toba, Maninjau, Singkarak, Pening, Tondano, and Tempe.

- On the other hand, Indonesia has also National Movement Partnership to save Water (Gerakan Nasional Kemitraan Penyelamatan Air- GNKPA), involving 8 Ministry which was refreshed in 2015.
- In this Movement, the role of the MPWPH, is:
  - To formulate policy, Standard, Procedures and Criteria and Guidance for water Resources Management covers WR Conservation, WR Utilization and WR destructive controls.
  - To conduct development water resources infrastructures for water resources management

3. Dr. Fatimah Md. Yusoff

(Akademi Sains Malaysia and National Institute of Hydraulics Malaysia)

"Lake Management Strategies in Malaysia: The Way Forward"

- Major challenges of lake management in Malaysia are siltation and sedimentation, proliferation of aquatic weeds and drying up lakes which consequences to water pollution and decline of indigenous species.
- The effort for solving the problems are:
  - Studies and assessments of lakes & reservoirs: Inventory – 90 lakes: 55 water supply/ irrigation; 35% lakes for hydropower, flood control. 62% were eutrophic – 2005
  - Workshops & discussions: Management of Lakes and Reservoirs – 2007 and Development of Strategies – 2008 to 2009
  - Publication of lake Briefs: Completed 26 lakes out of 92 lakes
  - Strategic Plan for the Sustainable Development and Management of Lakes and Reservoirs in Malaysia – Approved by National Water Resources Council (MSAN) in 2012.

- The Vision is "All lakes and reservoirs in Malaysia are managed and conserved on a sustainable basis"; and the Mission is "To advance sound management of lakes and reservoirs in Malaysia".
- National ILBM Strategies Implementation Roadmap starts from 8 strategies under 3 broad categories for the implementation involving both Federal and State Governments led by the Ministry of Natural Resources and the Environment (NRE)
- Category 1 is Enabling Environment. The strategy is Pass appropriate legislation to strengthen existing legal framework.
- Category 2 is Institutional Framework. The strategies are Identify and Empower a Lead Ministry/ Agency; Establish a National Lake Resource Centre under NRE; Establish a Standing Committee on Lakes within the Purview of the National Water Resources Council; Establish Lake Management Committees at State Level; and Support the role of Local Communities in Lake Management.
- Category 3 is Management Instruments. The strategies are Development of a Detailed Action Plan and Enhance networking and strengthen international strategic alliances.
- The National Lake Strategic Management Plan has 2 main committees those are Committee on The Implementation of ILBM Strategy Plan In Malaysia led by the Department of Irrigation and Drainage (JPS) and Committee on Research Programs led by the National Institute of Hydraulics, Malaysia (NAHRIM).
- Detailed action plan is developed to achieve 4 objectives (18 sub-strategies under 9 focus areas with 49 strategic action plans), consists of ensuring clean water, ensuring sufficient water quantity, improving environmental conservation and reduce flood risk.

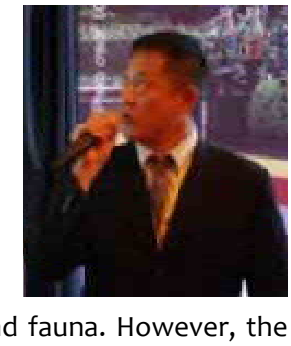
- For Objective 1, Clean water: Strengthen the governance, policy & legislation framework; Increase capacity building- training modules; Develop lake brief; Develop management plans; and Implement management plan throughout basins
- For Objective 2, Ensuring sufficient water quantity: Implement lake water use control; Manage water demand; Identify threat/hazards and control them; and Establish alternative sources i.e. ground water and rain water.
- For Objective 3, Improving Environmental Conservation: Improve research, development and innovation; Gazette reservoirs and lake reserves; Increase use of lake as part of urban landscape; Increase environmental conservation activities in the lake basins; Engage stakeholders participation; Enhance communication, education and awareness programs; and Develop information management and decision support system.
- For Objective 4, Reduce flood risk: Increase utilization of lakes for flood management & flood mitigation.
- For sustainable management and use of aquatic ecosystem resources, need to include all resources, water and living things: Integrated Lake Basin Management (ILBM)
- ILBM Research Philosophy and Areas: Demand-driven research for evidence-based policies (1. Ecosystem services, resource provision and regulating services and 2. Policy and regulation); Sustainable management and ecological technology (3. Physical limnology and hydraulic modeling; 4. Pollution and water quality; and 5. Green technology); Resources, Biodiversity, Conservation & sustainable utilization (6. Biodiversity and natural products and 8. Lake ecology and basin management).
- There is Blueprint for Lake and Reservoir Research and Development in Malaysia; where study completed in 2014, provides research framework for ILBM and identified 30 major lakes for integrated research.
- The way forward: 1. Have identified the causes and potential consequences; 2. Obtained approval and support from the Government – Most of related ministries and agencies are committed to the lake management in the country; 3. Have done the `Road Map'; 4. Have initiated the management plans at the Federal and State levels (DID & State Agencies); 5. Initiated the studies on ILBM plans – 2 reservoirs; and 6. Many more things to do – Implementation of ILBM on the ground.

4. Dr. Yoshiaki Kobayashi

Senior Water Resources Management Specialist, Environmental, Natural Resources, and Agriculture Division East Asia Department, Asian Development Bank

"Asian Development Bank's Initiatives in Lake and Wetland Protection in Asia (in the People's Republic of China)"

ADB's initiatives in lake and wetland protection have been active, particularly in the People's Republic of China (PRC). Aquatic ecosystems in the PRC are being destroyed by the combined effects of pollution and development. Lakes and wetlands are especially at risk.



- ADB's Key Projects for Lake and Wetland Protection in the PRC
- Example (L2157/Grant 4157-PRC: Sanjiang Plain Wetlands Protection Project):
  ADB loan $15 million and Global Environment Facility grant $12.14, for outputs in Watershed Management, Wetland Nature Reserve Management, Alternative Livelihood Programs, & Education & Capacity Building.
- Program in Sanjiang Plain Wetlands: - The largest area of wetlands in the PRC, and one of the PRC's richest areas in globally significant flora and fauna. However, the wetlands have receded by more than 80% in 50 years.
- Suggestions: International organizations should know other organizations' activities in lake and wetland protection; Sharing of information and knowledge between international organizations on common challenges and targets.

5. Ms. Joana Akrofi

Programme Officer, Divison of Early Warning and Assessment-DEWA United Nations Environment Program;, Nairobi Kenya)

"Global Challenges of Transboundary Water Systems: Lakes and Lentic Waters"

- Additional considerations of transboundary water systems
- No single global programme focusing on transboundary water assessment particularly on Lakes or lentic water systems, and no regular monitoring or assessment programme for assessing the environmental status of transboundary water bodies.
- The GEF's Technical Advisory Group for strategy development in IW focal area identified the need for a periodic global transboundary waters assessment programme in early 2007.
- Some Global Challenges of Lakes and Reservoirs:

  - Lakes & other lentic (standing) water systems>90% of liquid freshwater on Earth's surface; provide widest range of water-based ecosystem goods and services; Large water volumes, long flushing times & integrating nature Incremental, unpredictable non-linear responses to environmental stresses, complicating accurate assessment and management;
  - Lake/reservoir management often subsumed under river basin concerns Not realistically considering capacity to buffer basin-derived environmental stresses, or interactions with upstream/downstream water systems; Buffering capacity mask upstream basin degradation;
  - Lakes and other lentic water systems provide widest range of ecosystem services directly/ indirectly related to human livelihoods, health and well-being , including: Resource Provision Services -- *Drinking water, supply, agricultural irrigation, fisheries, recreation, transportation, hydropower, generation;* Regulating Services -- *Flood and drought mitigation, self-purification, climate mediation, shoreline ecotone buffering, diverse food-chains;* Cultural Services -- *Aesthetics, spiritual, anthropogenic and historical values;*
- Lessons learned assessment of lakes
  - Lakes (lentic lotic waterbodies): Complex water systems used for widest range of ecosystem services for human health, livelihoods & well-being;
  - Little uniform lake data on global scale Complicates accurate assessment (and management);
  - Sustainable use of lake-based ecosystem services: Requires detailed analysis of characteristics within context of integrated management framework (ILLBM);
- SDGs and lentic lotic water systems:
  - Sustainability agenda pursued on global scale enhance of our ability to achieve 2030 SDG goals and targets;
  - SDG Goal 6/Target 6.5 ("Ensure availability and sustainable management of water and sanitation for all") includes need to implement integrated water resources management at all levels, including through transboundary cooperation as appropriate…";
  - Achieving target requires transboundary lake (& other transboundary water systems) assessment methodology to: (1) identify threats in uniform, understandable manner; (2) provide guidance to effectively address them; (3) basis for transboundary cooperation;
  - Integrated elements encompassed within ILLBM, as complement to IWRM Framework for achieving assessment/management goals for transboundary lakes & other lentic lotic water systems.

- SDG Goal 6/Target 6.6 ("Ensure availability and sustainable management of water and sanitation for all") includes need to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers *and lakes…."); Linked to 2020 Archi Biodiversity Target.*
- Tied to sustainable water-based ecosystem services for human health, livelihoods and well-being;
- Concerted global-scale efforts needed to acquire data & management experiences to identify & address stresses/constraints to sustainable water-based ecosystem services;

- Lakes; lentic–lotic water systems particularly important because of wide range of ecosystem services
- SDG biodiversity goals and targets:
  - SDG Goal 15 ("Protect, restore and promote sustainable use of terrestrial ecosystems…. and halt biodiversity loss"):
  - Target 1: "..Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands ……in line with obligations under international agreements"
  - Target 5: "Take urgent and significant action to reduce degradation of natural habitats, halt the loss of biodiversity…"
  - Target 9: "Integrate ecosystem and biodiversity values into national and local planning, development processes, poverty *reduction strategies and accounts*."
  - Biodiversity goals: Strongly linked to ecosystem services and functions provided by lakes/ other lentic lotic water systems.
- TWAP and SDGs: TWAP freshwater indicators map to SDG 6 on Clean Water and Sanitation, notably Target 6.6 (protection and restoration of mountains, forests, wetlands, rivers, aquifers and lakes). TWAP marine indicators support SDG 14 on Oceans, Seas and Marine Resources, and all its targets.
- Linkages of Lentic and Lotic Water Systems: Mainstreaming lakes & other lentic lotic water systems in global water discussions, including future transboundary assessments; Identifying needed capacity- building to address transboundary lake assessment/management needs & sustainability of ecosystem services; Considering linkages/interactions of transboundary lakes with upstream, downstream & sub- surface water systems, (transboundary & non-transboundary).
- Effective Identification & Remediation of Institutional, Policy, Adequacy, and Magnitude of Transboundary Lake Threats Using ILLBM: Mainstreaming lakes & other lentic lotic water systems in global water discussions, including future transboundary assessments; Identifying needed capacity- building to address transboundary lake assessment/management needs & sustainability of ecosystem services; Considering linkages/interactions of transboundary lakes with upstream, downstream & sub- surface water systems, (transboundary & non-transboundary); Developing adequate, uniform, meaningful and understandable lake (Lentic-Lotic)data and Information data bases; Ensuring sufficient and sustainable financial, institutional and policy support to assess and manage lakes/other lentic-lotic water systems; and Considering other factors that could make national lakes 'transboundary's impact (e.g., located in transboundary basins; trans-continental migratory bird flyways;).

Discussion in each Roundtable

After all presentations, Prof. Nakamura invited all participants to have roundtable discussion. Dr. Efransjah started the discussion by explaining the frame of the discussion.

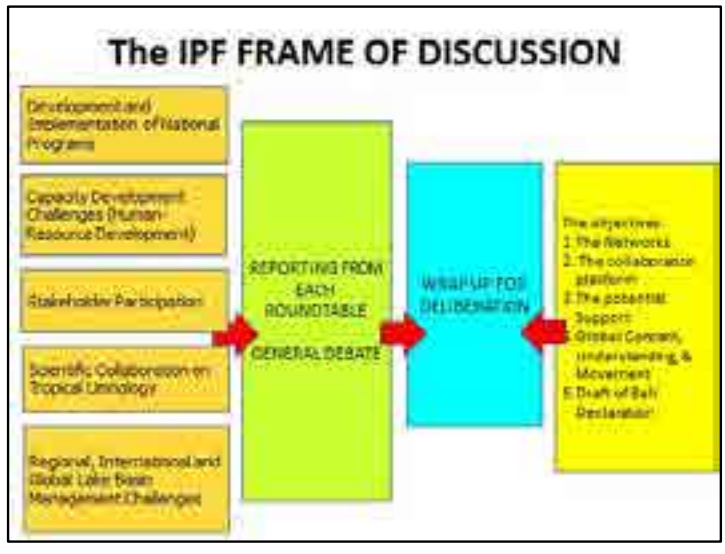


Table A Discussion: Development and Implementation of National Program

Table B Discussion: Capacity Development Challenges (Human Resources Development)

Table C Discussion: Stakeholder Participation

Table D Discussion: Scientific Collaboration on Limnology


Table E Discussion: Regional, International and Global Lake Basin Management Challenges


Presentation of the conclusion of each Roundtable

After roundtable discussion, Dr. Efransjah invited representative of each roundtable to present their conclusion.





Conclusion of Roundtable A

Development and Implementation of National Programs

- Example from some countries on problems and programs in lake and wetland management.
- The management is the subject of provincial government.
- Interpretation and implementation of workplan.
- Needed of leading agent.
- Problems in transboundary water management.
- Platform issue.
- Climate change mitigation should be included.
- Financing problems, weakness in coordination, connection among central, federal and local government.
- Facilitation of action and implementation.

Conclusion of Roundtable B

Capacity Development Challenges (Human-resource Development)

- Key players on ILBM need to have knowledge on basic properties of lake and impacts of climate change and activities of landscape/catchment level.
- Communication kill is important for ensuring better ILBM (include technical report activity)
- Expertize on appropriate restoration technologies including the application of GIS mapping, modeling, monitoring, assessment and database management.
- Lake managers should have capacity on sustainable resource mobilization and management and on successful intervention.

Conclusion of Roundtable C

Stakeholder Participation

- Identification of stakeholders is important.
- No one structure of stakeholders involvement.
- Negotiation of plan, considering issue in regional and central level.
- Stakeholders need to have discussion together, as each stakeholder has each own interest.
- Participation should have action.
- When it comes to decision and plan, not only involve attorney government and scientists, try to involve local stakeholders.
- Information sharing is very important.
- Conflict between local and government level.

Conclusion of Roundtable D

Scientific Collaboration on Tropical Limnology

- Collaborative research for better national and international networking: specific collaborative research to develop better database on tropical limnology focus on characteristics and dynamics.
- To be opened to interdisciplinary discussion and knowledge transfer to stakeholders.
- Efforts to solve communication barrier culture and language.

Conclusion of Roundtable E

Regional, International and Global Lake Basin Management Challenges

<u>Ecosystem Services</u>

- Must make sustainable ecosystem services a major goal of lentic water system management; Develop capacity to do so (case studies);
- Recognize that inaction can lead to the loss of many of them with their impacts on human existence;

<u>Information Acquisition and Sharing</u>

- Develop pilot projects/centers to gain and share experiences on how to successfully manage lakes vis-à- vis management capacity centers;
- International community should continue periodic assessments and consider how to best use gained knowledge/data to better manage lakes;
- Need to determine how to maximize benefits from TB water-bodies for all basin stakeholders;
- Regional networking must be considered as a fundamental requirement for sharing experiences, reinforcing knowledge, and as a common platform this purpose.

Governance Concerns

- Governance failures are typically at root of environmental degradation problems, requiring strengthening of lake/basin governance as basis for action;
- Need to develop common/complementary vision for lake management;
- Need to recognize the different 'types' of lakes can have unique features that must be considered in developing management goals;
- The unique characteristics of lentic waters must be emphasized; also the assessment and management implications of hydrologic and jurisdictional linkages between lentic and lotic waters should be a core consideration in setting management goals;
- Need to determine how to maximize benefits from TB water-bodies for all basin stakeholders;

The Reason for It All

- All of the above statements must also be directed in some manner toward achievement of the SDGs.

Dr. Efransjah closed the sub-session of roundtable result presentation by inviting all participants of the forum to upscale the issues and bring the messages of lake and water management in international agenda.

Wrap Up of the Forum

Prof. Nakamura wrap up the forum by inviting all participants to submit expression, raised issues and recommendation of action, from the forum, which will be reported by the Secretariat, to be taken up for Bali Declaration.

Facilitator of the International Policy Forum:

No	Photo	Name, background and experience
1.		Prof. Masahisa Nakamura • Professor by Special Appointment, Center for Sustainability and Environment, Shiga University • Resident Executive Director and Deputy Director General of International Lake Environment Committee (Foundation) • Field of Expertise: Environmental Engineering, Environmental Policy and Planning • Work Experiences: Professor by Special Appointment, Shiga University, Professor, Shiga University, Director of Center for Sustainability and Environment, Director of Lake Biwa Research Institute, WHO Western Pacific Regional Center for Environmental Planning and Applied Studies, Assistant Professor, University of Louisville, Kentucky, USA, and Environmental Systems Engineer of Nihon Suido Consultants, Co. Ltd.
2.		Dr. Efransjah • Senior Adviser to the Minister of Environment and Forestry Republic of Indonesia • More than 30 years work experiences in Indonesian Government, UN, international organization and civil society organization • Expert on ecology, forestry, natural resources management, ecotourism and advocacy of environmental awareness , sociology, anthropology and Ecosophy • Graduated from Faculty of Forestry Bogor Agricultural University, Indonesia, and PhD on Sciences du Bois, Universite de Nancy, Franc • Chief of Executive Officer of WWF Indonesia, Regional Coordinator of CIFOR South East Asia and Central Asia, Chief Technical Adviser GEF Malaysia, and ITTO Japan.

GALA DINNER AND IBARAKI KASUMIGAURA PRIZE

Kharisma Ballroom, November 9, 2016, 19.00 – 22.00

Time	Program
19.00 – 19.20	Hospitality to all
19.20 – 19.40	Welcome Speech: 1. Director General of Water Resources, Ministry of Public Works and Housing 2. Government of Bali Province
19.40 – 20.00	Speech of Governor of Ibaraki Prefecture The 9th Ibaraki Kasumigaura Prize, presented by the Ibaraki Prefectural Government, Japan
20.00 – 22.00	Dinner and Performance of Song, Music and Traditional Dance

The winners of the 9th Ibaraki Kasumigaura Prize are:

1. Forester Alvin Araban Faraon, Ms. Adelina C. Santos-Borja, Engr. Jocelyn G. Sta. Ana, Mr. Neil V. Varcas from Philippines.
   Paper title: "Valuation of Ecosystem Service of the Laguna Lake Basin: Erosion Control and Flood Water Retention"
2. Rudra Bahadur Raya from Nepal
   Paper title: "Climate Change Impact on Water Quality of Phewa lake, Sub-temperate Climate Region of Nepal"
















CLOSING CEREMONY

Kharisma Ballroom, November 10, 2016, 13.40 – 15.30

Time	Program
13.40 – 13.50	Opening by MC and Introducing the Key Persons
13.50 – 14.00	Brief Information on the Conclusion of Scientific Discussions and Policy Dialogue by Prof. Gadis Sri Haryani (Chair Person of Indonesian Scientific Committee of WLC16)
14.00 – 14.30	BALI Declaration: Background, Script, Brief Discussion and Conclusion by Prof. Masahisa Nakamura (Deputy Director General of ILEC)
14.30 – 14.50	Speech of Governor of Ibaraki Prefecture, Mr. Masaru Hashimoto "Toward WLC17 in Ibaraki, Japan, 2018"
14.50 – 15.00	Closing Speech by Director General of International Lake Environment Committee Foundation (ILEC), Prof. Hironori Hamanaka
15.00 – 15.10	Closing Speech by Deputy Chairman for Earth Sciences, Indonesian Institute of Sciences, Dr. Zainal Arifin
15.10 – 15.20	Photo Session
15.20 – 15.30	Souvenir Session



















SIDE EVENTS

Exhibition

Discovery Room, November 8-10, 2016, 08.00 – 17.00

Exhibition of the WLC16 was presented by Ministry of Environment and Forestry Indonesia; Ministry of Public Works and Housing Indonesia; Indonesian Institute of Sciences; Bali Botanical Garden; Government of Bali Province, International Lake Environment Committee Foundation (ILEC); Government of Shiga Prefecture, Japan; Government of Ibaraki Prefecture, Japan; Indonesian National Aerospace Agency (LAPAN); PT Indonesia Power; some provincial boards of environment and forestry; some technical of management units of environment and forestry, and some small and medium enterprises.

Things provided and showed in the exhibition

- Watershed management units and provincial forestry offices booth consists of: posters of forestry management performance, seeding press instrument, seeding media, forest product such as aloe tree, honey, cacao, pecan and Javanese sugar, craft from bamboo, several products from mangrove, craft from endemic grass, local culinary from meat, sago, cinnamon, peanut, and some endemic trees, and product of local fish.
- LIPI booths provide information on Bali Botanical Garden, including tree collection and silviculture technology.
- Ministry of Public Works and Housing booth provide performance and products of educated small scale and medium enterprises such as gold craft and Balinese textile.
- Booth of Indonesian Aerospace Agency provides information on remote sensing and its use for environmental analysis.
- Booth of PT Indonesia Power provides information on CSR products.
- Booth of some small and medium enterprises provides products of local textile, Batik and traditional local crackers.
- Special culinary booth provide Aceh scrambled fish with local spicy, Central Java bamboo sprout wrapped in thin wheat-flour pancake called "Lumpia", North Sulawesi "Nike" fish meatball, and Balinese coffee.
- Booth of Ibaraki Prefectural Government, Japan, provide information on management of Lake Kasumigaura and tourism attractions in Ibaraki.
- Booth of ILEC and Shiga Prefectural Government, Japan, provide information on management of Lake Biwa.













Community Forum

Lake Batur, Kintamani, Bangli, November 7, 2016, 09.00 – 15.00

Community's contribution in lake conservation and rehabilitation has been done in many regions in Indonesia. One of them is implemented by local people in Lake Batur, Bangli. As part of event in the 16th World Lake Conference, a forum is conducted at the shore of Lake Batur in Wantilan Pura Jati, Batur Village, Kintamani District, Kabupaten Bangli, Bali, on November 7, 2016 to explore the community activities and dialogue among stakeholders,.

This forum is attended by 250 participants from several backgrounds, representing Ministry of Environment and Forestry, Ministry of Public Works and Housing, Ministry of Village, Underdeveloped Regions and Transmigration, and local government. The forum is also attended by Dr. Erna Witoelar (Minister of Public Works and Housing period of 1999 - 2001), Head of Bureau for Environmental Management of Bali Province, Head of Bali and Nusa Tenggara Ecoregion Management, representatives of local community of some lakes in Indonesia: Lake Singkarak, Lake Maninjau and Lake Toba, and experts from universities and some enterprises. This forum was started by visiting the community of farmers who implement environmentally agriculture, presenting tree seeds, garbage bins and areas of aquaculture ponds, for the community, and continued by interactive dialogue.

Lake Batur problems which are discussed in the forum:

- Water pollution from chemical fertilizer, pesticides, oil spill of water intake machine and tourism motorboat;
- Land use change from forest to agriculture (chili and potato crops) which increase erosion and lake silting;
- Reclamation and ocupation of the shore of the lake;
- Aquaculture by fish cages which cause eutrophication;
- Increasing of housing and tourism development surrounding the lake which is not followed by provision of facilities such as waste water treatment, sanitation and waste management.
- Lack of community awareness in lake preservation.

Some solutions to address the Lake Batur problems are:

- Ministry of Public Works and Housing will provide facilities of waste treatment and sanitation.
- Ministry of Village, Underdeveloped Regions and Transmigration and Ministry of Environment and Forestry will increase environmental education in enhancing community awareness.
- Zoning and quota regulation for activities will be adopted for lake preservation in catchment and aquatic area.
- Divert of aquaculture location from natural lake to ponds, and divert of fish feed type from chemical to organic feed from local tree.

Kids Lake Forum

November 6-7, 2016, 08.00 – 16.00, Japanese Kids

Shiga prefecture has hosted "Biwa Kids Ambassador Project" since 2008 to support sustainable environmental conservation effort and to nurture younger generation for the future of the lake district. ILEC has entrusted with this project since 2015 in a row. In 2015, the kids were dispatched to several places around the Lake Biwa to study indigenous cuisine and to Chiang Mai, Thailand for the international exchange. In 2016, the study theme is "to learn about rice farming, irrigation and creatures around rice pads". The kids went to local rice fields to find various creatures in the channels, and were dispatched to Bali, Indonesia, where WLC16 was held.

This year's destination of international exchange program was Bali, Indonesia where WLC16 was also held. ILEC hosted "WLC16 Kids Exchange Program" on this occasion. As a result, additional four kids from Kyoto Prefecture joined and, in all, ten kids traveled to Bali. Japanese kids have special activities on November 6 and 7, 2016, by exploring planting in paddy fields, visiting Indonesian school, Udayana University and some other activities.

November 7, 2016, 08.00 – 16.00, Indonesian Kids

For Indonesian side, Kids Lake Forum is the side event of the 16th World Lake Conference, which aims are as follows:

- To raise awareness and knowledge of young generation about sustainable lake management
- To deliver kids' message/aspiration to adults/decision makers who have role in the WLC16.
- To interact Indonesian kids with 10 Kids Lake Ambassador from Japan
- To give opportunity and experience for the students to be involved in international conference
- To appreciate and strengthen commitment and motivation of Adiwiyata Mandiri schools.

Adiwiyata Program is one of Ministry of Environment and Forestry (MoEF) strategic programs, which aims to create green school at elementary school to high school level. To be granted Adiwiyata Award, schools have to show their performance in school policy, curriculum, participative based activities and school infrastructure. The award is given gradually from municipal level, provincial level, and national level. Further, if National Adiwiyata schools are able to support and assist 10 other schools to become Municipal Adiwiyata schools, they would be granted Adiwiyata Mandiri schools. For many environmental activities held through MoEF that need students' involvement, Adiwiyata Mandiri schools are the priority to be invited, both for incentive and refreshment of Adiwiyata Mandiri schools as well as for motivating and commitment strengthening.

In the WLC16, as Kids Lake Ambassador from Japan are between 10-14 years, MoEF decided to choose students from the same age group, but the older ones so they do not need accompanied by their parents. Accordingly, MoEF invited 75 schools from 20 provinces of Adiwiyata Mandiri schools year 2014-2016 at junior high school level, to follow the selection process by sending 500 words essay on lake conservation. Sixty percent of invitees or 45 schools from 13 provinces responded by sending back 125 essays. Based on the criteria of synchronization of theme and content, solution, innovation and reference and writing/spelling regulation in Indonesia language, MoEF chose 22 essays from 17 junior high schools in 13 provinces. In order to upscale the program, MoEF invited JICA expert to collaborate in conducting Kids Lake Forum. Further, with support from JICA and related institutions, Kids Lake Forum was conducted successfully in Discovery Hotel Kartika Plaza Hotel (educative games and opening ceremony) and Bali Rani Hotel (workshop and sharing session).

The activities in Kids Lake Forum are as follows:

a. Capacity building in sustainable lake management through educative game and workshop, by knowing the 9 biggest world lakes and 15 Indonesia's priority lakes and identifying benefits, problems and solutions of lake;
b. Group work to prepare expression/aspiration to be delivered at the Opening Ceremony of the WLC16; and
c. To interact with 10 kids lake ambassador from Japan.




November 8, 2016, 09.00 – 16.00, Japanese and Indonesian Kids

On November 8, 2016, the Japanese and Indonesian kids have activities together to perform speech and poem on their concern to the lake condition in the Opening Ceremony of the WLC16, After the Opening Ceremony, the kids have sharing forum in awareness and action on lake conservation. Although there were difficulties in communication but it can be helped by assistance of the interpreter. In general, kids from both countries were very active and passionate to follow the program. The chaperone (teacher, headmaster, and parents/grandparents) also appreciated the Kids Lake Forum program, as they thought that it was beneficial and gave more understanding about environmental issues, particularly in lake management.

As follow up, one kid from Indonesia has been assigned as the Indonesian lake ambassador from her school. Further, Ministry of Environment and Forestry will ask the Indonesian kids to send their plan to implement their commitment as they mentioned in their poem that delivered on the opening ceremony. Each kid received goodie bag which contains of folded bag, tumbler, note book, pen, traditional Balinese cloth, t-shirt and "Kulkul" (traditional Balinese music instrument).

Speech by Ms. Yuna Mochizuki
(representing Japan Kids Lake Ambassador and Kids of Shiga)

Good morning to the participants of the Sixteenth World Lake Conference!

We are 5th and 6th grades kids from Japan. Six of us here, are the Ramsar Biwa- Kids Ambassadors from Shiga Prefecture, which is a home to the largest lake of Japan.

And the other four of us are our friends from Kyoto, the ancient capital of Japan, located next to Shiga Prefecture.

The mission of us Biwa-Kids Ambassadors is to introduce Lake Biwa to children outside of Japan, and let them know how wonderful and important our "mother lake" is.

At the same time, we tell our friends in Shiga and in Japan what we have learned from our overseas experiences. Our predecessors have been sent to China, South Korea and Thailand where they successfully completed their missions.

Here in Bali, Indonesia, we have learned the traditional "Subak System", and also visited Pegoyangang elementary school where we presented our activities and made friends.

Upon our return to Japan, we would like to tell our friends in Shiga and in the downstream area of Lake Biwa about the valuable experiences we've got here in Bali.

I am sure that this could raise more awareness for the future generation's active participation in the conservation and restoration of lakes and rivers.

We would like to conclude this speech by saying that "let us find many treasures of lakes and rivers, and then let people know how important they are!"

Thank you very much for your kind attention.

Poem by Indonesian Kids
My Lake, My Future (Danauku, Masa Depanku)

I was born in the lake side
Grew up and witnessed the beauty of the lake
Lake is my life
But now my lake is changing
It is not as beauty as it was
The water is not clear anymore
The biodiversity is slowly deteriorating
My heart is broken
Now I'm wondering,
Where is the lake I know?
Why the beauty has gone?
Now I'm here, not only expressing my voice
Moaning about lake endangered ecosystem
But indeed, I also have actions
To make my lake sustainable…

Aku lahir di tepi danau
Tumbuh besar melihat indahnya danau
Danaulah sumber hidupku
Namun kini danauku telah berubah
Tak seindah dulu lagi
Airnya pun tak lagi jernih
Dan ragam hayatinya perlahan hilang
Hati ini berdesir miris
Kini kutbertanya
Kemana danauku yang dulu?
Mengapa keindahannya telah hilang
Tapi aku tak sekedar menyuarakan suara hati
Atau mengeluh biotik danau mati
Aku juga punya aksi
Agar danauku lestari

List of Japanese Kids

No	Family Name	First Name	Age	Boy/Girl	Designation	City	Prefecture	School Name
1	Kajiwara	Sho	12	B	RBA	Kusatsu	Shiga	Minamikasa East
2	Kunitomo	Ryota	12	B	RBA	Nagahama	Shiga	Kamiteru
3	Sumida	Koki	12	B	RBA	Kusatsu	Shiga	Kusatsu No.2
4	Nishimura	Ichika	12	G	RBA	Moriyama	Shiga	Hayano
5	Hase	Sarara	12	G	RBA	Nagahama	Shiga	Kamiteru
6	Mochizuki	Yuna	12	G	RBA	Konan	Shiga	Iwane
7	Ganno	Satsuki	12	B	WKE	Kameoka	Kyoto	Chiyokawa
8	Nishiyama	Wajiro	11	B	WKE	Kyoto	Kyoto	Notre Dame
9	Kuribayashi	Misaki	12	G	WKE	Kameoka	Kyoto	Anjo
10	Miyagawa	Chifuyu	12	G	WKE	Kameoka	Kyoto	Anjo

RBA: Ramsar Biwa-Kids-Ambassador WKE: WLC16 Kids Event

List of Indonesian Kids

No	Name	School Name	City/Kabupaten	Province
1	Theo Suranta	SMPN 4 Satu Atap Sunggal	Deli Serdang	North Sumatera
2	Mira Zahrani Siregar	SMPN 3 Lubuk Pakam	Deli Serdang	North Sumatera
3	Shafira Kaisya Ramadhani	SMPN 1 Sunggal	Deli Serdang	North Sumatera
4	Wening Tyas Ayomi	SMPN 1 Karanganyar	Karang Anyar	Central Java
5	Adellian Nugraha	SMPN 1 Gresik	Gresik	East Java
6	Irnaz Sanika	SMPN 1 Gresik	Gresik	East Java
7	Novi Dwi Yanti	SMPN 1 Jombang	Jombang	East Java
8	Adhati Janni	SMPN 13 Tangerang	Tangerang	Banten
9	Priscilla Tiffany	SMPN 13 Tangerang	Tangerang	Banten
10	Muhamad Naufal Hibatullah	SMPN 13 Palembang	Palembang	South Sumatera
11	Sidiq Ardiansyah	SMPN 6 Kandis	Kandis	Riau
12	Tristania Faisa	SMPN I Pacitan	Pacitan	East Java
13	Jesica F.Nura	SMPN 1 Jayapura	Jayapura	Papua
14	Keisyha Amanda Putri	SMPN 02 Pangkal Pinang	Pangkal Pinang	Kep. Bangka Belitung
15	Della Silvi	SMPN 4 Kota Jambi	Jambi	Jambi
16	Ninda Ayu Pramesti	SMPN 1 Bantul	DIY/Bantul	DI Yogyakarta
17	Alifathun Nur Winda Sari	SMPN 1 Bantul	DIY/Bantul	DI Yogyakarta
18	Putu Adnanta Jaya	SMPN 1 Denpasar	Denpasar	Bali
19	Ni Putu Diah Dira Putri	SMPN 1 Denpasar	Denpasar	Bali
20	Amanda Nur Utami	SMPN 1 Enrekang	Enrekang	South Sulawesi
21	Sahra Sapia Kadar	SMPN 1 Enrekang	Enrekang	South Sulawesi
22	Steve Geraldy	SMPN 12 Balikpapan	Balikpapan	East Kalimantan

SMPN: Sekolah Menengah Pertama Negeri (State Junior High School)

Fieldtrip and Tree Planting

The Fieldtrip, November 7, 2016

The fieldtrip of the 16th World Lake Conference (WLC16) was held on 7 November 2016. It was followed by 123 participants who are 17 domestics and 106 foreigners. The participants depart from Discovery Kartika Plaza Hotel at 08.00 AM using 3 unit Coaches and 1 unit Mini Coach. During the activity, participants are invited to have a full day tour to various tourist attractions which accompanied by professional tour guides. The tourist attractions visited offers natural beauty and unique culture that makes Bali as a world tourism icon. Purpose of the fieldtrip is to improve understanding of WLC participants regarding the current condition of existing lakes in Bali by doing direct observation. In addition, through this activity the participants were also invited to visit various attractions, enjoy the natural beauty of Bali and learning about Balinese culture. Detail of the fieldtrip as follows.

1st destination: Pura Ulundanu Lake Bratan

Pura Ulun Danu Bratan, or Pura Bratan, is a major shivaite and water temple in Bali, Indonesia. The temple built beside of Lake Beratan, which is the second largest lake in Bali after Lake Batur. Water temples serve the entire region in the outflow area; downstream there are many smaller water temples that are specific to each irrigation association (subak). Built in 1633, this temple is used for offerings ceremony to the Balinese water, lake and river goddess Dewi Danu, due to the importance of Lake Bratan as a main source of irrigation in central Bali. The 11 stories of pelinggih meru dedicated for Shiva and his consort Parvathi Buddha statue also present inside this temple.

Pura Ulundanu in Lake Bratan

The Group at Pura Ulundanu Lake Bratan

2nd destination: Lake Buyan

Buyan Lake is one of the three similar lakes formed in a big caldera. It is flanked by two other lakes: Beratan Lake on the eastern side and Tamblingan Lake on the western side. Beratan Lake is the largest from all of them. Meanwhile, Buyan and Tamblingan Lake is often said as the twin lake because of its similar landscape and nature condition. The naturalness of Buyan and Tamblingan Lake is still well maintained because of the absence of human's interference to its ecosystem. Even if some activities exist, those are done by traditional fishermen. There are no modern boats here, just some rafts and traditional boats made by wood.

Lake Buyan

Tree Planting at the shore of Lake Buyan

Presenting tree to the local community and representative of participants

Planting tree at the shore of Lake Buyan

3rd destination: Bali Botanical Garden

The Bali Botanical Garden is located in the mountainous region of Bedugul, central Bali, around 90 minutes driving north of Denpasar. The Garden has an area of 154.5 hectares (389 acres) and daytime temperatures range from 17 - 25 °C and 10 - 15 °C at night. The humidity averages around 70-90%. The Garden contains more than 18,000 species of plants, representing various species from mountainous areas of eastern Indonesia: Bali, Nusa Tenggara, Sulawesi, Maluku and Papua. In addition its herbarium contains 10,000 preserved plant specimens ranging from algae to flowering plants.

Bali Botanical Garden

The Group at Bali Botanical Garden

Lunch time



4th destination: Pura Taman Ayun

Pura Taman Ayun is situated in a beautiful park with trees and ponds, near the village of Mengwi in the south of Bali at about 8 km southwest of Ubud and 18 km northwest of Denpasar. Pura Taman Ayun was built in 1634 by the Raja of Mengwi, I Gusti Agung Putu. It is a special family temple where the deified ancestors of the Raja Dynasty of Mengwi and important gods of other temples are honored. The main attraction of the temple is the beauty of Meru temple or shrine. Meru worship building is like a pagoda whose roof can be built up to eleven levels. Material roof was made by fibers that extracted from palm trees. Meru is located on the inside of the temple area. In Taman Ayun Temple, there are some skyscraping Merus that increase the beauty of this temple.


The Group at Pura Taman Ayun

5th destination: Tanah Lot

Pura Tanah Lot is located at 30 Km on the western side of Denpasar city and about 11 kilometers south of the city of Tabanan. The temple was built on a rock 20 meters from the beach with a size of 3 hectares. This temple is very famous among tourist destinations in Bali with a spectacular view of the sunset. Pura Tanah Lot is built in the 16th century based on the instructions of a priest named Danghyang Nirartha. During his travels along the south coast he saw the rock-island's beautiful setting and felts holy vibrations there. The main deity of the temple is Dewa Baruna or Bhatara Segara, who is the sea god or sea power.

Tanah Lot

The Group at Tanah Lot

Open Tour

November 11, 2016

Two Open tours were organized for visiting some natural and cultural attractions in Ubud and Kintamani, Bali, on November 11, 20116.