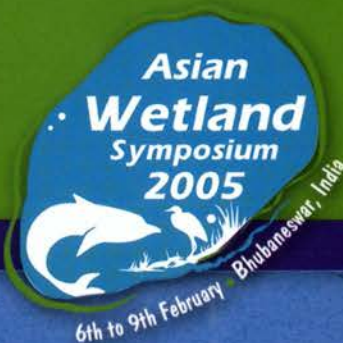
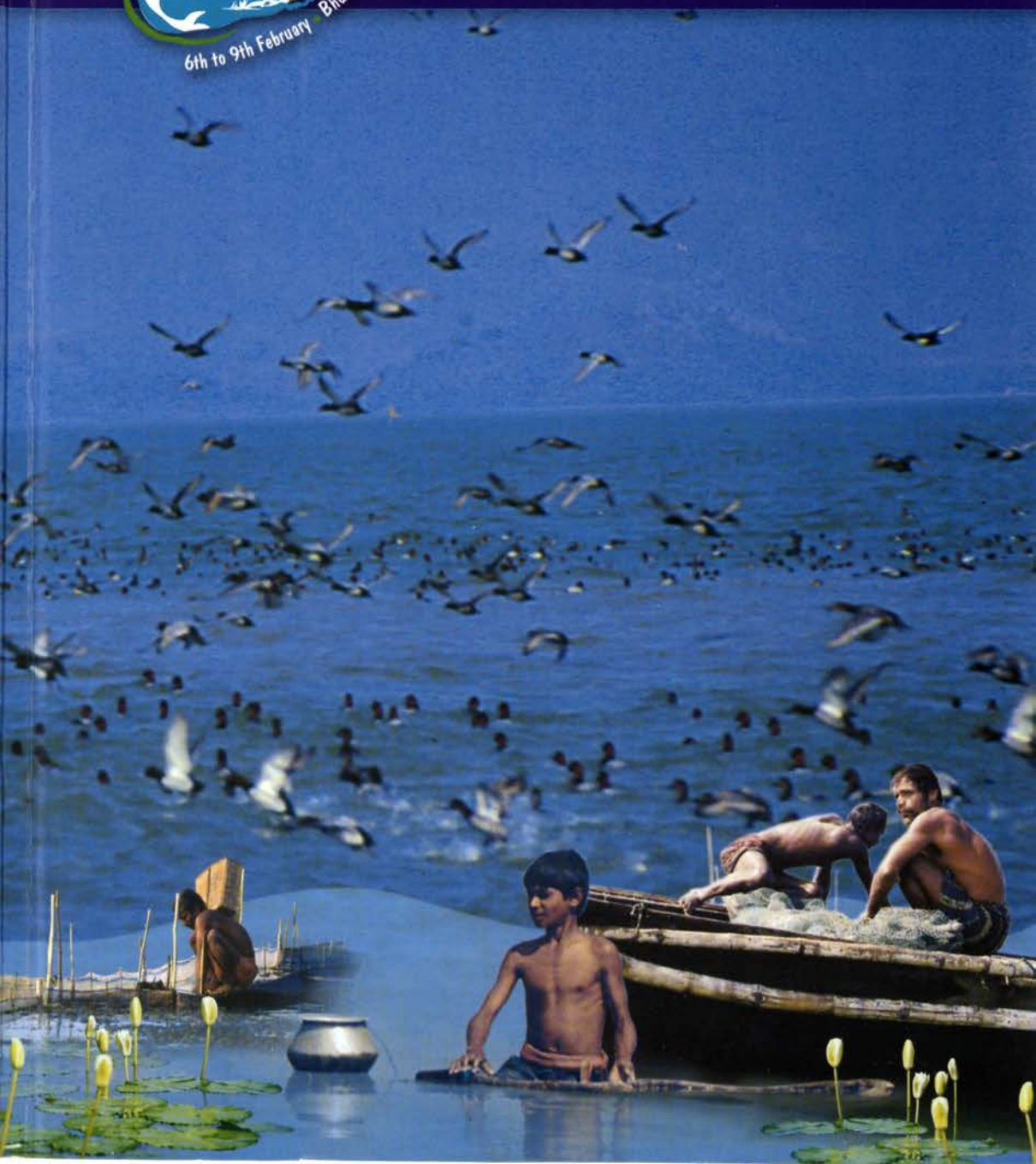


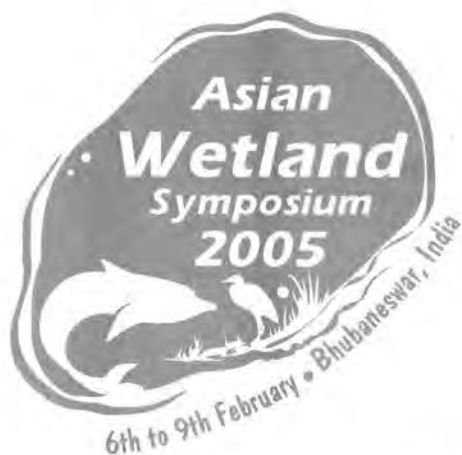
ASIAN WETLAND SYMPOSIUM 2005



*innovative approaches
to sustainable livelihood*

SYMPOSIUM PROGRAMME AND ABSTRACT





VENUE: HOTEL SWOSTI PLAZA, BHUBANESWAR, INDIA



**INNOVATIVE APPROACHES
TO SUSTAINABLE LIVELIHOOD**

The organisers would like to thank all the authors of the papers and posters that make this publication a rich source of information.

Published by:
AWS Secretariat (India)
Chilika Development Authority
C-11, BJB Nagar, Bhubaneswar-751 014
Orissa, India.

DISCLAIMER

The views expressed in this Abstract Proceedings do not necessarily represent those of the AWS 2005 organisers.

We regret any errors or omissions that we may have unintentionally made.

ISBN : 81 - 87894-00-8



Organisers



Ramsar Center Japan



Chilika Development Authority, India



Department of Forest & Environment,
Government of Orissa, India

Co-organisers



Ministry of Environment & Forests,
Government of India(MoEF)



Wetlands International

Wetlands International, Japan

Sponsors



Keidanren Nature Conservation Fund(KNCF)



Sekisui Chemical Co.Ltd.



Foundation of Hokkaido River Disaster Prevention
Research Center,



RICOH Company Ltd.

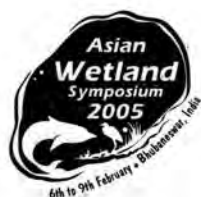


Institute for Global Environment Strategies (IGES)

CONTENTS

Symposium Programme	V
Technical Session -I WISE USE, CAPACITY BUILDING AND EDUCATION	01
Technical Session -II INNOVATIVE PARTNERSHIP AND NETWORKING FOR WETLAND CONSERVATION	13
Technical Session -III CULTURAL VALUES OF WETLANDS AS ENGINE FOR SUSTAINABLE LIVELIHOOD	21
Technical Session -IV COMMUNITY BASED MANAGEMENT OF THE WETLAND ECOSYSTEM	39
Technical Session -V RESTORATION AND STAKEHOLDER PARTICIPATION	51
Side Event RESTORATION OF CHILIKA LAGOON – A JOURNEY FROM MONTREUX RECORD TO RAMSAR WETLAND CONSERVATION AWARD	87

SYMPOSIUM
PROGRAMME



INNOVATIVE APPROACHES
TO SUSTAINABLE LIVELIHOOD

6th - 9th February, 2005

Venue

**Hotel Swosti Plaza
Bhubaneswar, India**

SYMPOSIUM PROGRAMME

5 FEBRUARY 2005

1600 - 1900 hrs Registration

6 FEBRUARY 2005

0800 - 1700 hrs Field Visit to Chilika
1800 - 2100 hrs Registration

7 FEBRUARY 2005

0800 - 0900 hrs Registration
0900 - 1000 hrs Inauguration (at CHANAKYA)

1000 - 1030 hrs TEA BREAK

PLENARY SESSIONS (at CHANAKYA)

Chairperson: Mr. D. D. Verma, Joint Secretary, GoI

- | | |
|-----------------|--|
| 1030 - 1050 hrs | Plenary-I: Maintaining the Ecological Character of Wetlands through Wise Use and Participatory Management.
Dr. Max Finlayson
President, Wetlands International |
| 1050 - 1105 hrs | Plenary-II: Wetlands, and Its Inter-Linkages with Culture and Biodiversity
Dr. Guangchun Lei ,
Senior Advisor - Asia/Pacific,
The Ramsar Convention Secretariat, Switzerland. |
| 1105 - 1115 hrs | Plenary-III: Asian Wetland Symposium from Otsu to Bhubaneswar.
Ms. Reiko Nakamura
Secretary - General, Ramsar Center, Japan. |
| 1115 - 1125 hrs | Plenary-IV: Wetland, People & Culture
Prof. Priyambada Mohanty Hejmadi ,
Ex-Vice Chancellor,
Sambalpur University, India. |
| 1125 - 1145 hrs | Plenary-V: Wetland restoration with people's participation; Chilika a case study
Dr. Ajit Kumar Pattnaik , Chief Executive, CDA |
| 1145 - 1200 hrs | Plenary VI: Voice of Wetlanders:
Fishers Federation, Watershed Association,
Boatmen Association. |

TECHNICAL SESSION-I

Wise Use, Capacity Building and Education (at CHANAKYA)

Chairperson : Dr. Bishnu Bhandari

Rapporteur : Dr. Taej Mundkur

1210 – 1222 hrs	The Ecosystem Approach and Wetland Conservation. Dr. Bishnu Bhandari
1222 – 1234 hrs	The Asian Wetlands Week Campaign and Wetland Conservation. Ms. Reiko Nakamura
1234 – 1246 hrs	Public Monitoring of Stream and River Health in Thailand: The Case of Green World Foundation. Mr. Saranarat Oy Kanjanavanit
1246 – 1258 hrs	Civil War and Wetland Conservation in Afghanistan Mr. Md. Shafi Sahrifi
1258 – 1310 hrs	Evaluation of Sensitization Programs for the Sustainable Use of Mangroves Mr. Tran Minh Phuong
1310 – 1410 hrs	LUNCH BREAK
1410 – 1422 hrs	The Restoration and Conservation of Peatlands in China: An Example from Ruorgai Plateau Ms. Zhang Xiaohong
1422 – 1434 hrs	Seasonal Wetlands and Wetland-locked People: Some Observations from Lake Jempang, East Kalimantan Mr. Martin Nanang
1434 – 1446 hrs	Traditional Performance Arts and the Conservation of Lakes: Some Successes from Chilika Mr. Durga Pd. Dash
1446 – 1458 hrs	A Cultural Pilgrimage Site in Himalayan region of Nepal Mr. Dilli Raj Sharma
1458 – 1540 hrs	Discussion.
1540 – 1550 hrs	TEA BREAK

TECHNICAL SESSION - II

Innovative Partnership and Networking for Wetland Conservation

(at CHANAKYA)

Chairperson : Dr. Sundari Ramakrishna

Rapporteur : Ms. Ch. Salmah

1550 – 1602 hrs	The Coastal and Marine Management Offices Coastal Resource Management Program for Local Government Units Mr. Carlo. C. Custodio
1602 – 1614 hrs	Review of the Himalayan Wetlands Conservation Initiative Dr. Guangchun Lei
1614 – 1626 hrs	Fivebough and Tuckerbil Swamps in southern New South Wales, Australia: partnerships in the management of a Ramsar site Mr. Iain R. Taylor
1626 – 1638 hrs	Partnerships for change: Working together to secure a better future for the Lower Kinabatangan Floodplain, Malaysia Ms. Daria Matthew Abdullah
1638 – 1650 hrs	The Need for a Regional Arrangement to collaborate and cooperate in the conservation and wise use of wetland resources in South Asia Mr. Prashantha Dias
1650 – 1702 hrs	Preserving Wetlands: Learning the hard way Dr. Tej Razdan
1702 – 1740 hrs	Discussion
1740 – 1810 hrs	POSTER SESSION (relating to session - 1,2&3) All the Poster presenters are requested to remain present by the side of their poster. Inauguration by Ms. Jane Madgwick, CEO, Wetlands International
1840 – 1940 hrs	CULTURAL PROGRAMME Dance form — <i>Odissi</i> i. <i>Konark Lasya Lila</i> ii. <i>Sruti 'O' Pralaya</i> (Creation and Destruction)
1950 – 2200 hrs	WELCOME DINNER

8 FEBRUARY 2005

TECHNICAL SESSION - III

Cultural Values of Wetlands as Engine for Sustainable livelihood
(at CHANAKYA)

Chairperson : Prof. Priyambada Mohanty Hejmadi

Rapporteur : Mr. Anirudhe Mukherjee

0800 – 0812 hrs	Wetland-Related Cultural Diversity and Sustainable Livelihood of the Thai people Dr. Sansanee Choowaew
0812 – 0824 hrs	Hokaido city, Japan, Rekindling the “Memory of the cultural assets of coastal wetlands” Ms. Mina Yoshikai
0824 – 0836 hrs	Cultural values of wetlands Dr. M. K. Prasad
0836 – 0848 hrs	Eco-Cultural Tourism In And Around Chilika Lake. Mr. Biranchi Mishra
0848 - 0900 hrs	Sustainable practices by Semelai people in Tasek Bera Ramsar Site, Malaysia Dr. Sundari Ramakrishan
0900 – 0950 hrs	Discussion
0950 – 1000 hrs	TEA BREAK

TECHNICAL SESSION-IV

Community-based management of the Wetland ecosystem (at CHANAKYA)

Chairperson: Mr. Sanowar Hossain Sarkar

Rapporteur: Mr. Debasis Roy

1000 – 1012 hrs	Issues in Community Based Wetland Resource Management and livelihood in Bangladesh : An overview. Mr. Raquibul Amin
1012 – 1024 hrs	Strategies for Community Based Sustainable Wetland Management : A Case Study on Bangladesh Mr. M. Aminul Islam
1024 – 1036 hrs	Community Co-management Promotes Sustainable Development of Hengshui Lake Wetlands Mr. Wang Zhengmin
1036 – 1048 hrs	Community based sharing System Rice-Fish farming in seasonally flooded Eco-system in Bangladesh Mr. Md. Abdur Rahman
1048 – 1100 hrs	Lessons learnt in the Community involvement in the establishment of the NHATRANG BAY Marine Protected Area in Vietnam. Mr. Bernard O' Challaghan
1100 – 1112 hrs	Wise use of Wetland for Sustainable Livelihood through Participatory Approach: A case of adapting to climate change. Dr. Tapan Kumar Ghosal
1112 – 1124 hrs	Linking Scientific knowledge to community based strategic wetland management: A case of Nong Bong Kai Ramsar Site in Northern Thailand. Mr. Yongyut Trisurat
1124 – 1200 hrs	Discussion

0900 – 1200 hrs **SIDE EVENT** (at SURAJ MAHAL)
Training Needs Assessment Workshop

Chairperson: **Dr. Max Finlayson**

0910 – 0925	Training needs for implementation of WI strategy 2005 –2009 Ms. Jane Madgwick
0925 – 0940	Regional training course on wetland restoration of South Asia, Dr. A. K. Pattnaik
0940 – 0955	Ramsar Regional training centre initiatives, Iran Mr. Masoud Bagherzadeh Karimi
0955 – 1010	Training needs for wetland management in India Dr. S. Kaul
1010 – 1025	Experiences of implementation of regional wetland training courses, Dr. B. C. Choudhury
1025 – 1040	TEA BREAK
1040 – 1055	Priorities of training needs – South East Asia Mr. Dibjo Sartono
1055 – 1110	Priorities of training needs – South Asia Mr. C. L. Trisal
1110 – 1125	Priorities of training needs – North Asia Mr. Chen Kelin
1125 – 1140	Priorities of training needs and funding options Mr. Petra Meijer
1140 – 1200	Discussion

TECHNICAL SESSION- V
Restoration and Stakeholder Participation
 (at CHANAKYA)

Chairperson: Dr. Ajit Kumar Pattnaik, CDA
Rapporteur: Mr. Rajagopal Singh, Wetlands International

1205 – 1217 hrs	Sustainable development and Water resources management of Loktak Lake, India Dr. C. L. Trisal & Mr. Th. Manihar
1217 – 1229 hrs	Ecological degradation and Wetland restoration in the Central Yangtze Dr. Guangchun Lei
1229– 1241 hrs	Wetland Restoration Projects In Hokkaido 2004 Prof. Tatsuichi Tsujii
1241– 1345 hrs	LUNCH BREAK
1345 – 1357 hrs	Conservation and wise-use of natural resources of Chilika lagoon through community participation Dr. Masanori Doi
1357 – 1409 hrs	Nature Restoration In Japan - Recovery of lost future Ms. Noriko Moriwake
1409 – 1421 hrs	Wetland Conservation in Myanmar Mr. Thein Aung
1421 – 1433 hrs	Community Driven Alternative Livelihood of Coastal Communities in Indian Sundarbans Mr. Dipankar Saha & Mr. Subrata Rana
1433 – 1445 hrs	Management Challenges of Bhitarkanika Wetlands, Orissa, India Mr. Anup Kumar Nayak
1445 – 1457 hrs	Smart Partnership in Peatland Fire Prevention and Restoration -A Case Study, Mr. David Lee
1457 – 1509 hrs	Growth Of Nipa Palm (Nypa Fruticans Wurmb) Using Varying Planting Methods For Restoration Of Abandoned Shrimp Ponds Dr. Noparat Banroongrugs

1509 – 1521 hrs	Conservation & Management of Bhoj Wetland, India, Dr. S. M. Misra
1521 – 1530 hrs	TEA BREAK
1530 – 1542 hrs	Stakeholder participation in conserving the Ganges River dolphins in India Prof. R. K. Sinha
1542 – 1554 hrs	Dynamics Of Conflict - A Political Ecology Synthesis, Mr. Jyotiraj Patra
1554 – 1606 hrs	Ecological Assessment of River Yamuna Floodplains in Delhi stretch and its integration into river basin management, Ms. Pamposh
1606 – 1618 hrs	Biodiversity value of two Ramsar Sites (Bhitarkanika and Chilika) in Orissa, India. Dr. Sudhakar Kar
1618 – 1630 hrs	A Sustainable Community Led Nodule For Efficient Management of East Calcutta Wetland (Ecwl) in West Bengal, India Through Pisciculture using Domestic Wastewater- A Case Study On “Jhograsisa Fishery” Mr. Sasidulal Ghosh & Mr Dipankar Saha
1630 – 1715 hrs	Discussion
1717 – 1815 hrs	POSTER SESSION (relating to session- 4 & 5) All the Poster presenters are requested to remain present by the side of their poster. Inauguration by Ms. Meena Gupta , Addl. Secretary, MoEF, GoI

1815 – 2000 hrs **SIDE EVENT on CHILIKA** (at CHANAKYA)

Opening Remarks: Mr. Toshifumi Sakai,
Resident Representative, JICA India Office

Chairpersons: Dr. C. L. Trisal, Wetlands International - South Asia
Dr. Dhrubajyoti Ghosh

1820 – 1830 Chilika Lagoon – A journey from Montreux
Record to Ramsar Wetland Conservation Award
Dr. A. K. Pattnaik, CDA

1830 – 1840 Integrated watershed management
Mr. K. N. Chari, CDA

1840 – 1850 Response of Brackish Water to Fresh Water
Discharge
Mr. J. Sinha, CWPRS, Pune

1850– 1900 Coastal processes and Chilika Lagoon
Mr. P. Chandramohan, ICH Pvt. Ltd.

1900 – 1910 Enhancement of fisheries of Chilika lagoon after
opening of the new mouth
Mr. S. K. Mohanty, CDA

1910 – 1920 Avifauna of Chilika Lagoon
Dr. S. Balachandran, BNHS

1920 – 1930 Irrawady Dolphin of Chilika Lagoon
Mr. M. Khan & Mr. Bishnu Behera, CDA

1930 – 1950 Monitoring - a tool for ecosystem management:
A case study of Chilika Lagoon
Dr. K. S. Bhatta & Mr. R.N. Samal, CDA

1950 – 2010 Environment Flow Assessment of
Chilika Lagoon
Mr. Rajagopal Singh & Mr. Ritesh Kumar,
Wetlands International

2010 – 2025 Discussion

2030– 2130 hrs **DINNER**

9 FEBRUARY 2005

SPECIAL SESSION ON TSUNAMI

Chairperson: Ms. Meena Gupta, Addl. Secretary, MoEF, GoI

0830 – 0900

Opening remarks

- Government of India
- Ramsar Secretariat
- Ramsar Centre Japan

SESSION-I

Co-chair: Ms. Jane Madgwick, Wetlands International

0900 – 0912

Regional overview of the Tsunami and role of natural ecosystems in protection of coastlines
Global Environment Centre, Malaysia

0912 – 0924

Initial result of rapid regional evaluation of impact of the Tsunami on coastal ecosystems
Wetlands International (on behalf of the Ramsar Tsunami Reference Group)

0924 – 0936

Impacts of Tsunami on eastern coast of India
Prof. Sunder, IIT, Chennai

0936 – 0948

Tsunami and coastal wetlands of India (mainland & islands including Andaman Nicobar & Lakshwadeep) **Dr. D. K. Venkataraman**, National Bio-diversity Board

0948 – 1000

Preliminary assessment of the impact of the Tsunami in Aceh, Indonesia
Mr. Dibjo Sartono, Wetlands International – Indonesia

1000 – 1012

Tsunami and coastal mangrove of Malaysia
Global Environment Centre, Malaysia and **Prof. Zulfigar**, USM

1012 – 1022

TEA BREAK

1022 – 1034

Tsunami, coastal wetlands and Fisher communities in Sri Lanka
Mr. Prasantha Dias, SACEP

1034 – 1046

Tsunami and mangroves and coral in Thailand
Mr. Narong, PSU

1046 – 1058	Tsunami and coral reefs in Maldives
1058 – 1110	Satellite Remote Sensing for Post Tsunami Studies Mr. S. B. Choudhury & Mr. S. K. Sasmal
1110-1130	Discussion
SESSION II	
Co-chair	Mr. Faizal Parish , Global Environment Centre, Malaysia
1130 – 1142	Establishing mangroves as a barrier to Tsunamis and storms Disaster Prevention Research Institute , Japan
1142 – 1154	Improving coastal management planning – lesson learnt from the 2004 Tsunami Dr. A. Senthilvel , MoEF, India
1154 – 1206	Rehabilitation of coastal wetlands to support coastal livelihoods
1206 – 1218	Restoration techniques for mangroves, coral reefs and other habitats
1218 – 1230	Financing options for post-Tsunami rehabilitation, capacity building and awareness
1230 – 1300	Discussion (proposals for immediate action)
1300 – 1400 hrs	LUNCH BREAK

CONCLUDING SESSION & VALEDICTORY (at CHANAKYA)

Chairpersons: Chief Secretary / Secretary, Forest & Environment, GoO

1415 – 1445	Presentations by Chairpersons of Technical Sessions
1445 – 1500	Adoption of Chilika Declaration
1500 – 1515	Concluding remarks by Chairperson

SYMPOSIUM PREMISES:

SWOSTI PLAZA,
P-1, JAYDEV VIHAR,
BHUBANESWAR, ORISSA, INDIA.
PHONE: 91-674-2301936 TO 2301940.
FAX: 91-674-2301880
Email: splaza@sancharnet.in
URL: www.swosti plaza.com

Technical Session

I

WISE USE, CAPACITY BUILDING AND EDUCATION

Coordinator:

Dr. Bishnu Bhandari

*Principal Research Fellow/ Project Manager,
Forest Conservation Project, IGES, Japan*

*2108-11 Kamiyamaguchi
Hayama, Kanagawa
240-0115 Japan*

E-mail: bhandari@iges.or.jp

THE ECOSYSTEM APPROACH AND WETLAND CONSERVATION

Bishnu B. Bhandari

*Principal Research Fellow/ Project Manager, Forest Conservation Project, IGES, Japan
2108-11 Kamiyamaguchi
Hayama, Kanagawa
240-0115 Japan
Email: bhandari@iges.or.jp*

The Ecosystem Approach is a strategy for the integrated management of land, water, and living resources that promote conservation and sustainable use in an equitable way. This paper seeks to promote the use of this approach in the management and conservation of wetland resources. The paper begins with the discussion of the meaning of the Ecosystem Approach, how it emerged in the 1980's and how it has encapsulated the 12 principles and the five points of operational guidance. Then the paper rationalizes the wetlands as an entry point for the implementation of the approach because wetlands have got distinct advantages in many frontiers. The lessons and experiences of wetlands can be used to promote the concept of the Ecosystem Approach. The paper also draws on some of the examples of the wetland management where ecosystem management is in place, where planning has been done at the catchment level and where various stakeholders are involved. Finally, the paper offers advice to the planner, the promoter and the implementer for the effective implementation of the Ecosystem Approach in natural resource management.

THE ASIAN WETLANDS WEEK CAMPAIGN AND WETLAND CONSERVATION

Reiko Nakamura

Secretary-General, Ramsar Center Japan
2-10-3 Minamikugahara, Ota-ku,
Tokyo 146-0084 Japan
Email: reiko.nakamura@nifty.com

The “Asian Wetlands Week” (AWW) which combines the strengths of two phrases “Wetland education” and “Public awareness” is a campaign initiated by Ramsar Center Japan (RCJ) in 2002 with support of the Japan Fund for the Global Environment (JFGE). Its theme is “Children and Wetlands”, and its objective is to instill in children love, create interests and enhance their understanding on the importance, values and wise use of wetlands. It also attempts to build a synergy on wetland conservation, thereby developing and nurturing “*Asian Wetlands Initiative*”, a guideline for a long term regional cooperation in wetlands. AWW starts from the World Wetlands Day and is observed (i.e. from the 2nd) until the 8th February. Its activities are carried out at two levels; local and regional. RCJ provides educational tools and supports to the campaign activity. The Project is conducted on a three-year cycle, and the achievements of three years will be presented to the Ramsar COP9 as the world’s first “Coordinated Regional Wetlands CEPA Action Model”. *At the local level:* It is a voluntary activity carried out in collaboration with local communities/NGOs. The AWW campaigns in 2003 and 2004 were observed in countries and areas represented by the international members of RCJ; Bangladesh, Brunei, China, India, Japan, Korea, Malaysia, Nepal, Philippines, Taiwan and Thailand. Selected activities include the mangrove festival in the Philippines; interaction of urban and rural children in Bangladesh; the photo contest and green school programs in Taiwan, wetland conference in Thailand, wetlands clean-up in Japan, symposium in Korea.

At the regional level: The AWW Committee conducts model projects at the regional level. First, the Northeast Asia sub-regional wetland exchange program was organized in Japan with participation from China and Korea. These countries organized a joint event in January 2002 at the Yatsu-Higata Ramsar site in Japan. Approximately 13 children and teachers representing these countries gathered for the purpose of strengthening international cooperation in the conservation of the wetlands in Asia. In 2003, 27 children and teachers observed the joint event at the Woopo Wetland Ramsar site in Korea. The Third Wetland Exchange Program was held in Dafeng, a Ramsar site in China in December 2004, and approximately 49 children and teachers/educators participated in the event. The other sub-regional wetland exchange programs are in place to be organized in three zones; Chilika (India), Songkhla (Thailand), and Saroma (Japan) on the auspicious occasion of the Asian Wetland Symposium 2005.

Major achievements of the AWW campaign can be summarized as follows.

- ✓ Diversity of practices and problems but variation in their scale
- ✓ Similar thoughts on wetlands regardless of their locations
- ✓ Establishment of a Network of Wetland Educators in Far East Asia
- ✓ Need of regional cooperation for the wise use of wetlands
- ✓ Need of expansion of the exchange program to other countries

It was found that the AWW campaign is an effective regional tool to promote a synergistic action on wetland conservation and strengthen the “*Asian Wetlands Initiative*”, a guideline for a long term regional cooperation in wetlands in Asia.

PUBLIC MONITORING OF STREAM AND RIVER HEALTH IN THAILAND: THE CASE OF GREEN WORLD FOUNDATION

Saranarat Oy Kanjanavanit

*Green World Foundation, 394/40-46, Pranakom District,
Pranakom Bangkok 10200, Thailand
Email: oykan@hotmail.com*

Current environmental and socio-economic situations show a need for public empowerment in the monitoring of environmental health. In 1996, the Green World Foundation began to develop popular biomonitoring of stream water quality using freshwater macro-invertebrates for the first time in Thailand. When the pilot test gains public interest, a more comprehensive 'Stream Detectives' programme is developed, starting with an environmental education project in the River Ping catchment, North Thailand, where secondary schools are linked with local communities to promote the caring of river health. The project, known as the River and Stream Investigation Project for Youths (RSPY), has been successful in many respects. In particular, it has induced local initiatives from many sectors in all regions of Thailand. This ranges from schools, local groups and communities, government agencies, and a civic society group.

Today, the principle of 'Stream Detectives' is on its way to establishing itself into both the formal and informal education systems, starting from the primary level. An integrated country-wide network is also being developed with an initiative of volunteers from many sectors. The group has identified needs and a set of working plan to strengthen and expand the network.

As the Green World Foundation passes on the torch to members of the network, sustainability becomes more of a reality. Future needs, however, call for more intensive research initiatives from the scientific community to develop more in-depth knowledge of freshwater macro-invertebrates in diverse localities, as well as research in popular monitoring of other related ecosystems. A development of national protocol for official monitoring would also lend support to work carried out by the public.

CIVIL WAR AND WETLAND EDUCATION IN AFGHANISTAN

Mohammad Shafi Sharifi

*EE Department , Faculty of Engineering, Kabul University, Afghanistan
District No 8 T lane Karte Naw
Kabul- 0093
Afghanistan
Email: sharifi_mohd@yahoo.com*

Afghanistan is a landlocked country whose geography and natural resources share many characteristics with its neighboring countries. Afghanistan struggles to recover from decades of war and armed conflict as well as recent drought. Many urgent needs are competing for the attention of the government and donor agencies. At first glance it seems that environmental issues are not a top priority, in fact they lie at the hearts of current efforts to reestablish the bases for sustainable livelihood for Afghan people and a sound economic footing for broad based development. Wetland conservation as well as many other natural resources has suffered from varying degrees of depredation for extended periods of conflict combined with recent drought. As a whole, all sectors continue to perform poorly and the country depends on foreign aid. Firstly, this report provides a broad view of Afghan educational system, focusing particularly on structure of education, student enrolment, human resources and school building, and non-formal education. Secondly, it attempts to address the most significant, environmental education, activities and environmental issues, Afghanistan is currently facing, as it emerges from years of conflict and isolation. These two factors provide a clearer understanding of current education, environmental education and environmental issues in Afghanistan. Finally, the report provides perspectives on implication to wetland conservation, drought and its effects and winds up with suggestions for improving wetland conservation in Afghanistan.

EVALUATION OF SENSITIZATION PROGRAMS FOR THE SUSTAINABLE USE OF MANGROVES

Tran M. Phuong

Vietnam National University,

No.22 Luong Su B Quoc Tu Giam

Hanoi, Vietnam

Email: phuongtm75@yahoo.com

Located in the South East Asia, Vietnam is a tropical country rich in mangroves in coastal areas. However, at present, the area of mangroves has been decreasing rapidly. One of the main constraints for the participation of the community in a sustainable coastal development is the lack of awareness and information. The study on educational and informational methodologies is needed to raise the awareness of the coastal community in general and secondary level school students in particular and enhance their participation in the integrated sustainable development of mangrove ecosystems. The educational and informational program for secondary school students in 3 secondary schools of Thai Binh and Nam Dinh provinces was carried out applying 3 different models; (1) Establishing Mangrove Ecosystem Display Room, (2) Study Visit and (3) Establishing a "Club For the Green of Mangroves". After one year of implementing three different models in three different secondary schools, the awareness on sustainable use of mangroves for school students was remarkably improved. The effectiveness of these models in raising awareness was high. However, the data indicated that the 3rd model "Establishing a Club for the Green of Mangroves" was considered the best of all. As a result, the model is being modified and applied to raise the awareness of the community on biodiversity conservation in upland areas of the northern part of Vietnam.

THE RESTORATION AND CONSERVATION OF PEATLANDS IN CHINA: AN EXAMPLE FROM RUOERGAI PLATEAU

Zhang Xiaohong and Chen Kelin,

Deputy Director

Wetlands International-China

Room 501, Grand Forest Hotel

No. 3A, Beisanhuan Zhonglu, Rd. Beijing, China 100029

Email: zxh@wetwonder.org

Peatlands restoration is a general process that warrants repairing or rebuilding damaged ecosystem or restoring their structures, organizations, and functions to the original stage of those peatland ecosystem. Long term monitoring of peatlands restoration projects is essential for a better understanding of how to carry out such restoration successfully. Paleoecology is suggested as an underutilized tool in peatlands restoration. China has a large area of peatlands of different types. It supports the ecological functions and social economic values for local community. But the peat resource has been seriously destroyed (or over-exploited) by people. The main threats to peatlands include mining, overgrazing, drainage, etc. Peatlands have been degraded, biodiversity lost with characteristics of water level decreased, soil erosion worsened and desertification intensified. Therefore, urgent measures should be taken to tackle these issues.

DESERT WETLANDS IN PAKISTAN

Najam Khurshid,

IUCN Pakistan

Abdul Munaf Qaimkhani, Sindh Wildlife Department, Pakistan

Gulistan-E-Johar, Karachi

Sindh -75530, Pakistan

Email: najam58@hotmail.com

Deserts cover about one fifth of the Earth's surface and occur where rainfall is less than 50 mm/year. Although most deserts, occur at low latitudes, another kind of desert, cold deserts, occur in the basin of western Asia. The climatic and ecological variation in the region is extremely high ranging from the frozen Siberian tundra to the tropical coasts of Southeast Asia; deserts have a considerable amount of specialized vegetation, as well as specialized vertebrate and invertebrate animals.

The Islamic Republic of Pakistan spreads over 796, 095 km². Afghanistan bounds it on the north-west; Iran on the west; Russia and China on the north; India on the east; and the Arabian Sea on the south. The larger part of the country is situated in the arid and semi-arid zones. During the last decade environmental conditions in the arid portion of the country became worst due to the continuous drought. Pakistan has two major desert systems; Thar Desert including Cholistan and Kharan Desert including Chaghi. The largest desert wetlands system in Pakistan is situated along the Nara Canal.

Most of the desert wetlands are saline lakes and these are prone to a continuous threat caused by the moving sand dunes. Invasive species are also affecting this unique wetlands system. Continuous drought has severely impacted on the natural resources and leads towards over-exploitation of resources. Different developmental activities has further aggravated the situation. Together with recent climatic changes, these pressures combine to degrade and destroy the fragile desert wetland ecosystems. Only sound planning and recognition of the importance of this unique ecosystem can stop their further degradation.

SEASONAL WETLANDS AND WETLAND-LOCKED PEOPLE: SOME OBSERVATIONS FROM LAKE JEMPANG, EAST KALIMANTAN

Martnus Nanang

*Center for Social Forestry/Mulawaram University, East Kalimantan, Indonesia.
Perumahan Puspita Bukit Pinang E/5 Jl. P. Suryanata
Samarinda
East Kalimantan
Indonesia- 75124
Email: engkuni@hotmail.com*

Lake Jempang is a partially seasonal lake in the middle of the city of Samarinda in East Kalimantan . It covers an area of about 5000 square kilometers. Around this lake there are many clusters of lakes and small ponds. The lake is also the habitat of endangered species of Dolphin. The river that feeds these lakes is used by local people for transportation purposes. The lake is the resting area of many species of birds including endangered and rare species. The lake is surrounded by highly dense settlement. Its inhabitants are the Dayak who live around the lake area on houses built on stilt. Their livelihood is based on the cultivation of rice in the dried area of the lake. The lake is the source of livelihood for them. Rice cultivation is dependable for them because they lose their crop when there is flood or water level rises suddenly. These people also collect snakes for hide and leather. In the middle of the lake is found a small island, where different ethnic groups belonging to the tribes of the Kutai, the Biginese, and the Benajarse live and are totally dependent on this wetland for fishery. Main problems of the lake include invasive species of plants; pollution from the nearby area; pressure for the growing population, etc.

TRADITIONAL PERFORMANCE ARTS AND THE CONSERVATION OF CHILIKA LAGOON

Durga Prasad Dash

Secretary, PALLISHREE, India,
137, Dharmavihar, Bhubaneswar,
Orissa, India
Email: pallishree137@hotmail.com

Chilika Lagoon, designated as a Ramsar site in 1981, is the second largest brackish water lagoon in Asia. It had been facing a number of ecological and anthropogenic problems. PALLISHREE, a grassroots level NGO was implementing an Environmental Education and Awareness Project for the stakeholders of Chilika Lagoon from 2000 to 2003, with the financial support of the Japan Fund for Global Environment (JFGE), Japan and technical supports of the Ramsar Center Japan and the Chilika Development Authority (CDA), India. The overall goal of the Project is to raise environmental awareness of the stakeholders of the lagoon, particularly biodiversity conservation and its wise use. The focal point and nucleus of the entire program is the Center for Environmental Awareness and Education (CEAE). There are some ten CEAEs serving as the learning center for the stakeholders. The CEAE uses street theater "*Daskathia*", a traditional street play as a principal means to raise the public awareness. It was the best method to disseminate information through entertainment. This involves the method of story telling with wit, humor and comedy. This traditional folkway has succeeded in making the stakeholders (women included) aware of present environmental problems and finding the creative solutions through dialogue, song, and poem. *Daskathia* has been successful in making a difference on the ground. The impacts include (1) the reduction in the use of small mesh size nets in target villages, (2) significant reduction in the poaching of prawn juveniles, (3) release of smaller sized fish, prawn & crab for the future, (4) actions by stakeholders to lobby with the government for planting trees on lagoon embankments, (5) community decision and women empowerment on the implementation of wise use practices, (6) increase of bird lovers to reduce the poaching, and (7) reduction in the use of chemical fertilizer and pesticide at agricultural fields. The Environmental Education and Awareness Project has been implementing, through its CEAEs, other activities such as preparation, publication and dissemination of educational materials (newsletter, books, awareness kit, posters and audio visual materials); organizing essay contest, painting and debate competition, wall paintings, cultural programs and boat rally; development of nature camp and trail, observation of the World Wetlands Day, introduction of a floating educational center, etc.

Technical Session

II

INNOVATIVE PARTNERSHIP
AND
NETWORKING FOR WETLAND CONSERVATION

Coordinator:

Sundari Ramakrishnan

3A39 Block A

Kelana Centre Point Jalan SS7/19,

Kelana Jaya, Petaling Jaya, 47301 Selangor, Malaysia

Email: sundari@wiap.nasionet.net

THE COASTAL AND MARINE MANAGEMENT OFFICE'S COASTAL RESOURCE MANAGEMENT PROGRAM FOR LOCAL GOVERNMENT UNITS

Florendo B. Barangan¹, Carlo C. Custodio²,

*¹Executive Director Coastal and Marine Management Office,
Department of Environment and Natural Resources,
Visayas Avenue, Diliman, Quezon City, Republic of the Philippines*

*²Chief Ecosystems Management Specialist, Protected Areas and Wildlife Bureau,
Department of Environment and Natural Resources, Quezon Avenue,
Diliman, Quezon City, Metro Manila, Philippines 1100
Email: custodiocarlo@yahoo.com*

The Coastal and Marine Management Office (CMMO) of the Philippines' Department of Environment and Natural Resources (DENR) is tasked to integrate and synchronize all coastal and marine related projects and concerns in the whole country. The DENR's role as a catalyst to effect positive changes through empowering coastal and marine users, stakeholders and decision-makers to ensure a balance between coastal and marine conservation and responsible coastal development are carried through the CMMO. The role of the DENR is accomplished within the framework of Coastal Resource Management (CRM), which is defined as the process of planning, implementing, and monitoring beneficial and sustainable uses of coastal resources through participation, collective action and sound decision-making. The paper describes CMMO's various programs and services that consist of: Policy Review and Formulation; Capacity-Building; Information Education and Communication (IEC); Linkaging and Resource Leveraging; and, Coastal Resource Management (CRM) Certification. The CMMO activities designed to promote CRM at the level of the local government units (LGUs) such as: facilitation/ consultation on the revision, harmonization and formulation of CRM policies, plans and programs; provision of technical & capacity building assistance to LGUs and stakeholders on CRM; and develop and disseminate CRM IEC materials, are also described. A few success stories on coastal resource management as well as the directions and next steps that need to be undertaken for the sustainable management of coastal and marine resources, are cited.

REVIEW OF THE HIMALAYAN WETLANDS CONSERVATION INITIATIVE

Guangchun Lei

*Senior Advisor - Asia/Pacific, Ramsar Convention Secretariat,
Rue Mauverney 28
CH-1196 Gland
Switzerland
Email: lei@ramsar.org*

The ecological function and services of Himalayan mountain wetlands are essential for the sustainable development of more than 10 countries in Asia, which concerns at least 200 million people who live in the mountain ranges, and 1.4 billion people live downstream. Unfortunately, the environmental trend in the region caused by both economic development on the ground, and the global warming clearly indicate significant degradation of the ecosystem function and services. To stop such trend, or mitigate its negative impact needs urgent trans-boundary cooperation. Among a number of initiatives to look at this issue, Himalayan Initiative is one of them. This document is to provide a brief review of the Himalayan Initiative, and to provide recommendations, through analyzing the initiative development against the “guidance for the development of regional initiative in the framework of the Convention on Wetlands” adopted in the 8th Conference of the Parties (Ramsar Resolution VIII 30). Results indicate that innovative partnership and networking which mobilizes political wills, stakeholder involvement, financial resources, is the pre-requisites condition to achieve the goal of the initiative.

FIVEBOUGH AND TUCKERBIL SWAMPS: PARTNERSHIPS IN THE MANAGEMENT OF A RAMSAR SITE

Iain R. Taylor

*School of Environmental and Information Sciences,
Charles Sturt university, New South Wales 2640,
Australia.
Email: itaylor@csu.edu.au*

Fivebough Swamp is a 400 ha seasonal wetland in south east Australia. It is state-owned land (Crown Land). Up until 1997 the wetland was let to local pastoralists for cattle grazing. This resulted in serious over-grazing and degradation of the wetland, with a loss of many of its potential conservation values. In 1997 the grazing leases were terminated and in 2002, along with the adjacent Tuckerbil Swamp the wetland was designated a Wetland of International Importance. The Fivebough and Tuckerbil Management Trust, an independent body, was set up to manage the wetlands. The Trust includes members from the local community, the indigenous community, local government, state agencies, educational institutions and local agriculture-based industries. The Trust raises funds and carries out management operations. This paper describes the wetlands and the functioning of the Management Trust.

PARTNERSHIPS FOR CHANGE: WORKING TOGETHER TO SECURE A BETTER FUTURE FOR THE LOWER KINABATANGAN, SABAH, MALAYSIA

**Daria Mathew¹, Rajah Indran², Josephine Regip², Raymond J. Alfred²,
Julia Majail² & Kertijah Abdul Kadir²**

¹*World Wide Fund for Nature Malaysia (WWF-Malaysia)
49, Jalan SS23/15
Taman SEA
47400 Petaling Jaya, Selangor, Malaysia
Tel.: + + (603) 7803 3772 ; Fax: + + (603) 7803 5157
E-mail: dmathew@wwf.org.my*

²*WWF-Malaysia
Suite 1-6-W11 & 1-7-W11, 6th & 7th Floor
CPS Tower, No.1, Jalan Centre Point
88000 Kota Kinabalu, Sabah, Malaysia
Tel.: + + 6(088) 242620 / 248490 ; Fax: + + 6(088) 248697*

The 560km Kinabatangan River is the longest river in the Malaysian State of Sabah. Its basin constitutes almost 23% of Sabah's land area. The lower Kinabatangan floodplain (about 3,300 km²) is one of Malaysia's main wetland areas. Consisting of lowland dipterocarp forest, freshwater and riverine forests, limestone outcrops, mangrove forest and oxbow lakes, the lower Kinabatangan is home to about 50 wildlife species (including orang utans, pygmy elephants, rhinoceros and proboscis monkeys) and more than 200 bird species. The management of the lower Kinabatangan is challenging due to the existence of diverging interests and demands of the different sectors and stakeholders. Through partnership approach, WWF-Malaysia works together with stakeholders from government sector, tourism and oil palm industries and local communities to find viable solutions to meet the common purpose for economic development and sustainable use of the wetland. Efforts are targeted towards creating a corridor of life in the lower Kinabatangan by getting critical forest areas gazetted, reforestation to restore connectivity between forest fragments, and empowering local people through awareness and capacity-building programmes.

THE NEED FOR A REGIONAL ARRANGEMENT TO COLLABORATE AND COOPERATE IN THE CONSERVATION AND WISE USE OF WETLAND RESOURCES IN SOUTH ASIA

Prasantha Dias

*South Asia Co-operative Environment Programme (SACEP)
10 Anderson Road Colombo 5
Colombo Sri Lanka
Email: pd_sacep@eureka.lk*

A Regional Arrangement to Collaborate and Cooperate in the Conservation and Wise-use of Wetlands in South Asia (tentative). South Asia is home to large number of wetlands, ranging from high altitude glacial lakes in the Himalayas to the coastal mangroves and coral reefs. They play a crucial role in terms of biodiversity they support and in sustaining the livelihoods of millions of people in the region. These wetlands are severely threatened by the impacts of increasing human population and the high economic expansion of the region as well due to climate change. This paper highlights the need for a regional arrangement under the Ramsar Convention on Wetlands for cooperation and collaboration for the conservation and wise use of wetlands particularly in wetland management and poverty alleviation in South Asia. This collaboration will add value to national efforts in areas such as in the management of transboundary wetlands, conservation of migratory and common species they support, enhance coordination between international and regional wetland programmes, data and experience sharing and interlinkages between MEAs addressing wetland issues. It could also be used as a forum to mobilize assistance for non-signatory parties to sign and ratify the Ramsar convention and to designate wetlands of international importance. The concept of the arrangement is not to build new institutions, but to enhance communication and collaboration between existing institutions and programmes. A South Asian regional arrangement could be modeled on the existing MedWet Initiative, which mobilize partners and funds to assist in the implementation of the Ramsar Strategic Plan in the Mediterranean region. The structure and modalities of the South Asian operation needs to be determined through detailed consultation between all stakeholders. SACEP, the intergovernmental programme for the region mandated to promote cooperation towards achieving the goals of sustainable development and environment protection could play an important role in initiating this collaboration.

PRESERVING WETLANDS: LEARNING THE HARD WAY

Dr. Tej Razdan

Secretary, Jheel Sanrakshan Society

Email: tej_razdan@yahoo.co.in

The world-famous Udaipur valley, in the world's oldest hill range of Aravali, was inhabited by the erstwhile rulers of Mewar (in Rajasthan, India), primarily because of the safety provided by the girdle of well-forested hills, with a few approachable gaps. The secondary advantage was the possibility of creating interlinked water storage reservoirs for irrigation, entertainment and a wet moat around the city as a defense strategy to protect the Udaipur (Mewar). This ownership of these interlinked lakes, preserved well during the Maharana's (King's) rule, was transferred to thirteen different Government departments, after independence. The inter-departmental "passing-the-buck" syndrome, an unplanned development of the city around the lakes, and finally, the apathy and detachment of the society towards these government-owned lakes, proved to be the death-knell of these lakes. The lakes of Udaipur, used earlier only for agriculture, and later for drinking water, were declared as wet lands by Govt. of India. So far, thirty-two Ph.D. theses and hundreds of scientific papers were published, on these lakes in local, national & international journals. Yet, unfortunately, sixty lakh liters of raw sewage, along with 25 tons of solid waste enter into these lakes every day. In 1992- Zealous Citizens of Udaipur created a loose partnership - Jheel sanrakshan Samiti (JSS). & coaxed the heads of thirteen different Govt. departments and administrators into it to properly manage and save the lake. Jheel Sanrakshan Samiti (JSS) was constituted in 1992, as a loose partnership of well-qualified, socially active citizens from different professions, as well as the heads of the thirteen departments, which "owned" the lakes. However, later, JSS, which developed into a pressure group, soon proved itself to be a pain in the neck for the government agencies. Therefore, in 1999, instead of accepting JSS's suggestion of creating a 'Lake Development Authority' for Udaipur, the Government of Rajasthan created and registered a body called "Jheel Samverdhan and Jheel Vikas Society" (JSJVS), with bureaucrats and government officials as its office-bearers. However, JSS got special powers delivered to JSJVS, through the intervention of the Hon'ble High Court of Rajasthan. Unfortunately, even the JSJVS gradually lost its focus and direction because its priorities shifted from lakes of Udaipur to their departmental, political and personal interests. My presentation will lay emphasis on the mistakes, pit-falls & the obstacles that confronted JSS during its struggle for preservation of Udaipur's lakes. Also, I will try to highlight suggestions, rectifications and improvements in our efforts to develop an effective and better wet-land preservation system.

Technical Session

III

CULTURAL VALUES OF WETLANDS AS ENGINE FOR SUSTAINABLE LIVELIHOOD

Coordinators:

Amado J. Tolentino

Email: amatol2@hotmail.com

Prof. Priyambada M. Hejmadi

Email: mohantyhejmadi@hotmail.com

SUSTAINABLE PRACTICES BY SEMELAI PEOPLE IN TASEK BERA RAMSAR SITE, MALAYSIA

Sundari Ramakrishna and Mohala Santharamohana

*Wetlands International, Malaysia Office, 3A39, Kelana Centre Point,
Jalan SS7/19, Kelana Jaya. 47301 Petaling Jaya, Selangor. MALAYSIA.
Email: sundari@wiap.nasionet.net*

Tasek Bera is a freshwater wetland system in central Peninsular Malaysia, consisting of a mosaic of wetland habitats dominated by peat swamp forest, extensive reed beds, *Pandanus* stands and open water bodies. Tasek Bera was designated Malaysia's first Ramsar Site in 1994, where 2200 individuals belonging to the ethnic aboriginal group called Semelai live in and around the wetlands. The Semelai people may be termed as a group of 'true wetlanders' and have lived in Tasek Bera since 600 years ago. All the basic needs for living (materials for the dwellings, fishing and hunting gear, medicine, transport and dietary requirements) and earning a livelihood comes from Tasek Bera Wetlands. The culture, beliefs and traditional practices of this indigenous people are deeply entwined with the functioning of the natural wetland habitats and the resources available therein.

This paper will highlight some of the practices carried out by the Semelai that have an innovative approach to using wetland resources and at the same time ensuring perpetuity of the wetland resources for the Semelai community. The idea of sustainable utilisation resources is not a new concept for the Semelai community as which is detailed out in Multilateral Environment Agreements which have evolved in the last 30 years (e.g. Convention on Biological Resources, Ramsar Convention, and Kyoto Protocol).

ADAPTATION OF RAINFED RICE-FARMERS TO POTENTIAL IMPACT OF CLIMATE CHANGE IN LAHAKHOKE, SEBUNGUANTAY, DONGKHAMPHOU, AND KOUTHEE VILLAGES OF SONGKHONE DISTRICT, SAVANNAKHET PROVINCE, LAO PDR

Somkhith Boulidam

Department of Geography, Faculty of Social Science,

National University of Laos, Lao PDR

Lao PDR - 7322

Tel : (856 021) 770070, 770071-13.

Fax: (856 021) 770381

Email: kkkhith@yahoo.com

Lao PDR is an agricultural based country with 84.7% of workforce engaged in agriculture and agriculture accounts for 50 % of the GDP. Rainfed rice cultivation is one of the most sensitive sectors to climate variability and climate change depending very much on seasonal climate and rainfall. Rainfed rice-farmers have had long time experience in responding and adapting to climate variability in order to sustain their livelihood and may have to further adapt themselves to cope with future climate change. Over 140 households of rainfed rice-farmers in 4 villages of Songkhone district of Savannakhet province in Lao PDR were interviewed and analysed for adaptive capacity level and adaptation options. This paper presents the results of possible alternatives and change in rice farming practices under the light of future climate change.

WETLAND-RELATED CULTURAL DIVERSITY AND SUSTAINABLE LIVELIHOOD OF THE THAI PEOPLE

Sansanee Choowaew

Faculty of Environment and Resource Studies, Mahidol University, Thailand

Puttamonthon 4Rd., Salaya,

Nakhon Pathom 73170, Thailand

Tel: 662-441-5000

Fax: 662-441-9509 / 9510

Email: enscw@mucc.mahidol.ac.th

Thailand's wetlands are of a wide range of riverine, lacustrine, palustrine, coastal and marine ecosystems. Thai people and their ways of life have long been associated with wetlands. The country's cultural diversity has partly originated from and is associated with wetland diversity. All year round and all over the Thai Kingdom, many different cultural practices can be seen in different types of wetlands. This paper describes 6 major wetland-related cultural concerns : history and archaeology; old settlements and traditional ways of life; festivals and ceremonies; beliefs and sacred sites; religion; and literatures, legends, folklores and folk arts. Such cultural values of wetlands contribute a great deal to sustainable livelihood of the Thai people. Based on intensive reviews, compilation and preliminary assessment, this paper presents the findings and depicts the significance of wetland-related cultural diversity to the existence of national and local identity, solidarity and strength of communities, environmental ethics, and arts of subsistence. This paper also addresses some relevant approaches to managing wetlands of cultural importance.

ECO-CULTURAL TOURISM IN AND AROUND CHILIKA LAKE

Biranchi Mishra

Jt. Director & Dy. Secretary,

Tourism Department, Government of Orissa, Bhubaneswar.

Lewis Road, Bhubaneswar - 751014

Email : ortour@sancharnet.in

The Chilika Lake is an integral part of the culture of coastal Orissa and a mute witness to the historical past. It was one of the outlets through which the ancient traders of Orissa, popularly known as Sadhabas, sailed off to the countries like Java, Bali, and Borneo. etc. and left indelible mark of our culture on their soil which is alive even today. Hundreds of villages around the lake have developed over a period of time a firm cultural base. There are scores of legends and folk lores that contain absorbing stories. It's therefore, an eco-cultural destination that holds motivation for a variety of people - from ornithologists to pilgrims and from nature lovers to pleasure seekers.

Chilika has, been a tourist attraction for quite some time now. The attraction is irresistible because of its proximity to the popular golden triangle of Orissa namely Puri-Bhubaneswar-Konark which are themselves great attractions. Chilika has however, been popularized as an eco-tourism destination with hardly any mention about the cultural aspect except a passing reference to the Shrine of Kalijai. The other face of Chilika Lake has remained in oblivion. Visit of the tourists to Chilika, has also been so far confined to a few activities like cruising, bird watching, dolphin sighting and paying homage to Goddess, Kalijai. The people living on the periphery of Chilika Lake have also confined their means of livelihood to fishing and boating. With the vast cultural landscape around this wetland, the activities can be diversified to a great extent.

Visitors to Chilika lake can be motivated to visit the nearby villages to see the cultural heritage, interact with the local people, observe their life style from close quarters, enjoy their folk lore and folk tales etc. This will ease out the pressure on the fragile eco system while extending the duration of the stay of the tourists which will ultimately further strengthen the local economy and enhance their life style. With appropriate planning it is possible to diversify the activities without disturbing the ecology of the lake. The duration of the tourist visit can be extended to a week or ten days in place of one or two days as at present, Satapada, Barkul / Balugaon and Rambha can be taken as the units for the diversified activities to start with.

The local community will greatly benefit in terms of employment and economy if the cultural vista around the lake are exposed to the tourists and exploited to the

benefit of the locality. Currently they are hardly aware of the potentialities and the opportunities they have. They need to be motivated to take up tourism as entrepreneurs not only to sustain their families but also to contribute to the sustenance of the lake.

HAKODATE CITY, JAPAN: REKINDLING THE “MEMORY” OF THE CULTURAL ASSETS OF COASTAL WETLANDS

Mina Yoshikai

Graduate student, Hokkaido University Graduate School of

International Media and Communication

Email: yoshikai@hotmail.com

Attracted by the wealth of its wetland environment, for over 8000 years the Hakodate City bay area has been settled by a variety of peoples, leaving a rich historical and cultural legacy. However, recent decades have witnessed the adverse effects of an urbanized population, where pollution and over-exploitation of natural resources largely severed the physical and spiritual ties of people with wetlands, leaving little but a memory. However, a combination of sound government policy, a concerned public, and a rich and diverse culture shows enormous potential through the mediation of cultural values for the conservation and wise use of its wetlands. With its focus on wetlands in urban environments, this paper may provide a different story in the cultural values of Japanese wetlands.

THE CULTURAL VALUES OF THE LAKES IN THE RICE-BASED SOCIETY OF BALI, INDONESIA

IG. Pitana

University of Udayana, Bal, Indonesia

Email: pitanabrahmananda@yahoo.com

Rice has been the staple food of most Balinese for centuries. As such, the role of rice farming was (and is) very crucial in Balinese life. Although the land size of the irrigated land in Bali is smaller than the upland, the influence of 'irrigated culture' or 'rice culture' is much more important than upland or marine culture. It is not an exaggeration to argue that Balinese culture, which is agrarian culture, is basically 'rice-culture'.

In line with the importance of rice in the life and culture of the Balinese, the role of water resources is salient, and water sources are given special religious significance. In this context, the lakes (there are four lakes in Bali) hold enormous cultural-religious significance, which can be seen from ritual activities held at the lake temples, especially those organised by the irrigation associations ("Subak").

This paper will discuss this issue. In so doing, the discussion will embrace information on the Balinese irrigation association, called "Subak", followed by its ritual praxis especially those related to the lake temples, and its interpretation in the context of sustainable development.

CULTURAL VALUES OF WETLANDS

M.K. Prasad

62 Girinagar, Cochin 682020

Email: prasad_mk@hotmail.com

The Aryans, when they entered the Indian subcontinent, first settled in the basins of seven rivers, known as the *Sapta Saindhava*, the rivers being Indus, the five rivers of the Punjab, and the Saraswathi. Later they settled in the plains of the Ganga and the Yamuna. A unique civilization developed also in the Cauvery basin of South India the agrarian communities depended considerably on the river for their livelihood and, therefore, they considered this mighty source of fresh water as Goddess and Mother. The cult of river gained strength, the rivers found an important place in their mythology; their rituals became closely associated with these water bodies. Some of these traditional rituals, associated with rivers, continue even to the present day. This paper examines the situation in the state of Kerala in South India.

Specific physical features of wetlands have contributed to particular ways of managing traditional activities through structures, procedures, techniques and specifically designed artifacts which are of great cultural significance.

Peoples' relationship with wetlands have given rise to aspects of non-material culture through folklore, music, mythology, oral traditions, customs, traditional knowledge and popular wisdom, and their reflection can be found in social practices and the traditional forms of social organisation for managing wetland resources, especially water.

Sustainable traditional uses of wetland resources have frequently created cultural landscapes of significant value to wetland conservation and wise use.

NATURAL RESOURCE-BASED CONFLICTS IN LIGAWASAN MARSH, MINDANAO IN THE PHILIPPINES

Marlynn M. Mendoza

*Protected Areas and Wildlife Bureau
Department of Environment and Natural Resources,
26-17th Avenue Cubao, Quezon City,
Metro Manila-1101
Philippines
Tel 632-9258950,
Fax 632-9258950,
Email: mmendoza@i-manila.com.ph*

The Ligawasan Marsh is the largest swamp and marsh area in Mindanao and one of the largest natural wetlands in the Philippines. It is situated in 3 provinces, Maguindanao, Sultan Kudarat and North Cotabato, occupying around 290,000 hectares. It covers one city (Cotabato City), 20 municipalities and around 180 barangays. It is a flood plain composed of 3 adjoining marshes namely: Libungan (north), Edpanan (west) and Ligawasan (east) which forms part of the Cotabato River Basin.

Ligawasan Marsh is of biological importance. It is considered a distinct and unique region among the 15 biogeographic zones of the country because of the presence of significant diverse flora and fauna; a possible crocodile reserve for the reintroduction of captive bred crocodiles of the DENR Crocodile Farm Institute in Palawan to repopulate the diminishing crocodile stock of the marsh; a globally important bird site (IBA site); and, for inclusion in the National Integrated Protected Area System per recommendation by the National Economic Development Authority - Region 12 in the 1999–2025 Liguasan Marsh Development Plan.

Ligawasan Marsh biological diversity and ecological functions are threatened by logging, construction of dams and diversion of river flows for irrigation and hydro-electric power generation, unstable peace and order condition and presence of exotic species to name a few.

The recommendation in the Liguasan Marsh Master Plan for Ligawasan to become a protected area, paved the way for the implementation of the Protected Area Suitability Assessment (PASA) Project in the year 2001 and ended a year after. The PASA is a requirement for the inclusion of the site under the National Integrated Protected Area System. Information on the biophysical and socio-economic characteristics and other environmental features of the site are assessed. The PASA project also brought about a major concern – efforts at providing mechanisms for biodiversity conservation and ecologically sustainable development will require program implementers to situate Ligawasan Marsh between two conflicting realities – the traditional institutions governed by

customary laws and Islamic precepts and institutions on one hand, and the existing laws and national guidelines of the Philippine government on the other.

The Maguindanaon Muslims predominantly inhabit the Ligawasan Marsh. This group occupies almost all the areas of the Marsh. Most of the inhabitants within and surrounding the Marsh are engaged in fishing and farming. Certain core beliefs, values and practices that had early beginnings in pre-Islamic time have in a way retained their efficacy to activate present-day Maguindanao Muslim society. Thus, whatever activities or developments are being proposed in the Marsh, it would be unwise not to take into consideration the connection of the people, its culture and the area.

ECONOMIC VALUATION OF WETLAND RESOURCES IN THE NORTHEAST THAILAND: CASE STUDY IN SURIN AND BURIRUM PROVINCES.

Narong Veeravaitaya¹, Pongpat Boonchuwong¹ and Suchart Ingthamjitr²

¹*Faculty of Fisheries, Kasetsart University, Thailand.*

Email: ffishrv@ku.ac.th

²*Department of Fisheries, Ministry of Agriculture and Cooperatives, Thailand*

Wetlands contain a diversity of multifunction and resources. Inefficient uses of wetland resources can lead to an increased pressure on resources and conflicts. To prevent this shortcoming, estimation of total economic value has been introduced in order to extend calculation of the value beyond physical resources, and to functions that yield indirect benefits to human. It is the intention of this study to evaluate the value of wetlands in the Northeast Thailand (NET) by using Total Valuation Approach (TVA). The study was conducted in 2002 by compiling all relevant secondary information and data related to wetlands in the NET and thoroughly reviewed. Two field visits in Surin and Buriram Provinces were organized to compile primary information from key informants. The NET covers an area of approximately 168,854 square kilometers of the country. There are 4 types of wetland in the NET; riverine, lacustrine, palustrine and other type. The total area of all types of wetlands is approximately 1,999.5 square kilometer, covering 1.18% of the total area of the region. However, palustrine is the most common type of wetlands in the region. Wetlands in the NET are closely related to human settlement, traditions, beliefs and living condition. Several economic activities are derived from wetland ecosystems and resources. Wetlands are regarded as the main source of income by its surrounding communities. Surin and Buriram Province have similar wetlands type since they are located close to each other and influenced by the Mun River. Wetlands in these 2 provinces are rivers, floodplains, inundated forests, reservoirs and swamps and marshes. Among these wetlands types, floodplains seems to be the most significant which is suitable for various activities; farming with rice, vegetables crops, pasture, aquaculture and trap ponds. Inundated forest provides diversified products; mushrooms, wild vegetables and fruits. Reservoir is significant for fisheries, water consumption and tourism and recreation. River is prominent in fisheries while swamps and marshes are developed for fisheries. There were at least 3 methods used for data collection; Random Statistical Survey, Compilation of all Available Information and Literature Review. Current available wetland data of Surin and Buriram Provinces would only allow for the evaluation of values derived from direct use of wetlands. These include data of fisheries (catch and aquaculture), agriculture (rice farm, crop and pasture), inundated forest products (fuel wood, aquatic plants and herbal plants), some wildlife, water for consumption (waterworks), tourism and recreation. It was not possible to evaluate the indirect use of wetlands due to lack of relevant information.

Any attempts to assess the value would only result in an underestimation of the true value of wetlands. It is this incompleteness in the valuation of wetlands that has prevented the recognition of wetland's values and its importance, and has led to the adoption of laws and regulations that are ineffective in protecting the real values of wetlands. This has led to adverse impacts on the use of wetlands.

CULTURAL VALUES OF WETLANDS IN BIODIVERSITY CONSERVATION IN NEPAL

Kamal Rai

CKNF/Society for Wetland Biodiversity Conservation-Nepal.

Email: swbc_rai@yahoo.com

Nepal is rich in wetlands and its' biodiversity is due to diverse geography, ecology, ecosystem, and cultures. More than 59 different traditional societies reside in various geographical belts with diverse and distinct language, culture, custom, religion, beliefs, social norms, knowledge and practices. This has a significant role in the protection and wise use of wetland biodiversity. Wetland ecology, landscape and cultural values may differ in accordance with the geographic and human dimension. The bio-cultural diversity has been largely instrumental in sustaining wetlands and biodiversity richness. Traditional cultural, religious, spiritual values, customary lore, folklore, knowledge of the societies is playing an important and responsible role in wetland ecology, landscapes and biodiversity restoration, conservation and sustainable use. Themes of CBD, and RAMSAR should be respected and implemented to protect the cultural, religious, ritual, and customary contribution by the society.

FLOOD MITIGATION BENEFIT OF WETLAND SOIL IN MOMOGE NATURE RESERVE

Jiang Ming Lu Xian-guo

*Northeast Institute of Geography and Agricultural Ecology,
Chinese Academy of Science, Changchun,
Jilin 130012, China
Email: jiangm@mail.neigae.ac.cn*

Wetlands have many important functions, purposes, and attributes, including flood mitigation, climate regulation, pollutant degradation, natural erosion weakening, and a refuge provision for wildlife and so on. Wetland benefit indicates functions, purposes, and attributes of wetlands, which can be acquired by direct value, indirect value, and non-use value. In this paper, based on GIS means and field soil data, and combined with environmental economics assessment method, flood mitigation benefit of wetland soil was calculated in a case of Momoge National Nature Reserve. the result shows that the amount of flood mitigation of wetland soil in Momoge Reserve is $2.57 \times 10^{10} \text{ m}^3$, and benefit is $1.72 \times 10^{10} \text{ yuan} \cdot \text{a}^{-1}$. At the same time, there are spatial differences on flood mitigation in Momoge wetland. Benefit of flood moderation of Momoge wetland is the biggest in the middle and the least in the east; the west is in between.

CAMBODIA WETLANDS

Kan Vibol

Email: vibolparkssociety@yahoo.com

The Kingdom of Cambodia is rich in wetland environments. Over 30% of the country is considered wetland. Following internationally accepted criteria for wetland identification (defined by the Ramsar Convention) over 20% (36,500 km²) of the Kingdom may be classified as wetlands of international importance. This represents over 5% of Asia's total area of wetlands of international importance. Cambodia's internationally significant wetlands can be divided into four areas: the Mekong River (468 km in length) and its floodplain; the Great Lake - Tonle Sap (between 13,000 km² and 2,500 km²) and its floodplain; the Stung (river) Sen (c. 3,000 km²); and the coastal estuaries of Stung Koh Pao and Stung Kep. In addition, Cambodia has numerous other wetlands, notably streams, ponds, freshwater swamps and marshes, mudflats and seagrass beds.

The Kingdom of Cambodia is closely linked to wetlands, both culturally and economically. Most of the population live in wetland areas and the central part of Cambodia, being essentially a large wetland comprising floodplains and flooded forests, has been exploited by Cambodians for centuries. Wetland products harvested by local communities include food (fish, waterbirds, edible plants, animals), medicine, water and fuelwood.

Wetland areas support rice and fish production - the primary source of food for the vast majority of the population and currently Cambodia's most economically productive sectors. Wetlands provide nutrient-rich and sheltered habitats for fish (spawning and nursery areas or habitats for adults) and therefore play a central role in the supply of animal protein in Cambodia. Cambodia's wetlands are important sanctuaries for birds and other species of wildlife not commonly found in other countries in the world. Agriculture is supported by water from wetlands. Wetland water may be stored for use in the dry season or withdrawn for irrigation purposes. Other economic activities utilising wetland resources include aquaculture, tourism, inland transport, and energy (hydro-electricity).

Cambodia is unique within Southeast Asia in that it retains large areas of wetlands untouched by development. However Cambodia's wetlands are threatened by a variety of human activities including drainage for agriculture; agricultural run-off carrying pesticides and fertiliser; deforestation and forest clearing for firewood and charcoal, especially in the flooded forest; domestic waste and mining activities. Although industrial pollution does not pose a problem at the moment, it is expected to increase with the development of paper and textile mills, chemical factories and food processing industries. Major development projects such as irrigation and

hydro-electric dams are likely to be implemented in coming years with inevitable impacts on wetland resources.

Cambodia is at a critical stage of its development. The prospect of greater pressure on its valuable wetland resources raises issues that need to be addressed urgently through the elaboration of a clear National Wetland Policy and implementation of a comprehensive Wetland Action Plan.

Technical Session

IV

COMMUNITY BASED MANAGEMENT OF THE WETLAND ECOSYSTEM

Coordinators:

Sanowar Hossain

Email: bdpoush@3comtech.com

Dr. Sidharth .Kaul

Email: kaul52@yahoo.com

STRATEGIES FOR COMMUNITY BASED SUSTAINABLE WETLAND MANAGEMENT: A CASE STUDY ON BANGLADESH

M. Aminul Islam

UNDP, Dhaka, Bangladesh

Bhaban Agargaon,

Dhaka- 880

Bangladesh

Tele: 880-02-8118600

Fax: 880-2-8113196

Email: aminul.islam@undp.org

The wetlands of Bangladesh are a key contributing factor to the country's unique ecology, culture and society. More than 50 per cent of the country is classified as a wetland, and perhaps more so than for any other nation. The fate of Bangladesh—its people and its prospects for sustainable development – is determined by its relationship with water and wetlands. Indeed, it is the wetland areas that attract the greatest density of rural settlements as people are drawn towards the wealth of natural resources available to them for their own needs and for income opportunities. The majority of people in Bangladesh directly rely on the life-giving natural resources and ecosystem services supplied by the country's wetlands. A majority of Bangladesh's 140 million people are critically dependent on the country's wetland systems as vital natural resources to sustain them, primarily through agriculture and fishing. Indeed, the movement of water to the sea and associated processes of sedimentation, accretion and mangrove growth have created much of the country's land. Ironically, this dependence all too often turns into disaster during Bangladesh's annual period of flooding. Development interventions have tried to 'control' or stop the natural processes, but have ultimately had a negative impact as the natural system settles into a new equilibrium, unplanned by the developers. Thus, increasingly natural resource experts are realizing that human development can only be achieved when the needs of the ecosystems and natural resources on which the country is reliant are taken into consideration in decision-making. Development must work with, not against, the dynamics of the ecosystem on which the country is dependent. However, there exist a range of institutional, political, technical and knowledge barriers to achieving such integrated ecosystem management and development planning. This paper investigates the interrelationships between a range of variables influencing decisions to manage and protect wetlands in a sustainable manner. Based on this analysis, it will present appropriate strategies for sustainable wetland management, in the context of Bangladesh's unique environmental situation.

LINKING SCIENTIFIC KNOWLEDGE TO COMMUNITY-BASED STRATEGIC WETLAND MANAGEMENT: A CASE OF NONG BONG KAI RAMSAR SITE IN NORTHERN THAILAND

Yongyut Trisurat¹, Nawarat Kraipanonth²,

¹*Faculty of Forestry, Kasetsart University
Bangkok 10900, Thailand
Tel: (662) 579-0176 Fax: (662) 942-8107
Email: jforyyt@ku.ac.th*

²*Office of Natural Resources and Environmental Policy and Planning,
Bangkok 10400, Thailand
Email: wetlands@onep.go.th*

The Danish International Development Agency (DANIDA) has supported the Office of Natural Resources and Environmental Management (ONEP) of Royal Thai Government through the Implementation of the Ramsar Convention in Thailand: Management and Protection of Wetland Areas (MPW) Project. A major objective of the MPW Project is to demonstrate management and conservation of two Ramsar Sites, Nong Bong Kai Non-hunting Area and Krabi Estuary. The Projects are in line with the principles of sustainability and wise use as promoted by the Ramsar Convention. As part of each project, a baseline ecological situation is being developed to support effective wetland management at each wetland site. The MPW Project employs the Asian Wetland Inventory (AWI), adopted at the Ramsar Contracting Parties (COP) in 1999, as a tool for developing a broadly-supported, standardized inventory protocol that can provide information for the assessment, evaluation and monitoring of wetlands. This approach has been developed to delineate and map wetland habitats from the intertidal zones to the inlands, and to store this information in a GIS database. The results of this study were integrated into the strategic wetland management planning of both pilot areas through participatory process of multi-stakeholders at local and provincial levels. This paper elaborates on the findings of ecological study and AWI GIS database of the Nong Bong Kai in Chiang Rai Province. Besides, this study also presents key elements of the Community-based Strategic Wetland Management Plan of Nong Bong Kai Ramsar Site. This strategy includes two main components: 20-year strategy (2004-2023); and 5-year action plan. The strategy includes issues, visions, goals, objectives, management zones and strategic actions while operation plan comprise of project definitions, estimated budgets and expected implementation period. The results also reveal that various user groups, local government and provincial government are intensively involved in the planning processes and have committed resources and efforts to manage Nong Bong Kai in a sustainable manner as recommended by Ramsar Convention.

COMMUNITY CO-MANAGEMENT PROMOTES SUSTAINABLE DEVELOPMENT OF HENGSHUI LAKE WETLANDS

Wang Zhengmin and Liu Zhenjie

The Hengshui Lake National Nature Reserve in Hebei Province

China

E-mail: hshzrbhq@sina.com

Hengshui Lake, located in Hengshui City of Hebei Province, a part of Northern China Plain, represents a natural wetland ecosystem, which consists of various habitats, including water area, meadow, swamp, mudflat and forest land. The wetlands of the lake are featured by their rich biodiversity, and serve as an important staging site for global migration of many rare and endangered bird species. As records show that there are, in the reserve, 296 bird species, including 7 species of Grade I of national protection, including Red-crown Crane (*Grus japonensis*), Siberian White Crane (*Grus leucogeranus*), Black Stork (*Ciconia nigra*), Oriental White Stork (*Ciconia boyciana*), Great Bustard (*Otis tarda*), Golden Eagle (*Aquila chrysaetos*) and Imperial Eagle (*Aquila heliaca*); and 44 species of Grade II including Whooper Swan (*Cygnus cygnus*), Whistling Swan (*Cygnus columbianus*), Common Crane (*Grus grus*), Japanese White-napped Crane (*Grus vipio*), Demoiselle Crane (*Anthropoides virgo*), Horned Grebe (*Podiceps auritus*), Grey Pelican (*Pelecanus philippensis*), Chinese Egret (*Egretta eulophotes*), Owl, Falcon and Eagle. In July of 2000 the Government of Hebei Province approved establishment of a provincial level reserve in this area and in June of 2003 the State Council approved promotion of the reserve to a national level one. Meantime, this reserve has been put into the List of Nationally Important Wetland Sites.

WISE USE OF WETLAND FOR SUSTAINABLE LIVELIHOOD THROUGH PARTICIPATORY APPROACH: A CASE OF ADAPTING TO CLIMATE CHANGE

A. H. M. Rezaul Haq, Tapan K. Ghosal, Pritam Ghosh² and M. Aminul Islam³

²WRDS, 21, Hazi Mohsin Road, Khulna-9100, Bangladesh.

Tel: 88-041-811665.

E-mail : wrds@bllb.net.bd

³UNDP, Dhaka, Bangladesh.

Adaptive Capacity is the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with consequences. Adaptive capacities in vulnerable wetlands are related to coping mechanism at the grassroots level for sustainable livelihood such as economic well being, human and social capital and climate specificity. Given the fact that the absolute number of hardcore people is increasing and a large part of them live in the coastal belt, the real challenge lies in capacity building of these vulnerable communities to cope with climate change impacts. This paper focuses on Hydroponics (a Greek word hydro means water and ponos, labour) as an alternative source of livelihood means for the communities having no lands for cultivation. Approximately half of Bangladesh is covered by wetlands. The prospect of massive and enormous productivity lies in the development of wetland resources. Bangladesh has the highest wetland to total land ratio in the world. The south west region of Bangladesh exists about 4,24,538 acres of natural and manmade wetlands. Out of these about 45,512 acres of wetland could be fully used for the practice of soil-less agriculture. Nearly 5,000 acres of wetland are being used for this purpose. The soil-less agriculture is an indigenous practice in the south-western part of Bangladesh. The people living within the wetland ecosystem utilize locally available paddy straws, water hyacinths and various aquatic plants for making the floating mat or organic bed on which crops and vegetables are grown. The productivity of this farming system is much higher than that of terrestrial agriculture. The compost manure generates from refused organic bed is nutrient enriched and acts as soil conditioner. It would be a major source of nutrients in aquaculture as well. This farming system is capable to ensure more agriculture production without degrading the wetland. Moreover the technology is friendly to the ecology and ecosystem of wetland.

CONSERVATION AND MANAGEMENT OF SAROMA LAKE THROUGH AQUACULTURE COOPERATIVE

Kimihiko Maekawa

Aquaculture Cooperative of Saroma Lake, Japan

Email: mekw@srm.knc.ne.jp

Saroma Lake is the third biggest lake in Japan and situated in the northeast of Hokkaido. There are four fishermen's cooperatives (Tokoro, Saroma, Yubetu and Aquaculture of Saroma Lake) and are 440 fisherman houses in Saroma Lake. The annual fishery yield of Saroma Lake is approximately 10,000 tons. Eighty percent of the yield comes from culturing of shells (scallops and oysters). The quantity of cultured shells is limited by the allowance level calculated by scientific researchers and is controlled to produce a constant yield.

Before the first mouth was opened, natural oyster was the main yield for the people of Saroma Lake. After the mouth was opened, however, the oyster died out. Then studies on scallop culturing began. The fishermen of Saroma Lake solved many problems by themselves one after another. As a result of these endeavors, we could build up the foundation for today's 500,000 ton scallop yield in Japan.

When the scallop culturing began, the yield for fishermen in Saroma was lower than the average for fishermen of Hokkaido. Through these processes, the average yield of fishermen in Saroma achieved a level beyond the average yield for Hokkaido. The annual production of cultured scallops in Saroma Lake is now approximately 7,000 tons. And more importantly, Saroma Lake has become the cradle for scallop seeds scattered in the Okhotsk Sea, which produces approximately 80,000 tons of scallops each year.

ISSUES IN COMMUNITY BASED WETLAND RESOURCE MANAGEMENT AND LIVELIHOODS IN BANGLADESH: AN OVERVIEW

Raquibul Amin, Anisul Islam¹ and Ainun Nishat

IUCN Bangladesh Country Office

Centre for Natural Resource Studies, Bangladesh

Email: raquib@iucnbd.org

Over 80% of the poor in Bangladesh live in the rural areas. The slow progress in rural poverty reduction appears to be the key challenge facing the country in the coming decade. On the other hand, livelihood in the rural areas is highly dependent on natural resources. Wetland constitutes a major role in the rural livelihood. It is recognized that around 80% of the total population depends to some extent on the utilization of natural resources or on processing the resultant products, which can be categorized as environmental resources. The ecosystem goods and services provide the natural safety nets to poor against shock. The sustainable use of biological resources will continue to play a critical role in reducing vulnerability and poverty situation. In this context, there is a pressing need to understand the dynamics of the natural capital and find links between natural capital, rural livelihood and poverty. This paper primarily focuses on wetlands, productivity of resources, trends and causes of degradation. It also tries to find links between wetland resources, population, livelihood, and community based efforts for managing the wetlands. The presentation will highlight, through case studies, on institutional arrangements undertaken for sustainable community wetland management.

LESSONS LEARNT IN THE COMMUNITY INVOLVEMENT IN THE ESTABLISHMENT OF THE NHA TRANG BAY MARINE PROTECTED AREA IN VIETNAM

Bernard O'Callaghan, Chu Tien Vinh and Truong Kinh

IUCN- Hon Mun Marine Protected Area Pilot Project for Vietnam,

PO Box #01, Nha Trang, Vietnam.

Mail: bocallaghan@dng.vnn.vn

Coral reefs are vital to the daily survival of a large number of poor coastal people in Vietnam. These reefs have been severely degraded over the past 20 years and long-term productivity is threatened. Their livelihoods are now being threatened by the depletion of coastal resources and degradation of the ecosystems which naturally sustained them. The Government of the Socialist Republic of Vietnam has recently demonstrated its commitment to the management of these coral reef wetlands through the establishment of the first comprehensive Marine Protected Area, Nha Trang Bay Marine Protected Area, with an area of 16,000 hectares and 5,300 people living within the area. This paper will document the approaches to community involvement in the management of Nha Trang Bay Marine Protected Area. In particular it will focus on:

- Involvement of local communities in the management of the MPA
- Community involvement in monitoring, enforcement and promotion
- Development of alternative income generating activities
- Longer-term requirements for sustainable financing of development within the MPA

COASTAL AND WETLAND BIODIVERSITY MANAGEMENT IN COX'S BAZAR AND HAKALUKI HAOR - AN OVERVIEW OF ECOSYSTEM APPROACH FOR BIODIVERSITY CONSERVATION IN BANGLADESH UNDER UNDP-GEF

Mahiuddin Ahmed

Bangladesh

Semp,Pmu Paribesh Bhaban E/16, Agargaon, Dhaka1207

Email: m.ahmed@sdnbd.org

The coastal and wetland area of Bangladesh is endowed with rich and diverse genetic resources of flora and fauna because of its climate and fertility of land. Major areas of concern are the conservation and development of natural resources which are under pressure due to increasing population thereby leading to degradation of ecosystem, habitat and natural environment and endangering the life and property at the time of cyclones and storm surges and flash flood. Species richness of flora and fauna is greatly diminished in Bangladesh. Many species are now extinct in the country and many more species are listed as threatened or endangered. The major factors for the losses of biodiversity are: Population pressure, natural hazards, overexploitation of biological resources, deforestation, destruction of habitat, land use change on conflicts, agriculture and industrial pollution, flood control related activities etc. In recent years Bangladesh has demonstrated increased determination and commitment to address the challenges of ensuring sustainable use and conservation of its natural resources, including its biodiversity. A major current challenge is effective implementation of Environmental Conservation Act, 95 which includes a key provision providing the Department of Environment (DOE) with broad powers of conservation of ecosystems that it determines to be Ecologically Critical areas (ECAs). In this context of formulating the present UNDP-GEF Project: BGD/99/G31- Coastal and Biodiversity Management in Cox's Bazar and Hakaluki Haor, Bangladesh has taken the crucial step of nominating the first six ECAs under the PRIF Study of this project at first phase and within the framework of the country's highly significant coastal, marine and wetland ecosystems. The overall objective of the present project is to establish an innovative system for management of ECAs in Bangladesh that will have a significant and positive impact on the long - term viability of the country's important biodiversity resources. The project will support DOE efforts to operationalize the ECA concept at three coastal and marine ecosystems and another ecosystem at fresh water wetland areas.. There is a provision of creating demonstration sites which should create important opportunities for replication in other coastal, marine and fresh water wetland ecosystems throughout the country including other sites recently nominated as ECAs. The present paper gives an overview of national strategies for coastal and

marine biodiversity management, threats and root causes of biodiversity loss, project structure and institutional arrangement, major outputs vis-à-vis activities etc. The site specific global biodiversity significance has also been touched upon.

Technical Session

V

RESTORATION AND STAKEHOLDER PARTICIPATION

Coordinator:

Ajit Kumar Pattnaik

*Chief Executive, Chilika Development Authority,
Bhubaneswar, Orissa, India*

Email: ajitpattnaik@hotmail.com

STAKEHOLDER PARTICIPATION IN CONSERVING THE GANGES RIVER DOLPHINS IN INDIA

R. K. Sinha

*Environmental Biology Laboratory
Department of Zoology, Patna University,
Patna 800 005 India.
Email: rksinha_54@sancharnet.in*

The Ganges River dolphin, *Platanista gangetica gangetica*, commonly known as susu is a freshwater dolphin which never enters sea. It is distributed in the Ganges-Brahmaputra-Meghna river basins of India, Nepal, Bangladesh and probably in Bhutan between tidal zone and as far up as rivers are navigable. The total estimated population in its entire distribution zone is about 2500 only. The species is facing extinction throughout the distribution range due to exploitation and habitat degradation. The IUCN has categorized it as Endangered and it has been given legal protection under the Indian Wildlife (Protection) Act 1972. The animal is killed mainly to extract oil from its subcutaneous fat layer, blubber, which is about 25-40% of the total body weight depending on the age of the individual. The oil is used mainly as fish attractant by the fishermen and occasionally as liniment. The degradation of the habitat due to construction of barrages, pollution etc has led to shrinkage of population. An effort was made to educate the fishermen and provide them an easy alternative from fish scraps. The animal was projected as potential tool for promotion of eco-tourism. Many of the fishermen came forward to save the species from extinction and on many occasions they helped in rescuing the dolphin, when it got entangled in their fishing nets. Also they adopted the alternative oil as fish attractant. Media played very important role in highlighting the plight of the dolphins. In 2001 Hon'ble Patna High Court filed a *suo moto* case against the state and central government based on a report of unabated poaching of the dolphins published in the local newspaper. This activated the concerned government agencies in general and the custodian of the Wildlife (Protection) Act in general. All these actions have given a ray of hope for the survival of the susus.

ECOLOGICAL DEGRADATION AND WETLAND RESTORATION IN THE CENTRAL YANGTZE

Guangchun Lei

The Ramsar Convention Secretariat

Senior Advisor - Asia/Pacific

The Ramsar Convention Secretariat

Rue Mauverney 28, CH-1196 Gland

Switzerland

Email: lei@ramsar.org

Central Yangtze wetland complex is one of the largest wetland ecosystem in Asia (60,000 sq. km), which consists of more than 1000 lakes with the hydrological, ecological and geochemical links with the Yangtze river. Historically, the Central Yangtze wetland complex maintains its dynamic with the flooding water from the Yangtze river, provides enormous benefits to the local people and nature. The wetlands is home of 300 freshwater fish species and has been providing 60% of China's freshwater fish products. The area is also one of the most important wintering areas for the migratory birds. Recent field survey carried out by WWF and its partners revealed that the region may host the whole global populations of Swan Geese (60,886 individuals) and Lesser White-fronted Geese (16,937) exceeded current estimates of their respective global (55,000) and regional (14,000) populations, 93% of the global population of the Siberian Crane (2,784 individuals counted), 93% of the regional population of the Hooded Crane (933 individuals), 68% of the regional population of the White-naped Crane (2,716), and 57% of the global population of the Oriental White Stork (1,697 individuals). Massive wetlands reclamation between 1950s and 1980s, had converted 60% of the wetland into farmland. More than 50% of the lakes are totally disappeared, whereas the remaining lakes have been isolated from the river system, except Dongting Lake and Poyang Lake. Dyke to protect people from flooding has to be heighten from year to year, which significantly fragmented the wetland ecosystem. As a result, its ecological service and function reduced significantly. Dykes are no longer able to compete with the ever increased water level due to reduced retention capacity of the system, and had caused serious problem to the local people, as well as to China as a whole (1998 flooding alone, caused 1% of China's GDP loss). Even worse consequences are ecological fragmentation, which blocked the links of ecological processes, such as the migration route of fishes, the exchange of water between lake and rivers, which led to a 75% decrease the fish yielding from nature, and accelerating eutrophication among lakes in the region, respectively. Our recent field survey revealed that both species composition and population structure of icefishes have been significantly influenced by the ecological processes in the region. In 1999, after the disastrous flooding in 1998, the Chinese government launched a massive wetland restoration programme in the region. To assist the important initiative, WWF launched a Yangtze River

Programme in the same year, to develop model of wetland restoration at two sites in Dongting Lake region, namely Qinshan Polder (8000 ha), and Xibanshanzhou Polder (500 ha). We have monitored ecological parameters (birds, fishes, plants), water quality, as well as social economic development in the two sites since its restoration in 1998. In 2004, number of fish species increased to 65, among which icefish population recovered to economic catching level (used to be very famous for the region); vegetation succession covers 50%, and 34 birds species use the wetlands. Water quality shows a clear increase in Nitrogen and Phosphorous from 1998 to 2000, and since then decays to lower level. Similarly, water COD and BOD₅ shows a gradual increase in the first two years, and then slowly decreased. Local communities have benefited from such environmental improvement. Supported by WWF and local government, they have developed an adaptive economy using their wetland resource, fishery, animal husbandry, eco-tourism and organic farming activities yielded a 20% annual income increase. This happy result returned with their appreciation of wetlands, and their care for environment, which is a great paradigm shift from the previous fighting against water, to let water in to flood their land.

MANAGEMENT CHALLENGES OF BHITARKANIKA WETLANDS, ORISSA, INDIA

Anup K. Nayak

*Conservator of Forests (Wildlife)
Forest & Environment Department
Govt. of Orissa, Bhubaneswar.
Email: bravo_123@satyam.net.in*

Bhitarkanika wetland extending over 672 sq.km is a Ramsar site and an estuarine system of delta located in northeastern part of Orissa state in east coast of India. This wetland is known for its rich biodiversity. The unique mangrove forests, water body & agricultural lands provide an ideal habitat for its highly diverse flora & fauna to thrive & sustain. It is home to over 80 species of mangroves & their associates besides harboring the largest population of estuarine crocodiles in India, largest nesting ground for Olive Ridley Sea Turtle & over 260 species of birds. The State Govt. has declared the area with mangrove forests within the wetland over 145 sq. km. as a National Park in 1998. There are 410 villages within the wetland area including about 100 villages in the immediate vicinity of the National Park. Most of the villagers being poor depend on natural resources of the National Park for their subsistence against the provisions of law. Agricultural lands surrounding the park are unproductive & are increasingly being converted into aquaculture farms diverting waters from the creek, which sustains the mangroves. Fishery resources are on a decline outside the Park due to excessive fishing. A twofold increase in population during the last 30 years has compounded the problem further. Conflict with the villagers is on the rise. To elicit the support of the people, eco development committees on the line of Joint Forest Management have been constituted in over 40 peripheral villages. Various eco-developmental activities have been taken up over the last 3 years with funds received from Central Govt. These include vocational training for women folk, distribution of solar cooker & fuel efficient chullahs, Nalia grass plantation, promotion of bee-keeping etc. Other management practices adopted are erection of hexanet fencing around the periphery of National Park to avoid man-crocodile conflict, annual census for crocodiles, birds & sea turtles, regulation of tourist flow, restoration of degraded mangrove forests, survey & demarcation of newly formed islands and above all strict protection measures like patrolling. Awareness measures like environmental education programs for school children, distribution of leaflets, brochures, stickers and other publications from time to time.

GROWTH OF NIPA PALM (*Nypa fruticans* Wurmb) USING VARYING PLANTING METHODS FOR RESTORATION OF ABANDONED SHRIMP PONDS

Noparat Bamroongrugs¹, Chorthip Purintavarakul¹ and Asae Sayaka²

¹Biology Department, Faculty of Science,
Prince of Songkla University, Thailand, 90112.

²Wetlands International, Thailand.
Email: b_npr@yahoo.com

The rapid increase in the production of marine shrimp in coastal zones has produced large-scale conversion of mangrove forests to shrimp ponds. Production of shrimp in many regions has been unstable. Consequently, a number of ponds are left idle and disused. Restoring the environmental conditions within the pond site by planting a suitable mangrove species is considered an option. The experiment herein was carried out to explore the effect of planting methods on growth of Nipa palm in abandoned shrimp ponds in southern Thailand. Economically, coastal villagers in this area earn their income from the palm in several ways, most importantly in Nipa sugar production. Most seedlings were planted on top of furrows constructed in the pond to avoid flooding, except for some seedlings which were planted in the pond base to compare their growth rates. The results showed that planting seedlings with attached rhizomes had the best growth rates and without seedling death at 14 months after planting. At this stage, however the height of seedlings grown from the fallen fruits was similar to those grown from bare rooted seedlings (70 cm. tall). Also, seedling mortality was not observed when grown from the fallen fruits whereas about 6% mortality was experienced by the bare rooted ones. Among the bare rooted seedling treatment, however no significant differences in growth rates were found when applying the soil with chemical fertilizers or farm manure or liming with CaCO_3 . In addition, it was found that seedling growth measured at 40 months after planting for those grown in pond base was almost 100% greater than those grown on the furrows. As a result, this finding may be applied for the restoration of abandoned shrimp ponds by growing Nipa palm.

SMART PARTNERSHIP IN PEATLAND FIRE PREVENTION AND RESTORATION -A CASE STUDY

David Lee, C. L.¹, T. Y. Chee² and F. Parish³

Global Environment Centre

2nd Floor, Wisma Hing, Jalan SS2/72

47300 Petaling Jaya,

Selangor, Malaysia

Email: david@genet.po.my; ² tychee@genet.po.my ;

³ fparish@genet.po.my

Tropical peatlands are found in mainly in Southeast Asia, whereby rainfall and topography lead to poor drainage, permanent water logging and substrate acidification slowing down organic matter decomposition. Peat swamp forests play important roles in regulation of hydrology such as flood control, flow regulation, water supply and prevention of saline water intrusion. Lately, significant prolonged months of extreme dry period in the region of Southeast Asia had resulted in many fires over areas such as Central Kalimantan, South Sumatera, Southern Thailand and also in Malaysia. Majority of the haze that had blanketed the region had been due to the burning of peat swamp forests or agricultural peatlands. This case study focused on the "smart-partnership" between private stakeholder and NGO in minimising the threats of fire in peatlands by addressing the issues of fire prevention and alternative management of peatland, as well as restoration of degraded peatland into peat swamp forest. Perbadanan Kemajuan Pertanian Selangor (PKPS) or Selangor Agricultural Development Corporation who owns a piece of agriculture land on peat soil which is adjacent to the National Forest Reserve, faced the problems of persistent fires that not only wiped out its entire crops, but threatened to destroy the fringes of the Forest Reserve nearby. Through a series of consultations and workshops, this issue was able to be addressed with an NGO taking the lead in studying these problems in this piece of land and subsequently providing some advice to the stakeholder for better management of the peatland that would prevent further fires from occurring. Multi-agencies consultative approach had been taken into consideration in order to manage the land in a sustainable manner. Recommendations were given with the priority on preventing further fires and promote rehabilitation of vegetation. The receptiveness and initiatives of stakeholder had successfully made this partnership a reality whereby the degraded peatland is being restored. The threats of fire had been greatly reduced if not eliminated after the whole place was flooded with water by raising the water table, and the adjacent Forest Reserve has also been protected at the same time. Hence, it has serve as a partnership model on sustainable management worth adopted by other agencies in addressing environmental issues.

UTILIZING PHOTOGRAPHS OF AQUATIC SPECIES TO ELICIT LOCAL ENVIRONMENTAL KNOWLEDGE

Eial Dujovny

University of Georgia

Department of Anthropology

Email: edujovny@uga.edu

This study employed photographs from the Marine Products Export Development Authority's (MPEDA) *Indian Fishery Handbook* (1999) to test the local environmental knowledge of Chilika Lake fisherfolk. The researcher assembled seven focus groups in six villages around Chilika Lake, Orissa, India (four groups of fishermen from fishing castes and three from historically agriculture-based non-fishing castes) and presented them with photographs of commercially traded aquatic species. All distinguishing marks were removed from the photographs and each group was tested on their fishery knowledge in a taped interview. Despite the fact that both groups are actively engaged in the local fishery, the research uncovered significant differences in local environmental knowledge. Focus groups comprised of fisherfolk from the historical fishing castes scored higher and were familiar with a greater number of marine species than fishermen from the historically agriculture-based castes. This preliminary study demonstrates that after over twenty years of involvement in the lagoon fishery, the historically agriculture-based communities have yet to match the local fishery knowledge of their fishing caste neighbors.

WETLAND RESTORATION PROJECTS IN HOKKAIDO 2004

Dr. Tatsuichi Tsujii

*President, Wetlands International-Japan; President,
Hokkaido Environment Foundation
Miyanomori 1-14 Chuo-ku, Sapporo,
Hokkaido, Japan 0640951
Email: tsujii@cocoa.ocn.ne.jp*

The starting point for concerted wetland restoration projects in the northern island prefecture of Hokkaido, Japan goes back to the Kushiro Mire's designation by the Ramsar Convention as a Wetland of International Importance in 1980. Following designation however, increasing environmental pressures on the mire led to rapid changes to its ecosystem. With growing consensus for its restoration by scholars and the general public alike, a series of alliances were forged leading to the creation of the Conference for the Nature Restoration of Kushiro Wetland in 2002. The establishment of such conferences that promotes and unites the participation of stakeholders can be seen as an effective driving force for wetland restoration projects. This paper will provide information concerning various restoration projects underway in 2004 in the Kushiro Mire as well as other wetlands found throughout Hokkaido.

DYNAMICS OF CONFLICT - A POLITICAL ECOLOGY SYNTHESIS

Jyotiraj Patra

Department of Environmental Sciences and Policy

University of Helsinki

Finland-00014

Email: Jyotiraj.patra@helsinki.fi

Conflicts over the access to use of natural resources are ubiquitous and there has been a marked increase in its scale and intensity in the recent past. Incidences of resistance, conflicts and uprisings centred around the Chilika lagoon underscores the urgency to understand the very nature and dynamics of such conflicts in order to build up an ecologically sound and socially just management practice. It is the very location of this ecosystem which is embedded in an environment of interconnected space, where actions results in impacts which are cumulative and long-range. The first step geared up towards this end would be to locate the diversity of actors and understand the dynamics of their actions at various levels being determined by the existing power relations. This paper is a humble effort to analyse this using strategies of Political Ecology, which discusses the interconnectedness of politics and environment. This will provide one of the approaches to look at the issues of sustainable management of this unique albeit contested ecosystem. And secondly pave the ways to forge meaningful alliances among the actors to resolve any conflicts and build cooperation.

CONSERVATION & MANAGEMENT OF BHOJ WETLAND, INDIA

Aniruddhe Mukerjee¹ & S. M. Misra²

Lake Conservation authority of Madhya Pradesh

Paryavaran Parisar, E-5, Arera Colony, Bhopal-462016, India

¹Email: *aniruddhem@yahoo.com* ,

²Email: *smmisra@rediffmail.com*

Upper & Lower lakes designated, as Bhoj Wetland are the wetlands of international importance. Upper lake basin comprises of a submergence area of about 31.0 sq. km and a catchment area of 361 sq.km., whereas Lower lake basin comprises of submergence area of 0.9 sq.km. and catchment area of 9.6 sq.km. While Lower Lake is surrounded on all sides by dense urban settlements, only about 40% of the fringe area of Upper Lake has dense human settlement and the rest is sparsely populated having cropping as the major land use. Increase in anthropogenic activities in the catchment had resulted in environmental degradation of the lakes. Consequently, a comprehensive project on the integrated water resources management was implemented during 1995-2004 for the ecological restoration of the lakes. Project action involved both preventive and curative measures and the application of locally suited design solutions, low energy, low cost technologies, as well as planned environmental education cum awareness programmes to ensure stakeholder participation in project implementation. A Lake Conservation Authority has also been created to ensure post project management of the lakes based on wise use concept.

WETLAND CONSERVATION IN MYANMAR

Thein Aung

Nature and Wildlife Conservation Division

Forest Department, Ministry of Forestry

Email: nwcd-cas@mptmail.net.mm

Myanmar possesses very diverse forms of wetland areas due to her unique topographic nature and climatic conditions across the country. This paper gives information such as established protected areas, wildlife management and legislation, and major wetland areas in Myanmar in brief. This paper describes the past and present wetland conservation activities in Myanmar, and also highlights the current threats and issues related to the wetland management. This paper also discusses the important role of wetland areas for the country's ecosystems, economy and her people's basic needs.

This paper presents the implementation of the wetland conservation activities in Myanmar through the collaborations of local, regional and international bodies and also highlights the endeavor of Myanmar to preserve and manage her invaluable wetland resources for the sustainable utilization.

CONSERVATION AND WISE-USE OF NATURAL RESOURCES OF CHILIKA LAGOON THROUGH COMMUNITY PARTICIPATION

Masanori Doi¹ & Ajit K. Pattaik²

Chilika Development Authority,

Bhubaneswar, Orissa, India

¹*Email: doi@fish@intemjapan.co.jp*

²*Email: ajitpattnaik@hotmail.com*

Chilika lagoon is a coastal wetland of international importance having been designated as a first Ramsar site of India in 1981. The area of lagoon is approximately 1000km². It is endowed with highly productive eco-system and valuable biodiversity and at the same time the lagoon supports livelihood of more than 30,000 fishermen or more than 120,000 of total family members. The water environment of the lagoon has been improving since September 2000 when new lagoon mouth was opened artificially. However, there are still many problems to be solved. Among those, unstable socio-economic state of fisherfolks both fishermen and non-fishermen is considered to be the fundamental threat for sustainability of lagoon environment conservation. In 2001, the Japan International Cooperation Agency (JICA) conducted a preliminary study for possible project formulation on natural environment conservation in India and the mission visited the Chilika lagoon as a case study site. Thereafter, based on the official request from the Government of India, JICA dispatched an expert on wetland conservation for participatory project formulation in 2003. The Chilika Development Authority in cooperation with the JICA expert has carried out the analysis on current problems and prepared the outline of the Project to be requested to the Japanese Government. The Project has a single purpose, namely "Wise-use of natural resources in and around Chilika lagoon is promoted through community participation", and it is composed of 5 outputs to be accomplished in the project period; 1. Scientific knowledge on fishery resource management becomes available, 2. Joint Fishery Management is elaborated through empowerment of fisherfolk in the selected villages, 3. Joint Watershed Management is strengthened through expansion of current activities, 4. Environmental monitoring system is improved, and 5. Environmental education activities are strengthened. Number of direct beneficiaries is roughly estimated to be 10,000 people. The Indian Government has examined the above-formulated project and requested to the Japanese Government officially with some modifications in April 2004. JICA is now discussing how to implement effectively the Project under its cooperation policy and available budget.

NATURE RESTORATION IN JAPAN - RECOVERY OF LOST FUTURE-

Noriko Moriwake

*Wildlife Division, Nature Conservation Bureau,
1-2-2 Kasumigaseki, Chiyoda-Ku, Tokyo
Ministry of the Environment, Japan
Email: noriko_moriwake@env.go.jp*

'New National Biodiversity Strategy of Japan', which was revised in March 2002, stated the importance of 'nature restoration' as well as 'conservation' and 'sustainable use' to protect biodiversity from human impacts, and further recommended the undertaking of nature restoration projects. As of December 2004, Ministry of the Environment of Japan is leading or supporting nature restoration projects and / or related studies at 21 sites nationwide in collaboration with local NGOs, local governments, related ministries and agencies. The types of ecosystems to be restored under the projects include many types of wetlands such as marsh, tidal flat, coral reef, and lake. The Kushiro Shitsugen (Mire), the first Ramsar Site of Japan and also the largest wetland ecosystem remaining in the country, nurses a variety of wildlife including endangered Japanese Cranes and attracts many visitors from both inside and outside of Japan. On the other hand, the mire has suffered from various human activities. It has been disappearing or deteriorating at the considerable rate of speed. 'The Kushiro Mire Ecosystem Restoration Project' was initiated in 2002 by Ministry of the Environment in conjunction with local NGOs, local governments, and related ministries and agencies as a model that takes the initiative among all nature restoration projects in Japan. To pursue the comprehensive implementation of measures concerning nature restoration, 'Law for the Promotion of Nature Restoration' came into effect in January 2003. The principle for nature restoration prescribed in the Law includes participation and cooperation of various stakeholders, and adaptive and long-term approach based on scientific knowledge. In addition, the law doesn't allow for biodiversity off-sets. The Basic Policy formulated under the law says that "a nature restoration project shall not be carried out as a compensatory measure to create a similar environment near the environment that has been destroyed by development activities".

USE OF REMOTE SENSING AND GIS TOOL FOR MANAGEMENT OF SUNDERBAN WETLAND

A.K. Raha,

*Chief Conservator of Forest and Director,
Sunderban Biosphere Reserve
Flat-5-G-A-I,
Golepark Housing Society,
49B, Gobindpur Road,
Email: atanu_raha@hotmail.com*

Sunderban, one of the largest delta in the world, consists of around 10,230 sq km of Mangrove Forest, spread over India (4230 sq km of Reserved Forest) and Bangladesh (6000 sq km approx of Reserved Forest) and is also the largest Mangrove Forest in the world. Another 5400 sq km of non-forest, inhabited region in India, along the north and north-western fringe of mangrove forest, is also known as Sunderban region in India. Hence, the total area of Sunderban region in India is 9630 sq km, which also constitutes the Sunderban Biosphere Reserve. Indian Sunderban is bound on the west by river Muriganga and on the east by rivers Harinbaha and Raimangal. Other major rivers flowing through this ecosystem are Saptamukhi, Thakuran, Matla and Goasaba.

River Matla divides Sunderban Reserved Forest into Sunderban Tiger Reserve (on the east) and Reserved Forest of South 24 Parganas Forest Division (on the west). Sunderban Biosphere Reserve was constituted by Govt of India in 1989 and it received the recognition of UNESCO, under its Man and Biosphere (MAB) Programme, in Nov 2001. It is one of the three UNESCO-recognized Biosphere Reserves from India. Sunderban National Park, forming the core area of Sunderban Tiger Reserve, had received recognition as a natural World Heritage Site, by UNESCO in 1987. It is one of the five natural WHS from India. Sunderban Reserved Forest has been nominated by GOI for recognition as a Ramsar Site (a wetland of international importance). Bangladesh Sunderban is already recognized as a Ramsar Site. Sunderban Tiger Reserve was constituted by GOI under "Project Tiger" scheme, in 1973. Sunderban is the only mangrove forest in the world, being the home of tiger. Sunderban Tiger Reserve has the highest population of tiger in the world. Sunderbans of India and Bangladesh together form the largest prograding delta and mangrove forest in the world. The mangrove forests have a typical dense undergrowth of *Ceriops* or *Phoenix* species, which almost make them impenetrable, and cuts off the visibility even a few metres away. That makes the movement on these island forests extremely risky, with the Royal Bengal Tigers stalking the prey silently. In such a difficult terrain, survey of the land mass and vegetation/forest monitoring through the conventional, manual method may be a nightmarish experience. The difficulties can be well appreciated if we look into the past system of Mangrove Resource Monitoring and Survey. The most

comprehensive Working Plan of 24 Parganas Forest Division, spread over the undivided Bengal prior to the partition of the country, was first written by Mr. Curtis between 1924 and 1929. According to this most elaborately written Working Plan, Curtis had incurred an expenditure of Rs 2,12,000/- approx. at that point of time for carrying out the detailed survey to demarcate the Forest Block and Compartment boundaries, and preparation of Forest Stock Maps depicting the status, extent, quality of forest vegetation and species composition. The first insight into the present state of mangroves in Sunderban was obtained in 1989-90 when W.B. Forest Deptt. took up a pioneering Project with Regional Remote Sensing Service Centre, Kharagpur, Deptt of Space, GOI, on mapping the forest cover of the entire State using 1988 satellite data from IRS-IA. The subsequent exercises remained confined to generation of Forest Cover map at three-year intervals, i.e. 1991, 1994, and 1997 through RRSSC, Deptt of Space, GOI. The GIS Cell in W.B. Forest Deptt was first opened during 1999-2000 and Forest Deptt carried out the triennial assessment of State's Forest Cover, as in 2000, using its in-house facilities and expertise. Subsequently, a full fledged GIS Cell has also been opened in the Office of Director, Sunderban Biosphere Reserve in October 2001. One of the most effective and unique application of the modern technology of Remote Sensing has been the case study of Jambudwip, an island Reserved Forest in the extreme South-western part of Sunderban Forest, along the cost of Bay of Bengal. This island mangrove forest was under progressive encroachment by a handful of fish merchants from the nearby Kakdwip area, for carrying out fish drying activities from October to February every year. During 2001, in order to implement a Supreme Court order, Sunderban Biosphere Reserve officials tried to remove the settlers and encroachers from this island, after obtaining approval of the highest level of administration. The fish merchants claimed that they had been carrying out the activities on the island for more than five decades and, as per Govt of India's policy decision of regularizing eligible, pre-1980 encroachments, they opposed the eviction move. At this stage, in the absence of other authentic records, time series analysis of forest cover of Jambudwip Reserved Forest island, over last two decades, had provided strongest basis for removal of encroachment and stoppage of degradation of mangrove forest. Determined effort of SBR officials resulted in removal of more than a hundred encroacher families, demolition of more than forty large godowns and afforestation of nearly 300 ha of degraded site with mangrove plants during July-Aug 2002. Even the Parliamentary Standing Committee on Environment, Forest, Science & Technology, and the Central Empowered Committee of Supreme Court of India had appreciated the usefulness of this modern technology in conservation of our natural resource. Removal of all encroachments of Jambudwip and conservation of the fragile mangrove ecosystem of the Global Biosphere Reserve was possible primarily due to availability of the satellite-based Remote Sensing technology.

THE PRODUCT OF LIQUID BIOFERTILIZER

Sittisak Uparivong

*Department of Biotechnology, Faculty of Technology, Khon Kaen University,
Thailand 40002*

Email: sittisak@kku.ac.th

Production of liquid biofertilizer was aimed to investigate on liquid biofertilizer for recovery abandon soil land. This research was located in Khon Kaen University, Thailand during the fiscal year 2546-2547. The available materials of twelve residues such as vegetable and fruit residues, food residues from food service centre etc., were fermented with molasses and the eighteen species of zymogenic-synthetic microorganisms (Liquid Biofertilizer KKU 1 of the research project of Product Improvement on Liquid Biofertilizer of the Theparugse Agricultural Community, KKU). The General Tank capacity of 20 Gallon to compare with the Biofermenter and Large Scale Microorganism Biofermenter of Research Project which were designed and constructed in Pilot Plant Scale, the capacity of 300 L and 500 L respectively. The total capacity of liquid biofertilizer productions were 8,000 L/2 weeks by the bioprocesses of unless chemicals. Results shown that the biodegradation rate by microorganism in Project Biofermenter higher than the general composting tanks. Microorganism growth rate in Project Biofermenter was higher than the control fermenters, 2.85×10^9 and 9.20×10^7 respectively, at the retention time of 2-weeks. For quality tests, it was observed that the products were qualified as "Biofertilizer" under the Standard Guideline on the Organic Fertilizer, Biofertilizer, and Natural Mineral Fertilizer of the Ministry of Agriculture and Cooperatives B.E. 2544. On the product's evaluation, liquid biofertilizer trials were carried out using water convolvulus, marigold, and rice as tested crops by the concentration rate of liquid biofertilizer 1:2000 at local area. The results indicated that the highest yield of water convolvulus at 4.10 kg/m^2 , 10-23 flowers/tree (diameter of 30-85.9 mm.) of marigold and $0.580\text{-}0.625 \text{ kg/m}^2$ (928-1,000 kg/rai) of rice after harvesting. The production of extracted bioliquid was achieved to call the Liquid Biofertilizer BIOTECH 1. These research products were distributed to Agriculture and General Mankind which their feed back data were satisfactory.

WETLAND RESTORATION IN BANGLADESH

Kazi Ahmed Kabir¹, Refat Laila Baby and Shayer Mahmood Ibney Alam

¹Department of Zoology, University of Dhaka,

Ramna, Dhaka-1000, Bangladesh

Email: kakabirdu@yahoo.com

Wetlands are of great ecological, commercial and socio-economic importance as they are rich in diverse aquatic resources, which provide sustenance and livelihood for millions of people in Bangladesh. Here about 50% of the land surface is wetlands. Unplanned developmental activities and unwise agricultural practices, political geography, environmental and climatic changes, poverty etc. are decreasing the size and quality of all wetlands that are affecting nature and livelihood severely. Wetland restoration programmes have been undertaken in different parts of the country. There are few projects activities either running or done in the country by Government, International Developing Agencies, NGOs, Civil Society and Private on restoration of wetlands. Some of those projects have good success, some other are not in that level. The present paper is a brief look on some good practices for wetland restoration and their achievements. The paper also describes the further possibilities of replicating those practices.

MONITORING THE RESILIENCE OF PEATLAND FOREST TO DISTURBANCES AT BELAIT PEAT SWAMP

Dr. Kazimierz Becek¹, Dr. Hjh Dulima Binti Jali, Gabriel Yit Vui Yong

*¹Geography Department
University of Brunei Darussalam
Jalan Tungku Link
Gadong BE 1410, Brunei Darussalam
Email: kbecek@brunet.bn*

The Belait Peat Swamp Forest (around 950 km² in area) is part of the extensive Baram Peatland situated between a large loop of River Belait and the littoral fringe along the coast, located in the western part of Brunei Darussalam. The peat sequence in the study area at Badas is at least 10 m deep and is of the woody type. The peat forest is relatively pristine, but is increasingly being impacted by anthropogenic disturbances, e.g. infrastructure, logging and oil exploration/production. Over the past decade, forest fires have become a common occurrence and increasing in frequency and extent during El Nino years. This has left numerous fire scars. As in other tropical biomes, the peat forest appears to be resilient, being able to regenerate after fire events, depending on the intensity of the disturbance. However, there is little information on the rate of regeneration, or the characteristics of the regenerating forests. GIS techniques has enabled studies to be conducted in this large spatial extend and inaccessible peatland. This paper therefore aims to study the resilience of the forest by monitoring regeneration rate, type and health of forested pockets in the Belait area, by using satellite imagery. The paper will present preliminary results of the research by examining the vegetation indices derived from 20 years sequence of multispectral SPOT imagery, augmented by analysis of recent high resolution multispectral IKONOS, QuickBird and radar images. The vegetation index maps are then overlain with hydrogeochemical data obtained from ground surveys to establish ground linkages. Meteorological data are used to compliment analysis of different-year data sets. It is hoped that the findings will add to the pool of knowledge on peat forest regeneration and aid management and rehabilitation of damaged peat systems.

The research is funded by a research grant of University of Brunei Darussalam.

INTEGRATED WATERSHED MANAGEMENT FOR SUSTAINABLE DEVELOPMENT

Kapileswar Mishra

*Research Scholar,
Department Of Civil Engineering,
Indian Institute of Technology,
KHARAGPUR, WB, INDIA
Email: kapileswar2001@rediffmail.com*

Land, water and people are the basic resources of a nation. Productive land is the source of human sustenance and security. The gross mismanagement of the land and water resources has resulted in increased recurrence of natural calamities like droughts, floods, earthquake, landslides etc. Water is essential for human survival, yet floods are responsible for increasing loss of life and destruction of crops and property every year. Droughts are caused by absence of water and floods by an excess of it. Nevertheless, one often follows the other, since the same process usually causes them: excessive environmental degradation in catchment areas. The integrated watershed management using the appropriate technology is the need of the hour for sustainable development

NATIVE PHOTOGRAPHY AND PHOTO ELICITATION: SEEING AQUACULTURE THROUGH LOCAL EYES

Eial Dujovny

University of Georgia

Department of Anthropology

Email: edujovny@uga.edu

This study used native photography and photo-elicitation to explore landscape history and changes in the environment as perceived by individuals from historically fishing and non-fishing communities in Chilika Lake, Orissa, India. Fourteen individuals from six fishing and non-fishing villages were provided with disposable cameras and requested to photograph changes that have occurred in their lifetimes. After the photographs were developed, taped interviews were conducted with the participants of this study. The research uncovered many undocumented social impacts of aquaculture, revealed differences between communities with regard to recent government interventions, and demonstrated the acute awareness of local residents of the environmental costs associated with the introduction of prawn aquaculture.

THE RESEARCH ON COMPARE OF CHARACTERS AND EVOLVEMENT OF COASTAL WETLANDS OF THE YELLOW RIVER DELTA AND THE SOUTHERN LAIZHOU BAY

Zhang Xu-Liang

College of Marine Geosciences, Ocean University of China,

Qingdao 266003, China; &

Department of Geography,

Qingdao University, 266071, China

Email: geo_zhang@163.com

The author divides the dominant plants and leading associated plants of vegetation of coastal wetlands in Yellow river delta and southern Laizhou bay into 2 eco-adapted types, such as halophytes, hydrophytes and so on, compares the different of types, distribution, evolvement of vegetation of coastal wetlands in the two places by analyzing the types of micro-geomorphology of plain, salinity of soil, comparatively intensity of intact of land and marine and influences of human activity. The wetlands in Yellow River Delta are influenced mainly by runoff of Yellow river, the dominant plants of vegetation of middle and high tide foreshore wetlands are *Suaeda heterobtera* and *Tamarix chinensis*, the vegetation of coastal wetlands in beach are fresh water marsh and meadow whose dominant plants are *Phragmites Communis*, *Typha orientalis* and *Aeluropus littoralis var sinensis* respectively, much of vegetation of fresh water marsh and meadow has distinguished in the latest 30 years for the construct of artificial wetlands such as reservoirs, paddyfield, tunnels. There isn't vegetation in tide foreshore in the southern Laizhou bay because of the strong influence of marine, but there are salt marsh whose dominant plants are *Suaedaheterobtera*, *Suaeda glauca* and *Tamarix chinensis* in beach. Much of vegetation of salt marsh in the southern Laizhou bay has disappeared for the construct of saltern and ponds pond of shrimps and crabs in the latest 30 years.

COMMUNITY INVOLVEMENT IN PEATLAND RESTORATION IN INDONESIA

Nyoman N. Suryadiputra¹, Alue Dohong

¹Technical Director Wetlands International – Indonesia Programme

Central Kalimantan's CCFPI Project Coordinator

Email: nyoman@wetlands.or.id

Land and forest fire is a serious problem which Indonesia has to face in the dry season almost every year. In 1997/1998, Indonesia experienced the world's worst land and forest fires. Over 2,000,000 ha of peatland were burnt, and are estimated to have emitted enough greenhouse gases to make a sizable contribution to global climate change. Peatland forest fire is much more difficult to handle than fires on mineral soil or highland plains. This because the fire spreads not only through the vegetation on the surface of the peat but also through the underlying layer of peat itself, so it is difficult to determine the direction in which it is spreading. In general, the cause of land and forest fires in Indonesia is 99.9% human, whether intentional or accidental, while the remaining 0.1% is due to natural causes (lightning, volcanic lava). Human causes of fire can be categorized as follows: land conversion, burning of vegetation, exploitation of natural resources, to reclaim rights to land or to take over 'ownerless' land in their vicinity and last but not least due the Construction of canals/ditches in peatland. In order to restore the degraded peatland area due to fire, Wetland International – Indonesia Programme through the CCFPI (Climate Change, Forest and Peatland Indonesia) project funded by CIDA (Canadian International Development Agency) from 2002 up to March 2005 have been implementing a number of community based peatlands restoration activities in Sumatera and Central Kalimantan. Such activities are including provide micro credits to the local community groups and in returned to this, the community were requested to plant the ex-burnt peatlands area with indigenous plant species and to restore the hydrology of peatlands area through canal/ditch blocking. This paper will provide information of these two major activities that have been successfully implemented by local community in several peatland villages in Sumatera and central Kalimantan, apart from various activities related to peatlands issues that also implemented under the CCFPI project mentioned above.

STATUS OF PEAT SWAMP FOREST IN THAILAND AND GUIDELINE FOR REHABILITATION

Tanit Nuyim

National Park, Wildlife and Plant Conservation Department
Ministry of Natural Resources and Environment Pollution Control
P.O. Box 37, Sungaikolok, Narathiwat, 96120, Thailand.
Email: Tanitnuyim@hotmail.com

Peat swamp forest in Thailand provide both direct and indirect uses which many aspects related to agriculture, forest, fishery and industry, gives a lot of benefits of nature resource to the people who inhabit the surrounding area. It also provides maintenance of natural balance and invaluable benefits in controlling the world's ecological system. The total area of peat swamp forest in Thailand is 64,555 hectare which consists of secondary (deteriorated) forest is 86 % (55,523 hectare) and only 14 % (9,032 hectare) for primary peat swamp forest remains nowadays. Primary peat swamp forest consists of diverse flora and fauna. It is found more than 470 species of flora, some of which are as 40 meters tall. At the present peat swamp forest are encroached upon and converted for agriculture purposes, trees are cut for produced into charcoal. The most distributing problem found to affect the peat swamp forest is the forest fire that often ravages the area during the dry season. The succession of deforested peat swamp area by natural is very slow and will cover by only one or two species, for example *Melaleuca cajuputi* or *Macaranga* spp. community. Reforestation in peat swamp forest is required for recovery of original peat swamp forest. Support under the King's project included activities research and experience on silviculture technique of rehabilitation during past almost 15 years in this paper which can be used as a beneficial guideline for the restoration program for increasing of succession.

REHABILITATION OF WETLANDS IN BELARUS

V. Rakovich

*Institute for Problems of Use of Natural Resources and Ecology of the Belarusian
National Academy of Sciences, Minsk, Belarus,
senior research scientist
Email: peatland@ns.ecology.ac.by*

There are 1.2 million of hectares of anthropogenical disturbed peatlands in Belarus from the total peatland area of 2.9 million hectares and 1.7 million of hectares are under the natural conditions now. More, then 200 thousand of hectares of disturbed peatlands are subjects to rehabilitation in the nearest perspective. After drainage all natural biospheric functions of peatland, namely accumulative, biological, circulation, landscape, gas-regulation, geochemical, hydrological and climatic one change radically or completely stop its implementation. As a result of secondary swamping of the drained peatlands all natural biospheric functions of mires completely restore in their original capacity and besides that essentially reduce the probability. Accumulative, circulatory and hydrological mire functions completely disappear while afforestation of drained and degraded peatlands. Biological, landscape, climatic and gas-regulation functions rise in the changed, not typical for mires forms, geochemical function weakens and fire probability increased. The anthropic interference in one of the wetland components produces a destabilizing negative influence on the other wetland components. In order to avoid the negative ecological consequences the natural hydrological regime of all the peat deposits including in the wetland composition should be preserved. It's of no less importance the preservation of the lakes' water level and purity, as well as establishing the sparing regime of the use of natural resources on the local lake-mire complex (LMC) watersheds. Renaturalisation presupposing the obligatory and full restoration of the whole totality of natural components of LMC the ensuring of their interaction and self-regulation with the purpose of the return of the natural-territorial complex to the initial natural conditions, in many cases is impossible on account of the impossibility of restoring the worked out peat deposits in the visible future, or is not expedient. That is why the ecological rehabilitation of wetland is more preferable, because it does not presuppose the restoration of all the components of the initial complex and is aimed at the restoration of the capability of its components for the fulfillment of their biosphere and economic functions. In the cause of restoring the biosphere and economic functions of every separate anthropically destroyed wetland, the individual approach to the elaboration of specific measures must be observed. It must take into account the specific peculiarities and conditions of a definite LMC: its genesis, hydrology, hydrogeology, geomorphology, the anthropic influence specificity and other factors.

INITIAL EXPLORATION OF NANJING QINHUAI RIVER WETLAND PARK CONSTRUCTION

Linchuan Luo¹ Yongjian Guan²

¹ Dalian University of Technology Dalian , 116000,
E-mail: lcluo18@vip.sina.com

² Nanjing Qinhuai River Wetland Park Construction Company,
7th floor, Golden Key Building, Jiangning, Nanjing, 211100,
E-mail: yongjianguan@163.com

Qinhuai River is a famous river with many culture values in China. Our project Qinhuai River Wetland Park locates at the upriver site of Qinhuai River. With the awareness of wetland values and restoration of wetland resources, Chinese government is carrying out a series of policy and steps to conserve wetland. Qinhuai River Wetland Park is a part of the Jiangning city plan, which is a new city near Yangzi River estuary. Our purpose is to construct a wetland part with the functions of wetland conservancy, tourism, wetland research and education, as well as provide optimal inhabitation. During the construction of Nanjing Qinhuai River Wetland Park, we put emphasis on the programming, functional design and investment mechanism, among which functional design is the most important. The functional design focuses on not only plant and animal protection but also water quality improvement. In order to show the decontamination ability of wetland, we also hope to establish a water quality model, which will deal with the pollution near our project. The construction of Nanjing Qinhuai River Wetland Park is innovative not only to the mode that the district realizes leaping and sustainable development, but also to the investment mechanism that enterprises take part in large eco-commonweal projects.

COMMUNITY CONSERVATION TRUSTS: A TOOL FOR WETLAND CONSERVATION IN LADAKH

Pankaj Chandan¹, Archana Chatterjee and Parikshit Gautam

¹Leh, Ladakh (J&K)

Email: pchandana@wwfindia.net

Ladakh which is located in Indian Trans Himalayas in India has one of the unique wetland ecosystems of the world - the High Altitude Wetlands. These wetlands are situated at an average altitude of 4000 to 5000 mtrs. above sea level. These wetlands are the only breeding grounds of Black-necked Crane and Bar headed Geese within Indian Limits. Besides these a large number of other bird species also breed in the area. The mammal species found in the area are Snow Leopard, Red Fox, Wolf, Tibetan Gazelle etc. At present due to various anthropogenic activities these wetlands are under tremendous pressure. During the past few years some of these wetlands have been opened to tourism and sudden influx of a large number of tourists has led to many adverse impacts on these wetlands. Moreover, tourist influx occurs during the peak period of biological activity. At the same time the population of the area is also increasing at a very fast pace. As the economy of the locals depends on the livestock. So huge increase in the livestock population over the past few years is also contributing to the degradation of the wetland ecosystems. WWF - India, in the year 2000 initiated a major conservation initiative with active involvement of local communities. Recognizing the importance of the local communities in the conservation process and also to provide the alternate source of livelihood to locals community conservations trusts were created at two wetland sites in Ladakh. Both these wetlands : Tsomoriri and Tsokar, are major tourist destinations for the tourists coming to Ladakh. The main mandate of these community trusts is to regulate the tourist activities around the wetlands in order to minimize the impact of tourism on the wetlands. At the same time these Community trusts are also generating some income through various ecotourism activities. These ecotourism activities are helping the local communities to raise their economic status and is also helping in proper regulation of tourism activities. The present paper presents the importance of the High Altitude Wetlands and the role of local communities in the conservation of these wetlands. The paper presents the detailed process how these community trusts were created and the long term vision of these community trusts being developed with technical assistance from WWF India.

RESTORATION OF LOST BIOENVIRONMENT IN SUNDARBANS MANGROVE WETLAND WITH SPECIAL REFERENCE TO SAGAR ISLAND AND JAMBU ISLAND – A CASE STUDY

Sabyasachi Majumdar, Abhijit Mitra And Amalesh Choudhury

S.D. Marine Biological Research Institute

Sagar Island, West Bengal.

Email: sabya63@rediffmail.com

The Sundarbans at the apex of the Bay of Bengal represents the largest delta on globe. It supports the most luxuriant mangrove wetland of the world internationally recognised for its unique biodiversity, immense scientific, anthropological and archaeological importance. It was declared as the World heritage site and included in the global network of biosphere reserve by the UNESCO. Of the 108 islands 54 are inhabited, the remaining are virgin. Overpopulation, overexploitation, insufficient scientific information and understanding of the ecosystem, pollution, siltation and sedimentation, erosion, logging of mangroves and subsequent habitat destruction or fragmentation, destructive fishing and aqua cultural activities, nonsustainable developmental activities in violation to the CRZ norms, reduced flow of fresh water, natural catastrophes etc had inflicted major damage to this spectacular coastal wetland over the year. Sagar Island and Jambu Island are located at the southwest end of Gangetic estuary at the confluence of river Hugli and river Mooriganga. Due to long term interference of human activities, coastal mangroves were gradually removed, destroying and eliminating the benthic and adjacent pelagic biota, thereby depleting the prospect of important fishery productivity of the region. Off late, with the rapid implementation of forest management activities, mangrove aforestation programme was successfully carried out around the coastal mudflat around Sagar Island and Jambu Island with the help of the village forest protection Committee (FPC) & eco development Committee (EDC) and the local panchayats. With the increased community participation in the past two decades the lost mangrove environment was gradually restored providing a lush green environment accelerating the settlement of innumerable species of mangrove-based flora and fauna. This restoration of ecodiversity directly and indirectly enhanced the forest floor and adjacent aquatic productivity, thereby helping to restore the water health, improvement and increase of detrital potential and micronutrients, sustenance of finfish and shellfish juveniles and allied fishery

WHAT'S GOING ON IN THE DEGRADED COASTAL LAGOON LAKES SHINJI AND NAKAUMI, JAPAN

Hideobu Kunii¹ and Isamu Mizoyama²

¹ *Research Center for Coastal Lagoon Environments,
Shimane University, Matsue 690-8504, Japan
Email: kunii@soc.shimane-u.ac.jp*

² *Izumo Work Office, Ministry of Land, Infrastructure and
Transport of Japan, Izumo 693-0023, Japan*

Lakes Shinji and Nakaumi have undergone extensive changes in the last 40 years due to the big national projects aiming at desalination and reclamation of these lakes. In the year 2000, however, the land reclamation project in Lake Nakaumi was officially discontinued, leaving Honjou area unreclaimed. Shortly thereafter, desalination project was also terminated. In July 2003, the president of Shimane Prefectural Government expressed a wish to designate the lakes for inclusion in the list of wetlands of international importance, and thus the efforts to restore lakes are now urgently needed. Designation of Lakes Shinji and Nakaumi for inclusion in the list of wetlands of international importance is not a final goal but a first step towards the restoration of the degraded lake ecosystem. This is an opportunity for us to come up with the grand design for these lakes and their watershed, a plan which must establish clear goals for the next 10 years and for the next 50 years. This will only be achieved rightly through the 'wise use' concept of the Ramsar Convention. Before starting the restoration project of the lakes, we have to set the goal, a general statement about desired project outcome. Since shallow areas in Lake Nakaumi have been diminished due to reclamation, restoration or rehabilitation of shallow littoral zone is one of the most important objectives in the lake. As a practical fishery promotion measure, Shimane Prefectural government mentions a guideline of the creation of shallow area (sand fill, seagrass bed) as well as the protection of waters threatened by anoxia. By creating shallow areas, quantitative recovery of macrophytes may be assured, and we may regain the fertile sea by exploring the factors which caused floral change in the past. We have just launched a collaborative work to reestablish the seagrass bed in the lake.

APPROACH OF NATURE RESTORATION PROGRAM FOR KUSHIRO MIRE

Jungo Funaki¹, Shyuji Ishizuka², Yasuyuki Hirai

Hokkaido Bureau, Ministry of Land, Infrastructure and Transport, Japan

¹Email: *funaki-j22aa@mlit.go.jp*

²Email: *ishizuka-s22ab@hkd.mlit.go.jp*

Kushiro Mire, Japan's largest wetland, approximately 20,000 ha in area, is an ecological wealth of valuable wildlife, including the red-crowned crane and Siberian salamander (in 1980, Kushiro Mire was registered as a Ramsar Convention site). The direct exploitation of Kushiro Mire and the development of the surrounding area in the past have caused a gradual decrease of the area of the mire, and the mire vegetation has changed from marshy species to those favoring a drier environment. To protect Japan's largest wetland, the Ministry of Land, Infrastructure and Transport (river administrator) is promoting mire conservation and restoration, in conjunction with the local community, by creating a society that has a harmonious relationship with nature.

A SUSTAINABLE COMMUNITY LED MODULE FOR EFFICIENT MANAGEMENT OF EAST CALCUTTA WETLAND (ECWL) IN WEST BENGAL, INDIA THROUGH PISCICULTURE USING DOMESTIC WASTEWATER—A CASE STUDY ON “JHOGRASISA FISHERY”

Sasidulal Ghosh, Dipankar Saha

Eco Dev Consultancy (P) Ltd.

P-134 Lake Town, Block-B

Kolkata-700089

Email: ecodcv@vsnl.net

East Calcutta Wetland (ECWL) has water area of 3898.75 ha and spread over 32 *Moujas* of two districts of West Bengal. The uniqueness of this wetland is where the domestic wastewater of Kolkata metro gets treated through pisciculture. Besides it having a rich biodiversity, millions of people living in and around the wetland directly and indirectly depend on it for livelihoods. There are three broad types of sewage fed fish farm existed here; such as individual firm (on leased land & own land), registered fish growers' cooperatives, and unregistered cooperatives. The present case study depicts the experiences of developing a sustainable management practice of sewage fed fisheries with the primary objectives of (i) low cost wastewater treatment (sanitation model) and (ii) employment generation involving communities. The study is based on “*Jhograsisa Fishery*”, which is having a contiguous wetland of 52 ha (1.33% of the total ECWL). The sewage fed fish farm generates on an average of over 50 thousand person days per annum benefiting directly 235 households. Besides it treats 1.14 mgd (million gallon per day) of sewage water (the entire wetland treats 124 mgd). It is also found that the average productivity of fish production has gone up to 4.5 tons per ha per year by adopting the multiple stocking system with carp, Tilapia and other species @ 40-50 thousand /ha., with multiple harvesting technique. The most important aspect of this initiative is to promote livelihood generation through increased persondays. The deliberate trade off made in this initiative is to adopt labour intensive management strategy rather than highly scientific farming with the single agenda of productivity enhancement, which essentially requires less human labour. The study has also showed that the BOD level of untreated sewage water (which is in the range of 150 – 300) has been reduced considerably through fish farming (BOD level – less than 20). It is perhaps the best example of low cost resource recovery using wastewater, it produces food for millions of people (fish and agriculture), and that is which it has been recognized by International Ramsar Convention. The sewage fed fisheries model of East Calcutta can be replicated to cities and urban areas not only as low-cost sanitation approach also as the opportunity to promote livelihoods involving communities.

ECOLOGICAL ASSESSMENT OF RIVER YAMUNA FLOODPLAINS IN DELHI STRETCH AND ITS INTEGRATION INTO RIVER BASIN MANAGEMENT

C.L. Trisal

Pamposh, Tanveera Tabasum, Jhumpa Ray, Manoj Vishwakarma
Wetlands International - South Asia
A-127, 2nd Floor, Defence Colony
New Delhi – 110 024, India
Email: wisa@hathway.com

Ecological study was carried out on floodplains of River Yamuna in Delhi stretch by Wetlands International in collaboration with Universities of Delhi, Jamia Millia and Barakatullah. The main focus of the study was to assess species composition and population dynamics of plants, benthos, phyto and zoo plankton, fishes and avifauna and their inter-relationships with abiotic variables were studied during pre-monsoon, monsoon and post monsoon periods. The survey of the floodplain area with the objective of delineating floodplain area into various categories adopting vegetational criteria. The study highlighted that floodplain area confined mainly within embankments from its entry at Palla to exit at Jaitpur. The floodplain area was broadly delineated into marshes, swamps and open water area. Using GIS techniques supported by strong ground truthing the entire area was delineated into marshes, swamps and open water area. Overall the floodplain occupies 114.15-sq. km. area with the contributions of (36.47%) by marshes, (7.63%) by swamps and (13.45%) open water area. Lakes/ ponds occupied 2.41 sq. km. area within floodplain. Overall 69 plant species, 62 zooplankton, 93 phytoplankton, 54 benthos, 35 fishes, and 131 birds were found in the floodplains. Using river continuity / discontinuity concept for assessment of vegetation longitudinally, three distinct zones were identified which reflect distortions due to construction of hydraulic structures and heavy pollution load from highly urbanized catchments. High biodiversity in the area was associated with large stands of *Typha* sp. and macrophytic stands which provided refuge and optimal conditions for colonization of benthic fauna. Avifauna showed marked differentiation in their preferences for microhabitats in relation to food and shelter. Based on the analysis of information collected and using cluster and gradient analysis it was noted that the river water quality greatly influences zonation of biotic communities. Based on the study carried out several recommendations have emerged which are expected to be of great use for planning for conservation and management of floodplain wetland. Specific stretches have been identified which need to be conserved for biodiversity conservation and utilizing the role of the floodplains to ensure long term sustainable management.

BIODIVERSITY VALUE OF TWO RAMSAR SITE (BHITARKANIKA AND CHILIKA) IN ORISSA, INDIA.

Dr. S. K. Kar¹, Dr. C. S. Kar²

¹Senior Research Officer

²Senior Research Officer

O/o Principal CCF(WL) & Chief Wildlife Warden, Orissa

Prakruti Bhawan, Nilakanthanagar, Nayapalli,

Bhubaneswar, Orissa – 751012,

Email: cwlwbbsr@ori.nic.in

In Orissa, Chilika lagoon and Bhitarkanika are two major coastal wetlands, in the east coast of India and are designated as Ramsar sites (Wetland of International Turbulence) on 1st October 1981 and 19.08.2002. respectively. The former is a vast brackish water lagoon and is a closed area, while the later is a deltaic area formed by the alluvial deposit of river Brahmani and Baitarani and is a wildlife sanctuary as per provisions of the Wildlife (Protection) Act 1972. a submerged island of 15.53 km² in the Chilika lagoon has been declared as Chilika (Nalabana) Wildlife Sanctuary. The core area of Bhitarkanika Wildlife Sanctuary has been notified as a National Park (145.0km²). The mangrove ecosystem of Bhitarkanika supports rich biodiversity including mangroves and associates (71 species), largest population of Estuarine crocodiles, largest Indian Lizards (Water monitor), poisonous and non-poisonous snakes like king cobra and python, varieties of resident and migratory birds (217 species) and number of mammal's species (spotted deer, sambar, fishing cat, otter, dolphin, etc.). Chilika is very rich in both invertebrate and vertebrate fauna. The Ramsar site is the habitat of the largest congregation of long distance and local migratory waterfowl (over a million) in India. The other vertebrate fauna includes 300+ species of fish, 7 species of amphibians, 30 species of reptiles, 18 species of mammals including threatened Irrawaddy dolphin or snubtin dolphin, *Orcaella brevirostris*. It is to be noted that, the coastal sandy beaches of Bhitarkanika i.e. the Gahirmatha is the world's largest Olive Ridley Sea turtle rookery where as sandy beaches of the Chilika coast also attracts sea turtles for sporadic nesting. This paper highlights the ecological, economic and threat aspects of both the wetlands and also conservation measures need to be taken to preserve these two unique wetlands/Ramsar sites of Orissa.

COMMUNITY DRIVEN ALTERNATIVE LIVELIHOOD OF COASTAL COMMUNITIES IN INDIAN SUNDARBANS

Dipankar Saha, Ph.D & Subrata Rana

*Eco Dev Consultancy Pvt. Ltd
P-134, Lake Town, Block -B, 1st Floor
Kolkata-700 089, West Bengal, India
Email: ecodev@vsnl.net*

Sundarbans lies between 21°30'N to 23°N latitude and 88°E to 89°E longitude, the coastal part of West Bengal are having two distinct micro-situations: i) mainland & ii) island situation. Both the situations are falling under CDR (Complex Diverse Risk prone) agriculture system under rainfed condition. The communities in the islands are mostly smallholders, landless labourers and fisher folks. The phenomenal population density has been creating tremendous pressure on the mangrove forest. Several development programs based on agriculture, livestock such as like land-care, integrated agriculture-aquaculture, etc., have been successfully experimented by a range of Government as well as non-Government agencies as an attempt to develop alternative livelihoods of the marginalized communities of this region. The present study focused on eleven villages in Kaikhali and Gurguria Island of Indian Sundarbans. It has demonstrated the impact of participatory planning and implementation of various development programs leading to enhanced quality of lives. The study also been able to chart out the emerging trends of community driven natural resource management strategies pertinent to the critical ecosystem of Sunderbans.

Side Event

RESTORATION OF CHILIKA LAGOON –
A JOURNEY FROM MONTREUX RECORD TO
RAMSAR WETLAND CONSERVATION AWARD

RESTORATION OF CHILIKA LAGOON –A JOURNEY FROM MONTREUX RECORD TO RAMSAR WETLAND CONSERVATION AWARD

Ajit K. Pattnaik, Ph.D.

Chief Executive

Chilika Development Authority

C-11, BJB-Nagar, Bhubaneswar-751014, INDIA

E-mail : ajitpattnaik@hotmail.com

Wetlands are among the most productive ecosystems in the world. A source of substantial biodiversity, they provide support to a variety of species ranging from the tiniest microbes to assorted mammals, a plentitude of agricultural activities and fisheries. Most importantly, wetlands maintain the livelihood of millions living in local communities in and around the wetland and its drainage basin. The Chilika lagoon is the largest brackish water lagoon in India and a Ramsar site. The lagoon is a unique assemblage of marine, brackish and fresh water eco-systems with estuarine characters. It is a hotspot of biodiversity and a wintering ground for more than one million migratory birds. The watershed and coastal process are integral factors determining the ecological integrity of this coastal wetland. The freshwater inflows drive the temporal and spatial salinity dynamics of the lagoon, which contributes to the mosaic of aquatic habitats for different plant and animal species, and the varying life cycle requirements of these species. It is primarily this dynamic salinity regime that enables the lagoon to support high biodiversity and a productive fishery. The highly productive ecosystem of Chilika lagoon sustain the livelihood of 0.2 million fishermen and 0.8 million in the watershed community. The lagoon encountered a combination of increased siltation due to changes in the land use pattern and degradation of the drainage basin, as well as partial closure of the outlet channel connecting the sea. The decrease in salinity caused proliferation of invasive species, increased turbidity, shrinkage of water-spread area, loss of biodiversity, and depletion of fishery resources. The retarded flow through the old mouth caused a low variation of water levels and lower drainage time that resulted in water logging in the agricultural lands of the peripheral villages, around the lagoon, which subsequently lead to complete crop loss, affecting more than 50,000 hectares, to the miseries of the agricultural communities. The overall decline in productivity both in the lagoon and the drainage basin adversely affected the livelihood of the local community. Due to changes in its ecological character, it was included in the Montreux Record maintained by Ramsar Bureau, in 1993. In response to the steady degradation facing the once lively Chilika lagoon, the Government of Orissa created the Chilika Development Authority (CDA). CDA initiated an integrated adaptive management process to address the complex ecological and socio-economic issues of the Chilika lagoon with an ecosystem approach. The primary feature of the restoration model is the

integration of watershed and the coastal process with active participation of the local communities with a shared decision-making process. The community participation and stewardship, linkages with the various national and international professional institutions and an intensive monitoring and assessment system are some of the unique management practices adopted by CDA for management of the wetland and the drainage basin. This is further testified by the fact that based on the assessment of the outcome of the restoration measures taken by CDA, the Ramsar Advisory Mission recommended the removal of the lagoon from the Montreux record (threatened list of Ramsar sites), and Chilika was removed from the Montreux record with effect from 11th November, 2002. Chilika is the first site from Asia to be removed from the Montreux Record. Chilika Development Authority was conferred with two prestigious awards: the Ramsar Wetland Conservation Award, for the outstanding achievements in restoring the Chilika lagoon; and the Indira Gandhi Paryavaran Purashkar, the highest national award for outstanding contribution in the field of conservation of environment. It is a perfect example of how the restoration of a wetland and its watershed with integrated water resource management, can not only restore the ecological integrity of the wetland, but also contribute significantly towards the improvement of the livelihood of the local community due to increased productivity. The core worth of the restoration model is that it is globally relevant. The government of Orissa is now envisaging an ambitious Integrated Water Resource Management plan for Mahanadi basin with Chilika lagoon as an integral part of it.

MONITORING - A TOOL FOR ECOSYSTEM MANAGEMENT: A CASE STUDY OF CHILIKA LAGOON

K.S.Bhatta, Ph.D., A.K. Pattnaik, Ph.D. & U.C. Panda, Ph.D.

Chilika Development Authority

C-11, BJB-Nagar, Bhubaneswar-751014, INDIA

E-mail : bhattaks@yahoo.com

Wetland monitoring is of paramount importance as it provides specific information on the characteristics and functioning of the environmental variables in space and time. It provides time series data for management of the project in appropriate time and direction, fulfils important functions of Environmental Impact Assessment, harmful impacts and magnitude of stern conditions.

Chilika lagoon is an important Ramsar site, for its rich fisheries resources, migratory birds and Irrawady dolphin etc. The lagoon faces some problems due to environmental and anthropogenic pressure. To address the problems, some ameliorating measures like excavation of channels, opening of new mouth and renovation of Palur canal were undertaken by Chilika Development Authority (CDA). To record the impacts of various interventions, Environmental Monitoring Programme was carried out by CDA since 1998. The physico-chemical parameters were recorded from 30 stations of the lagoon adopting standard methods during 2003-2004. Variations in limnological parameters were observed in different sectors of the lagoon. The evaluation of pre and post-intervention data is discussed in the present paper.

ENHANCEMENT OF FISHERIES OF THE CHILIKA LAGOON AFTER OPENING OF THE NEW MOUTH AND RESPONSIBLE MANAGEMENT STRATEGIES

S. K. Mohanty, Ajit K. Pattnaik and K. S. Bhatta

Chilika Development Authority

C-II, BJB-Nagar, Bhubaneswar-751014, INDIA

E-mail : Suryakmohanty @ yahoo.com

Fisheries of Chilika lagoon has been supporting the livelihood of more than 0.2million fishers and those engaged in subsistence and traditional fisheries and share more than 71% of the total tangible out put from the lagoon ecosystem. This valuable living aquatic resources were seriously threatened during the eco-degradation phase, resulting in drastic decline in fisheries output bringing miseries to the impoverished fishers and loss of fisheries biodiversity.

Consequent upon the hydrological intervention for restoration of the Chilika lagoon during 2000, spectacular fisheries enhancement was observed after opening of the new mouth as the immediate positive impact. As compared to the pre-mouth fisheries data, the four years (2000 – 2001 to 2003 – 2004) average fisheries output, productivity, catch per unit effort (CPUE), Pre-capita income of active fisher, income per fisher family and shrimp export to overseas countries increased by 521%, 515.39%, 463.70%, 873.78%, 887.85% and 652.32% respectively. The paper outlines the results of enhancement evaluation of the capture fisheries of Chilika lagoon and suggests responsible management strategies.

PARTICIPATORY INTEGRATED WATERSHED MANAGEMENT IN THE CATCHMENT AREAS OF CHILIKA LAGOON.

K. N. Chari, Ajit K. Pattnaik, Ph.D.

Chilika Development Authority

C-11, BJB-Nagar, Bhubaneswar-751014, INDIA

E-mail: ajitpattnaik@hotmail.com

Generally watershed is defined as a geo-hydrological unit of drainage area, every part of which drains to a common point. The concept of watershed was evolved as early as 1950, with an objective to reduce the silt load in to the reservoirs of multipurpose projects, which were installed with heavy investment. Subsequently it emerged as an important land-based programme to conserve soil and moisture. In the past many Government sponsored watershed management programmes were launched, but in many cases it failed to achieve their objectives due to lack of peoples participation. Even in cases where progress has been satisfactory development has not been sustainable in form of operation and maintenance of assets created. So to begin with an innovative participatory micro-watershed management with ecosystem approach was conceived by Chilika Development Authority (CDA) for management of the catchment areas of the Chilika lagoon. A pilot project comprising a micro-watershed having three villages was launched in 2001-2002. The total geographical area of the micro watershed is 640 ha. The project area is situated at a distance of 75 km. from Bhubaneswar on the NH-5. Much emphasis was laid on capacity building and strengthening of community based organization like formation of watershed association, watershed committee, users group and self-help groups. The planning process adopted is completely participatory with a bottom up approach using local technical knowledge as basic inputs. The basic objectives have been to strengthen the capacity and empower the communities to manage the natural resources within the watershed in a sustainable manner and its equitable distribution. The ultimate aim is to eliminate the dependency syndrome of the community at grassroots level through adequate capacity building to reverse the degradation of the life support system. To supplement the indigenous knowledge the services of the research institutions in the field of land and water management were also commissioned. A learning center is developed for the dissemination of the lesson learnt so far. The empowerment of the women is facilitated through the constitution of the self help groups and the skill improvement training. The effective rain water harvesting structures have reduced the frequency of failure of rain fed paddy cultivation.

INTEGRATION OF REMOTE SENSING, GPS AND GIS AS TOOLS FOR CONSERVATION AND MANAGEMENT OF CHILIKA – A RAMSAR SITE IN INDIA

R. N. Samal, Ajit K. Pattnaik, Mithun Karmakar, Nihar Ranjan Das

Chilika Development Authority, C-11, B.J.B.Nagar, Bhubaneswar-14

E-mail: rnsamal@hotmail.com

In our real world every event that happens and every object that exists have a locational dimension (i.e. they happen or exist somewhere). So any problem that is related with these real world objects or phenomena are called geographical or geospatial problems. Geographical Information Systems (GIS) an automated set of functions that provides professionals, scientists, citizens with advanced capabilities for the storage, retrieval at will, manipulation and display of geographically located data. But now, with due maturity of the GIS as a branch of information technology, various other tools like Remote Sensing which has been a powerful spin off from space exploration and it has emerged as a useful tool for wetland conservation, planning and management in recent times. Satellite remote sensing provides reliable and accurate information on wetland resources following the synoptic and multi-spectral coverage of Wetlands and also with the advent of time there are improvements in space borne sensor technology in terms of spatial resolution, swath coverage, radiometric, spectral and temporal resolutions. India recently launched its third generation of IRS series satellites viz., IRS-P6 (Resourcesat-1) with AWIFS (56m resolution and 10 bits radiometric resolution) sensors and Global Positioning System (GPS) have converged with GIS to create a new dimension for geospatial planning and problem solving processes. The Chilika lagoon is regarded as most valuable resources due to its rich bio-diversity, productivity and ecological & cultural values and also functions. Most importantly, the highly productive eco-system of the lagoon with its rich fishery resources sustains the livelihoods of more than 0.20 million local community who live in and around the lagoon. On the banks of the lagoon lie 8 large towns and 122 villages. About 70 percent of this population depends upon fishing as the only means of livelihood. Fisheries directly support a population of more than 0.20 million people and associated industries and marketing operations support at least another 50,000. Based on its rich biodiversity and socio-economic importance, Chilika Lagoon was designated by the Government of India as a Ramsar site in 1981, under the Convention of Wetlands of International Importance especially as Waterfowl Habitat, popularly known as the Ramsar Convention. Now a day there is a global concern for its preservation and sustainable management. For sustainable and wise use of the Chilika lagoon there is a need to know the processes that is taking place in the wetlands eco-systems, like the physical, Chemical and biological changes, which are taking place. To monitor these changes over space and time and to simulate them so that management strategies can be supported by valuable

reliable information base. In this regard, the integration of Remote Sensing, GPS and GIS have proved to be very effective and useful tools for better management and conservation of the Chilika eco-system. The present study is a review of works that had been carried out at Chilika Development Authority (CDA), where an attempts has been made to present a synoptic picture of integrated applications of Remote Sensing, Global Positioning System (GPS) and Geographical Information System (GIS) for monitoring and management of Chilika lagoon eco-system effectively.

RESPONSE OF BRAKISH WATER LAKE TO FRESH WATER DISCHARGE

J. Sinha¹, B. Gopikrishna², C.N. Kanetkar³, L.K. Ghosh⁴

Research Officer¹, Research Assistant², Joint Director³, Additional Director⁴

Central Water and Power Research Station,

Khadakwasla RS, Pune – 411 024

¹Email: jsinha_cwprs@yahoo.com

Chilika Lake is the largest brakish water lagoon located along the east coast of India. It is connected to the Bay of Bengal on the east side through an inlet. The salinity of the lake increases due to tidal influx from the sea. On the north side of the lake, several rivers of Mahanadi delta fall into the lake. During monsoon season, the high flood discharge from these rivers fall into the lake resulting in reduction of salinity of the lake. A cycle of regression and intrusion of salt water from the sea continues and as a consequence the strength of lake salinity changes continuously. A barrage near Naraj is under construction in the river Mahanadi to regulate flows of fresh water into the lagoon. In order to maintain the lake salinity and minimize the sediment load to the lake various operational scenarios were examined. The response of fresh water on the lake salinity was investigated through a 2D mathematical model for two options of operations. For this purpose software MIKE 21, developed by DHI, Denmark, was used. The flow field and the salinity distribution were simulated for a period of 22 months starting from November 2000 through September 2002 and the results of salinity distribution in the lake were obtained at the end of each month. It was observed from the results that the salinity was maximum at the middle of the lake near the tidal inlet and was gradually reduced on the northern and southern sides of the lake. The minimum salinity was observed on the northern side of the lake. This was mainly due to the prevalence of very low velocity in the lake. In monsoon months the salinity was comparatively less than that in non-monsoon months due to the fresh water discharge entering into the lake. The salinity zones were observed to reduce due to accelerated dilution caused by fresh water inflows. The salinity distribution under operating condition of the two options has been examined. It is observed that even with the controlled discharge under operating condition of both the options the lake gains salinity during non-monsoon months and the salinity is washed out.

With compliments from

FALCON MARINE EXPORTS LTD.

Bhubaneswar, India

