



第十一届世界生命湖泊大会  
11<sup>th</sup> International Living Lakes Conference

## 湖泊保护与农业协调发展

*Sustainable Lake Management  
Balancing Agriculture and Lake Protection*

October 29 — November 2, 2006

2006年10月29日—11月2日

中国·江西  
JIANGXI CHINA



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# 第十一届世界生命湖泊大会

11<sup>th</sup> International Living Lakes Conference

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# **INFORMATION**

## ***Information about the Conference***

### **Distinguished leaders and delegates:**

Welcome to attend the 11th World Living Lake Conference. In order to have a safe, happy and convenient stay during the conference, please pay attention to the following information:

#### **1 Timetable**

Breakfast: 7:00~8:30

Meeting in the morning: 9:00~12:45

Lunch: 12:45~14:00

Meeting in the afternoon: 14:00 (14:30)~19:00

Dinner: 19:30

Dining place:

- Breakfast, lunch and dinner (buffet, with meal coupons of the meeting), the first floor;
- Banquet on October 31: the second floor and Sky Lounge on the fourth floor of the hotel at 19:30.

#### **2 Meeting services, phone numbers and other contact ways you may need**

##### **2.1 Meeting services**

- 1) The secretariat is set in the Daphne Hall on the third floor of the hotel, equipped with computers, providing Internet service and related meeting services for the delegates;
- 2) Enquiry desk and information bulletin are set in the Lobby of the Hotel to provide you with meeting services. Please pay attention to relevant announcement of meeting information on the bulletin.
- 3) Volunteers are available to provide meeting services and interpretation services to the delegates.

##### **2.2 Telephone numbers and other contact ways you may need**

Secretariat: room No.: 1206 phone number: 0791-8521888-1206  
Medical service: room No.: 1205 phone number: 0791-8521888-1205

##### **2.3 Contact and telephone numbers in emergency**

Yan Bangyou Telephone number: 13970937780  
Liu Meiyong Telephone number: 139770087317  
Chen Qui Telephone number: 13970861668

## **2.4 The hotel address and phone numbers you may need**

The Lakeview Hotel you stay is located at 99, Hubinnan Road, Nanchang City, Jiangxi Province

A. Telephone exchange: 0791-8521888  
Fax number: 0791-8521999  
Reception: 0791-8521888-3

B. Phone number of room service: dial “7”;

C. How to use the telephone:

(1) Between rooms, dial “0”, the operator will exchange the line;

(2) When calling the room from outside lines, dial “0086-791-8521888”, the operator will exchange the line to your room;

## **3 Major Events of the Conference**

1) Welcome banquet host by the People’s Government of Jiangxi Province

Time: 19:30 on October 31

Location: Sky Lounge on the fourth floor of Lakeview Hotel

The guests are required to go to the banquet on time in formal suits with the invitations.

2) Exhibition of the Conference at 19:30 on November 1;

Location: Lily Room on the second floor of Lakeview Hotel;

3) Culture performance at 20:30 on November 2 and a Farewell Dancing Party after the culture performance.

Location: Sky Lounge on the fourth floor of Lakeview Hotel

The guests are required to go to the culture performance on time in formal suits with the invitations.

## **4 Attention**

1) Please wear the Meeting Card during the conference for your convenience to attend the conference, have meals and other relevant activities; Please keep your Meeting Card safely.

2) Rooms of all the delegates are arranged uniformly. In order to keep contact smoothly, please do not change rooms by yourselves.

3) Please set your mobile phone at quiet, vibration or off state when the meeting is ongoing.

4) After the meeting, the delegates are required to return the room cards to the Reception before departure from the hotel.

5) Please contact the secretariat if you need Muslim’s meals.

6) The delegates themselves shall pay such expenses as telephone call and laundry services occurred in the hotel; please contact the room service center of the hotel if you need the local and long-distance call services.

7) Please go to the secretariat of the conference for ticket-booking after your returning time and train or flight number are fixed The deadline for booking service is 18:00 on

November 1, 2006; You can also book ticket in the Business Center on the first floor of the Hotel. Telephone number: 0791-8521888-238.

- 8) Seeing-off services to the airports/train stations will be provided to the delegates invited by the Conference. For those delegates who need seeing-off services, please register with the secretariat of the conference by 18:00 on November 2; or you can also register taxi booking with the Service Center of the Hotel, with the taxi expenses paid by yourself.
- 9) Other matters for attention:
  - 1) The delegates are required to attend the Conference on time;
  - 2) Please keep your documents and personal things safely;
  - 3) Any comments and suggestions for the Conference are welcome.

Hope you have a good stay!

Secretariat of Conference



(2) 外线给房间打电话时，通过总机转房间号码；

### 三、主要大会活动

- 1、10月31日晚19:30，江西省人民政府招待晚宴；  
地点：五湖大酒店四楼蓝天吧（Sky Lounge）  
请各位嘉宾携带晚宴请柬着正装准时前往参加；
- 2、11月1日晚18:30~19:30，大会展示会（Exhibition）；  
地点：五湖大酒店二楼百合厅（Lily Room）；
- 3、11月2日晚20:30，文艺演出，演出后举行告别舞会；  
地点：五湖大酒店四楼蓝天吧（Sky Lounge）  
请各位嘉宾携带晚会请柬着正装准时参加。

### 四、注意事项

1. 会议期间请您佩戴会务组制发的证件，以方便您参加会议、就餐和参加相关活动；证件请妥善保管。
2. 会议代表住房由会务组统一安排，请勿自行调换。
3. 会议进行中请将手机设置为振动或关闭状态，并请勿在会场外喧哗。
4. 会议结束后，请代表离馆时将房卡交到宾馆总台。
5. 如有需要清真餐饮者，请与会务组联系。
6. 会议期间代表在宾馆内发生的电话费、洗衣费等自理；如需开通市、长途电话，请与酒店客房服务中心联系，费用自理。
7. 与会人员确定返程时间及车次和航班后，请于2006年11月1日晚18:00前到会议会务中心办理预订手续；可在宾馆一层商务中心办理预定手续，联系电话：0791-8521888-238。
8. 大会将在会议期间为会议邀请代表统一安排送机（站）服务，请需要会议提供送机（站）服务的代表于11月2日18:00前，前往大会会务中心办理送机（站）登记；或可与宾馆客房服务中心办理出租车预定手续，出租车费用自理。
9. 其它注意事项：
  - 1) 请各位代表按时参加会议；
  - 2) 请您妥善保管好您的文件和个人物品；
  - 3) 欢迎您对大会提出宝贵意见和建议。

祝您在会议期间生活愉快！

会议秘书处



## Sustainable Lake Management

# Balancing Agriculture and Lake Protection



*About 95 per cent of the world's population of Siberian Crane overwinter at Lake Poyang. It's surrounding reed and swamp areas are an ideal habitat for about 500,000 waders and water fowl. 54 of the 300 occurring bird species are on the Red List of endangered species.*

Lakes and wetlands have many important functions. They provide food, water and habitats for many endangered species. During the last hundred years many lakes, wetlands and reservoirs worldwide have encountered severe deterioration caused by eutrophication and other human activities such as agriculture, fishing, mining and water extraction. Shortage of water supply seriously affects economic development and the well being of the people living in the watershed. Economic development – including agriculture as a major economic factor in many rural areas - and protection of our water resources are intrinsically linked to each other. Sustainable and equitable water management must be balanced with sustainable agriculture in order to ensure that proper nutrition is available for people now and to preserve our resources for future generations.

Poyang-Lake, located in the Jiangxi Province in Southeast China, is the largest freshwater lake and the largest natural water resource in China. The area of the lake is subject to dramatic fluctuations of water levels, shrinking to a tenth of this size in winter. Consequently the diverse mosaic of shallow lakes, mudflats and wet grasslands make Poyang one of the most important bio-diversity sites both in China and worldwide. However the area suffers from

deforestation, draining of wetlands and pollution due to human activities and economic development.

The main objective of the 11<sup>th</sup> Living Lakes Conference is to share experience on how to balance lake protection, economic development and agricultural use of the watershed in sensitive lake and wetland regions in China and worldwide. The conference will focus on the following aspects:

- Policy and Legislation in Lake and Wetland Management;
- Impact of Agriculture and other Economic Activities on the Environment;
- Best Practice Examples and Visions from Sustainable Agriculture and other Economic Activities in Lake Regions;
- Challenges to reach the Millennium Development Goals (MDGs).

**The Conference will include a FAO and UNEP/CMS Seminar on Avian Influenza, Wildlife and Environment with a lively, interactive exchange of views on how to balance agricultural development with the conservation of key habitats for wildlife.**

## Programme of 11<sup>th</sup> Living Lakes Conference

### SUNDAY, 29 OCTOBER 2006 – ARRIVAL DAY

12.00 – 20.00	Arrival at Nanchang International Airport - Bus Shuttle to TianMu Hotspring Resort Departure of Shuttles at 16.00 and 19.00 hours
14.00 – 20.00	Registration and Check-in at TianMu Hotspring Resort
20.00	Dinner (Snack provided for participants arriving late)

### MONDAY, 30 OCTOBER 2006 – GUIDED FIELD TRIP – DAY I

7.00 – 8.00	Breakfast at TianMu Hotspring Resort
8.00 – 11.50	Field Trip to Lushan Mountains Bus departs from TianMu Hotspring Resort
11.50 – 12.50	Lunch
12.50 – 14.30	Field Trip to Lushan Botanic Garden
14.30 – 17.30	Field Trip to Rural Development Project
17.30	Arrival at TianMu Hotspring Resort
19.00	Welcome Dinner by MRL Development Committee: Barbecue and Tea-making Performance  Welcome Remarks - <b>Prof. Zhengpeng Hu</b> , Standing Deputy Director of MRL Committee and Vice Governor of Jiangxi Provincial Government

### TUESDAY, 31 OCTOBER 2006 – GUIDED FIELD TRIP – DAY II

7.00 – 8.00	Breakfast at TianMu Hotspring Resort and Check-out
8.00 – 12.30	Field Trip to Lake Poyang Bus departs from TianMu Hotspring Resort
12.30 – 13.30	Lunch

13.30 – 16.00	Field Trip to Jiangxi Guohong Group Company Limited
16.20	Arrival in Nanchang
16.20 – 19.00	Check-in at Nanchang Lake View Hotel Registration for Participants arriving to Conference only
19.30	Welcome Dinner by Jiangxi Provincial Government
<b>WEDNESDAY, 1 NOVEMBER 2006 – CONFERENCE DAY I</b> <b>Topic: Agriculture and Environmental Problems</b>	
7.00 – 8.30	Breakfast at Nanchang Lake View Hotel
8.00 – 9.00	Conference Registration at Nanchang Lake View Hotel
9.00 - 9.50	<p><b>Opening of Conference</b> Session hosted by Xinxiong Wu, Vice-Governor of Jiangxi Provincial Government, China</p> <ul style="list-style-type: none"> <li>- <b>Zhiquan Huang</b>, Governor of Jiangxi Province</li> <li>- <b>Zongze Wu</b>, Vice-Minister, Ministry of Science and Technology, P.R.China</li> <li>- <b>Xiaojian Fan</b>, Vice-Minister, Ministry of Agriculture, P.R.China</li> <li>- <b>Guangyao Zhu</b>, Vice-Minister, State Environmental Protection Administration of China</li> <li>- <b>Siyi Hu</b>, Vice-Minister, Ministry of Water Resources, P.R.China</li> <li>- <b>Xuemin Zhao</b>, Vice-Minister, State Forestry Administration of China</li> <li>- <b>Marion Hammerl</b>, President, Global Nature Fund, Germany</li> </ul>
9.50 – 10.45	<p><b>Keynote Presentations: Balancing Agriculture and Sustainable Development of Lakes and Wetlands</b></p> <ul style="list-style-type: none"> <li>- <b>Prof. Hartmut Vogtmann</b>, President, Federal Agency for Nature Conservation, Germany</li> <li>- <b>Prof. Wenhua Li</b>, Academician, Chinese Academy of Engineering, China Topic: Primary Study on Balancing Agriculture and Sustainable Development of Lakes</li> </ul>
10.45 – 11.15	Photo Session and Coffee Break

11.15 – 12.45	<p><b>Session 1: Policy and Legislation on Lake and Wetland Management</b></p> <p>Moderator: Prof. Guishan Yang, Director of Nanjing Institute of Geography &amp; Limnology, Chinese Academy of Sciences</p> <ul style="list-style-type: none"> <li>- <b>Prof. Manfred Niekisch</b>, <i>International Union for the Conservation of Nature (IUCN), Germany</i>. Topic: Sustainability: a key word in lake management and agriculture?</li> <li>- <b>Prof. Zhengpeng Hu</b>, <i>Deputy Director of MRL Committee and Vice Governor of Jiangxi Provincial Government</i> Topic: Lake Poyang - The Balance between Agriculture and Integrated Lake Basin Management.</li> <li>- <b>Mike Ounsted</b>, <i>Chair, Wetland and Livelihoods Working Group, UK</i>. Topic: Sustainable Lake and Wetland Management as a Tool to Preserve Biodiversity, Sustain Livelihoods, Improve Nutrition &amp; Health and Reduce Poverty in Developing Countries.</li> <li>- <b>Friedrich Barth</b>, <i>Vice-Chairman, European Water Partnership</i> Topic: New Developments in European Water Policy.</li> </ul>
12.45 – 14.15	Lunch



*The goal of MRLSD is to promote the sustainable development of Lake Poyang through mobilising the participation of local communities and the establishment of partnerships among different stakeholders such as farmers, fishermen, local communities, government agencies and enterprises, to help solve the issues of ecological degradation and poverty.*

14.15 – 15.30	<p><b>Session 2: Agriculture and Sustainable Lake Management</b></p> <p>Moderator: Prof. Xiubin Li, Vice-Director of Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences</p> <ul style="list-style-type: none"> <li>- <b>Daqing Chen</b>, Vice-Director, Yangze River Institute of Fishery Sciences, Chinese Academy of Fishery Sciences. Topic: Aquatic Resources Protection and Reasonable Utilization of Lakes</li> <li>- <b>Dr. Raquel Gutiérrez Nájera</b>, Institute of Environmental Law (IDEA), Mexico. Topic: Irrigation and Pollution – The End of Lake Chapala?</li> <li>- <b>Prof. Xiaohong Wang</b>, Director of Jiangxi Mountain-River-Lake Development Office Topic: Practice and Prospect of Sustainable Development of Poyang Lake Watershed</li> </ul>
15.30 – 16.00	Break
16.00 – 18.00	<p><b>Parallel Workshops I: Agriculture and Impact on Environment</b></p> <p><b>Workshop 1: Reducing Non-Point Pollution and Other Threats Caused by Agriculture Through Management Mechanisms</b> Moderator: Prof. Manfred Niekisch, International Union for the Conservation of Nature (IUCN), Germany</p> <p>Introductory Presentations:</p> <ul style="list-style-type: none"> <li>- <b>Naoko Kimura</b>, International Lake Environment Committee (ILEC), Lake Biwa, Japan</li> <li>- <b>Prof. Linzhang Yang</b>, Vice-Director of Institute of Soil Science, Chinese Academy of Sciences, China</li> <li>- <b>Prof. Fengyan Huang</b>, Director of Jiangxi Livestock Management Bureau, China</li> </ul> <p><b>Workshop 2: Balancing Irrigation and Ecological Minimum Water Level</b> Moderator: Haoming Huang, Director China Association for NGO Cooperation (CANGO), China</p> <p>Introductory Presentations:</p> <ul style="list-style-type: none"> <li>- <b>Gidon Bromberg</b>, Israeli Director, Friends of the Earth Middle East (FoEME), Dead Sea, Israel, Jordan, Palestine</li> <li>- <b>Prof. Lida Weng</b>, Director of Changjiang Water Resources Commission of the Ministry of Water Resources, China</li> <li>- <b>Prof. Wenjie Zhang</b>, President of Academy of Science for Water Conservancy of Jiangxi Province, Lake Poyang, China</li> </ul>

	<p><b>Workshop 3: Establishment of Sustainable Forms of Aquaculture</b> Moderator: Dr. Danielle Krebs, YK-Rasi, Mahakam Wetlands, Indonesia</p> <p>Introductory Presentation:</p> <ul style="list-style-type: none"> <li>- <b>Lennie Santos-Borja</b>, Chief of Research and Development Division, Laguna Lake Development Authority, Laguna de Bay, Philippines</li> <li>- <b>Prof. Shaofei Guan</b>, Director of Aquaculture Administrative Management Bureau of Jiangxi Province, Lake Poyang, China</li> </ul>
18.00 – 18.30	Break
18.30 – 19.30	<p><b>Exhibition Presentation</b></p> <p>Opening Speech</p> <ul style="list-style-type: none"> <li>- <b>Dr. Fiorello Primi</b>, Representative of the President of the Province Perugia, Italy</li> <li>- <b>Dr. Prof. Bangyou Yan</b>, Vice-Director of Jiangxi Mountain-River-Lake Development Office</li> <li>- <b>Guochao Liao</b>, Project Coordinator, WWF Wuhan Office</li> </ul>
19.30	Dinner
	<p>GNF and MRLSD are carrying out sustainable agricultural projects in order to present alternatives to the unremunerated cultivation of rice and fishing to the rural population. An innovative pilot scheme for the use of the wild grass Lihao and Lotos has successfully been launched and shall be transferred to other lake regions. MRLSD will support this project and foster extensive cattle breeding in order to create a lasting source of income for the rural poor.</p>
<p><b>THURSDAY, 2 NOVEMBER 2006 - CONFERENCE DAY II</b> <b>Topic: Agriculture and Sustainability Approaches</b></p>	
7.00 – 8.30	Breakfast at Nanchang Lake View Hotel
9.00 – 9.45	<p><b>Vision of Sustainable Lake Basin Management</b></p> <p>Hosted by Prof. Honglie Sun, Academician, Former Standing Vice President of Chinese Academy of Sciences</p>

	<ul style="list-style-type: none"> <li>- <b>Summarization of Yesterday's Parallel Workshops</b></li> </ul> <p><b>Keynote Presentations:</b></p> <ul style="list-style-type: none"> <li>- <b>Prof. Qiguo Zhao</b>, Academician, Chinese Academy of Sciences. Topic: Problems of Fresh-Water Lakes in Southeast China and the Sustainable Development of Poyang Lake</li> <li>- <b>Rainer Baake</b>, CEO Deutsche Umwelthilfe. Former Vice Minister for the Environment of Germany</li> </ul>
9.45 – 12.30	<p><b>Session 3: Avian Influenza, Wildlife and Environment</b> Moderator: Dr. Taej Mundkur. Wetlands International - South Asia</p> <ul style="list-style-type: none"> <li>- <b>Dr. Peter Bridgewater</b>, Executive Director Ramsar Topic: Healthy Lakes &amp; Wetlands and Healthy people</li> <li>- <b>Marco Barbieri</b>, Scientific &amp; Technical Officer, UNEP/CMS Secretariat. Topic: Avian Influenza, Wildlife and the Environment</li> </ul> <p>Coffee Break</p> <ul style="list-style-type: none"> <li>- <b>Dr. Wolfgang Fiedler</b>, Max Planck Institute for Ornithology, Germany. Topic: Risk Assessment and the Role of Wild Birds</li> <li>- <b>Dr. Vincent Martin</b>, Food and Agriculture Organization of the United Nations (FAO), Italy. Topic: Highly Pathogenic Avian Influenza and Social Economic Impact</li> <li>- <b>Dr. Scott Newman</b>, FAO, Italy. Topic: Fishfarming - Are we Promoting the Spread of Avian Influenza?</li> </ul>
12.30 – 14.00	Lunch Break
14.00 – 15.30	<p><b>Session 4: Best Practices in Sustainable Agriculture and Other Economic Activities in Lake Regions</b> Moderator: Prof. Aitken Clark, Vice-President, Global Nature Fund, UK</p> <ul style="list-style-type: none"> <li>- <b>Dr. Lifeng Li</b>, Director Freshwater and Marine Programme, WWF China. Topic: Balance between Agricultural Use of Resources and Protection of Lakes and Wetlands</li> <li>- <b>Patrick Trötschler</b>, Lake Constance Foundation, Germany Topic: Sustainable Farming and Effective Marketing Strategies</li> <li>- <b>Alvaro Casanova</b>, Fundación Global Nature, Spain. Topic: Landscape Preservation and Agricultural Traditions</li> </ul>
15.30 – 16.00	Break

16.00 – 17.30	<b>Parallel Workshops II: Solutions and Best Practice Examples</b>
	<b>Workshop 1: Agriculture and Eco-Tourism</b> Moderator: Marion Hammerl, President, Global Nature Fund, Germany Introduction Presentations: <ul style="list-style-type: none"> <li>- <b>Jorge Cárdenas Robles</b>, <i>President of the Board, Trópico, Lake Titicaca, Bolivia</i></li> <li>- <b>Dr. Gábor Molnár</b>, <i>Managing Director, Lake Balaton Development Coordination Agency, Lake Balaton, Hungary</i></li> </ul>
	<b>Workshop 2: Agriculture and Renewable Energy Technologies</b> Moderator: Jörg Dürr-Pucher, Global Nature Fund, Germany Introduction Presentation: <ul style="list-style-type: none"> <li>- <b>Prof. Herick Othieno</b>, <i>Osienala, Lake Victoria, Kenya.</i></li> <li>- <b>Rensheng Fang</b>, <i>Director of Jiangxi Rural Energy Office.</i></li> </ul>
	<b>Workshop 3: Public Private Partnership and Community Participation</b> Moderator: Jika Mendoza-Dalupan, Unilever Philippines Introduction Presentation: <ul style="list-style-type: none"> <li>- <b>Johann Senner</b>, <i>Landscape Architect, Germany &amp; China</i></li> <li>- <b>Haoming Huang</b>, <i>Director of China Association for NGO Cooperation (CANGO), China</i></li> </ul>
17.30 – 18.00	Break
18.00 – 18.45	Closing Programme <b>Best Conservation Practice Award Ceremony</b> <b>Poyang Lake Protection Declaration</b> <b>Initiation for Establishing China Living Lakes Network</b> Closing Remarks: <ul style="list-style-type: none"> <li>- <b>Udo Gattenlöhner</b>, <i>Executive Director, Global Nature Fund, Germany</i></li> <li>- <b>Prof. Zhengpeng Hu</b>, <i>Deputy Director of MRL Committee and Vice Governor of Jiangxi Provincial Government, China</i></li> </ul>
20.00	Cultural Performance, Farewell Party
<b>FRIDAY, 3 NOVEMBER 2006 – DEPARTURE DAY</b>	
7.00 – 8.30	Breakfast and Shuttle to Nanchang International Airport

## Hosts and Contact Addresses of Conference Team

### Conference Organisers



## 第十一届世界生命湖泊大会

11<sup>th</sup> International Living Lakes Conference

The 11<sup>th</sup> Living Lakes Conference 2006 is hosted by the Global Nature Fund (GNF) and our Living Lakes partner organisation Promotion Association for Mountain-River-Lake Regional Sustainable Development (MRLSD) and in collaboration with Office of Mountain-River-Lake Development Committee of Jiangxi Province (MRLDO) and the Government of the Jiangxi Province, China. The event is organised in partnership with the United Nations Environmental Programme (UNEP)/Convention on Migratory Species (CMS), Food and Agriculture Organization of the United Nations (FAO) and WWF China Programme Office.

Headquartered at Lake Constance, Germany, the Global Nature Fund (GNF) is an independent, international non-profit foundation for the protection of the environment and nature. The Living Lakes partnership was launched by GNF in 1998.

Promotion Association for Mountain-River-Lake Sustainable Development of Jiangxi Province (MRLSD) is a non-profit and non-government organization founded in 1999. Its purpose is to promote the sustainable development of China's largest freshwater lake, Poyang Lake, and its watershed.

The Office of Mountain-River-Lake Development Committee of Jiangxi Province (MRLDO) is a quasi-department of the provincial government affiliated with the Science & Technology Department (STD) of Jiangxi province. It was established in 1985 to institutionalize a holistic approach and to promote sustainable development in the Poyang watershed (MRL region).



### **MRLSD**

Promotion Association for Mountain-River-Lake Regional Sustainable Development

MRL Office Building

Contact persons: Meiyong Liu, Kui Chen

Phone: + 86 - 791 - 62 71 - 022, 6288-748

Fax: + 86 - 791 - 62 88 - 747

E-mail: [llc-china@mrl.org.cn](mailto:llc-china@mrl.org.cn), or [meiyongliu@vip.sina.com](mailto:meiyongliu@vip.sina.com)



### **MRLDO**

Office of Mountain-River-Lake Development Committee of Jiangxi Province

Contact persons: Bangyou Yan

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## 第十一届生命湖泊大会会议议程

### 到达日，2006年10月29日，星期日

12.00 – 20.00	<b>到达南昌国际机场，乘车前往星子天沐温泉宾馆</b> 出发时间为16点至19点之间
14.00 – 20.00	<b>代表注册并入住天沐温泉宾馆</b>
20.00	<b>晚餐</b> 为晚到者提供快餐

### 第一天——实地考察，2006年10月30日，星期一

7.00 – 8.00	<b>早餐（天沐温泉宾馆）</b>
8.00 – 11.50	<b>实地考察庐山</b> 乘汽车离开天沐温泉宾馆
11.50 – 12.50	<b>午餐</b>
12.50 – 14.30	<b>参观庐山植物园</b>
14.30 – 17.30	<b>实地考察农村发展项目</b>
17.30	<b>返回天沐温泉宾馆</b>
19.00	<b>江西省山江湖委宴请：野外烧烤、茶艺表演(住天沐温泉宾馆)</b>  <b>致欢迎词：</b> 胡振鹏，教授，江西省人民政府副省长，江西省山江湖开发治理委员会常务副主任

### 第二天——实地考察，2006年10月31日，星期二

7.00 – 8.00	<b>早餐，代表退房</b>
8.00 – 12.30	<b>实地考察鄱阳湖</b> 乘汽车离开天沐温泉宾馆

12.30 – 13.30	午餐
13.30 – 16.00	考察江西国鸿集团
16.20	抵达南昌
16.20 – 19.00	入住南昌五湖大酒店 会议代表报到注册
19.00 – 19.30	省领导接见中外重要嘉宾
19.30	江西省人民政府宴请中外参会代表
<b>大会第一天，2006年11月1日，星期三</b>	
7.00 – 8.30	早餐（南昌五湖大酒店）
8.00 – 9.00	会议代表报到注册
9.00 – 9.50	<p><b>开幕式</b></p> <p>主持人：吴新雄，江西省委副书记、省人民政府常务副省长（待定）</p> <ul style="list-style-type: none"> <li>• 江西省人民政府省长黄智权致辞（待定）</li> <li>• 吴宗泽，科技部党组成员，纪检组长致辞</li> <li>祝光耀，国家环保总局副局长致辞</li> <li>范小建，农业部副部长致辞</li> <li>赵学敏，国家林业局副局长致辞</li> <li>胡四一，水利部副部长致辞</li> <li>• 德国全球自然基金主席 Marion Hammerl 致辞</li> </ul>
9.50 – 10.45	<p><b>主旨报告：协调农业与湖泊及湿地的可持续发展</b></p> <ul style="list-style-type: none"> <li>• Hartmut Vogtmann 教授，德国联邦自然保护局主席（副部级）</li> <li>• 李文华，研究员，中国工程院院士 主题：湖泊保护与农业协调发展的初步思考</li> </ul>
10.45 – 11.15	大会合影、茶歇
11.15 – 12.45	<p><b>大会专题发言 1：湖泊和湿地管理的政策与法规</b></p> <p>主持人：杨桂山，研究员，中国科学院地理与湖泊所所长</p> <ul style="list-style-type: none"> <li>• Manfred Niekisch, 教授，国际自然保护联盟副主席，德国。 主题：可持续性：湖泊管理与农业的重要话题</li> <li>• 胡振鹏，教授，江西省人民政府副省长，江西省山江湖开发</li> </ul>

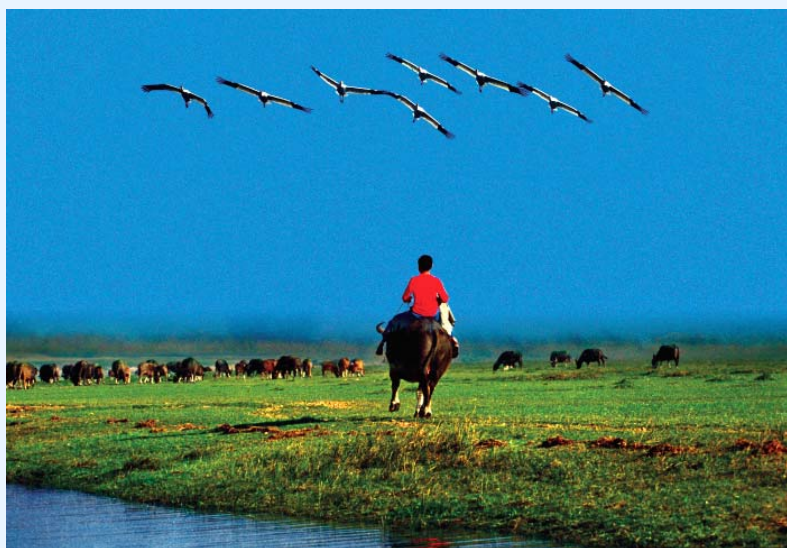
	<p>治理委员会常务副主任 主题：鄱阳湖保护与农业可持续发展</p> <ul style="list-style-type: none"> <li>• Mike Ounsted, 湿地与生计协会主席，英国。 主题：湖泊和湿地的可持续管理——发展中国家保护生物多样性、持续生计、改善营养和健康以及减少贫困的手段</li> <li>• Friedrich Barth, 欧盟水伙伴副主席 主题：欧盟水政策的新发展</li> </ul>
12.45 – 14.15	午餐



*The goal of MRLSD is to promote the sustainable development of Lake Poyang through mobilising the participation of local communities and the establishment of partnerships among different stakeholders such as farmers, fishermen, local communities, government agencies and enterprises, to help solve the issues of ecological degradation and poverty.*

14.15 – 15.30	<p><b>大会专题发言 2：农业与湖泊可持续管理</b></p> <p>主持人:李秀彬, 研究员, 中国科学院地理科学与技术研究所副所长</p> <ul style="list-style-type: none"> <li>• 陈大庆, 副所长, 中国水产科学研究院长江水产研究所 主题: 湖泊水生生物资源保护与合理利用</li> <li>• Raquel Gutiérrez Nájera 博士, 墨西哥环境法研究所 主题: 灌溉与污染— Chapala 湖的消亡</li> <li>• 王晓鸿, 研究员, 江西省山江湖办主任 主题: 鄱阳湖流域可持续发展的探索与展望</li> </ul>
15.30 – 16.00	<p><b>茶歇</b></p>
16.00 – 18.00	<p><b>分组讨论：农业及其对环境的影响</b></p> <p><b>研讨会 1：如何通过改善管理机制减少由农业生产造成的面源污染及其他威胁</b></p> <p>主持人: Manfred Niekisch 教授, 国际自然保护联盟副主席</p> <p>报告:</p> <ul style="list-style-type: none"> <li>• Naoko Kimura, 国际湖泊环境委员会, 琵琶湖, 日本</li> <li>• 杨林章, 研究员, 中国科学院土壤所副所长 主题: 太湖地区农村面源污染的防治技术与管理</li> <li>• 黄峰岩, 局长, 江西省畜牧兽医局局长 主题: 江西农业面源污染及其控制</li> </ul> <p><b>研讨会 2：如何协调灌溉和生态需水</b></p> <p>主持人: 黄浩明, 中国国际民间组织合作促进会秘书长</p> <p>报告:</p> <ul style="list-style-type: none"> <li>• Gidon Bromberg, 中东之友 (FoEME), 死海, 以色列, 约旦, 巴勒斯坦</li> <li>• 翁立达, 中国水利部长江流域水资源保护局教授级高工, 长江论坛秘书长 主题: 长江流域生态水需求的初步研究</li> <li>• 张文捷, 教授级高工, 江西省水利科学研究院院长 主题: 江西农业可持续发展的水资源保障及对策</li> </ul> <p><b>研讨会 3：如何建立可持续水产业模式</b></p> <p>主持人: Danielle Kreb, YK-Rasi, Mahakam 湿地, 印尼</p> <p>报告:</p> <ul style="list-style-type: none"> <li>• Lenni Santos-Borja, 菲律宾 laguna 湖流域管理局 主题: 可持续渔业养殖—亚洲经验</li> </ul>

	<ul style="list-style-type: none"> <li>官少飞，教授，江西省农业厅水产管理局局长 主题：鄱阳湖渔业可持续发展战略研究</li> </ul>
18.00 – 18.30	<b>茶歇</b>
18.30 – 19.30	<b>会议展示：</b> 参展单位代表发言 <ul style="list-style-type: none"> <li>--Fiorello Primi 博士，意大利佩鲁贾省省长代表</li> <li>--鄱帮有博士，江西省山江湖办公室副主任</li> <li>--廖国朝，项目协调员，世界自然基金会武汉办公室</li> </ul>
19.30	<b>晚餐</b>



*GNF and MRLSD are carrying out sustainable agricultural projects in order to present alternatives to the unremunerated cultivation of rice and fishing to the rural population. An innovative pilot scheme for the use of the wild grass Lihao and Lotos has successfully been launched and shall be transferred to other lake regions. MRLSD will support this project and foster extensive cattle breeding in order to create a lasting source of income for the rural poor.*

**大会第二天，2006年11月2日，星期四**

7.00 – 8.30	<b>早餐（南昌五湖大酒店）</b>
9.00 – 9.45	<b>流域可持续管理展望</b> 主持人：孙鸿烈，研究员，中国科学院院士，原中国科学院常务副院长  <b>总结前一天分组讨论结果</b>  主旨报告： <ul style="list-style-type: none"> <li>赵其国，研究员，中国科学院院士 主题：中国东南部淡水湖泊及鄱阳湖可持续发展</li> <li>Rainer Baake，德国环境基金执行主任，前德国环境部副部长</li> </ul>
9.45 – 12.30	<b>专题发言 3：禽流感、野生动植物和环境</b>

	<p>主持人: Taej Mundkur 博士, 南亚国际湿地</p> <ul style="list-style-type: none"> <li>• Peter Bridgewater 博士, 湿地公约局执行主任 主题: 健康的湖泊与湿地, 健康的人民</li> <li>• Marco Barbieri, 联合国环境计划署/迁徙动物保护协定秘书处 (UNEP/CMS) 项目官员 主题: 禽流感、野生动植物和环境</li> </ul> <p>茶歇</p> <ul style="list-style-type: none"> <li>• Wolfgang Fiedler 博士, Max Planck 鸟类研究学会, 德国 主题: 风险评估与野生鸟类的角色</li> <li>• Vincent Martin 博士, 联合国粮农组织 (FAO), 意大利 主题: 高致病性禽流感与社会经济影响</li> <li>• Scott Newman, 和 Rohana Subasinghe, FAO 主题: 如何预防禽流感的传播</li> </ul>
12.30 – 14.00	<b>午餐</b>
14.00 – 15.30	<p><b>专题发言 4: 湖区可持续农业和其他经济活动的优秀实践</b></p> <p>主持人: Aitken Clark, 教授, 全球自然基金副主席</p> <ul style="list-style-type: none"> <li>• 李利锋博士, 世界自然基金会淡水与海洋项目主任 主题: 协调农业资源利用和湖泊湿地的保护</li> <li>• Patrick Trötschler, 德国康斯坦茨湖基金会 主题: 可持续农业和有效的市场策略</li> <li>• Alvaro Casanova, 全球自然基金会, 西班牙 主题: 景观保护与农业传统</li> </ul>
15.30 – 16.00	<b>茶歇</b>
16.00 – 17.30	<p><b>分组讨论: 解决方案与最佳实践案例</b></p> <p><b>研讨会 1: 农业与生态旅游</b></p> <p>主持人: Marion Hammerl, 全球自然基金, 德国</p> <p>报告:</p> <ul style="list-style-type: none"> <li>• Jorge Cárdenas Robles, 董事会主席, Trópico, Titicaca 湖, 玻利维亚</li> <li>• Gábor Molnár 博士, Balaton 湖发展协调局, Balaton 湖, 匈牙利</li> </ul> <p><b>研讨会 2: 农业与可再生能源技术</b></p> <p>主持人: Jörg Dürr-Pucher, 全球自然基金, 德国</p> <p>报告:</p> <ul style="list-style-type: none"> <li>• Herick Othieno 教授, Osienala 维多利亚湖, 肯尼亚</li> <li>• 方仁声, 研究员, 江西省农村能源办公室主任</li> </ul>



	主题：建立沼气生态模式，综合防治面源污染
	<p><b>研讨会 3：公共私营部门的合作伙伴关系和社区参与</b></p> <p>主持人：Jika Mendoza-Dalupan, 菲律宾联合利华</p> <p>报告：</p> <ul style="list-style-type: none"> <li>• Johann Senner, 中德园艺师 主题：中国南宁的湿地恢复</li> <li>• 黄浩明, 中国国际民间组织合作促进会秘书长</li> </ul>
17.30 – 18.00	<b>茶歇</b>
18.00 – 18.30	<p><b>闭幕式</b></p> <p><b>“最佳保护成就奖”颁奖仪式</b></p> <p><b>鄱阳湖保护宣言</b></p> <p><b>成立中国生命湖泊网倡议书</b></p> <p>致闭幕词：</p> <ul style="list-style-type: none"> <li>• Udo Gattenlöhner, 执行主任, 全球自然基金会, 德国</li> <li>• 胡振鹏, 副省长, 江西省人民政府</li> </ul>
20.00	<b>文艺晚会</b>
<b>2006 年 11 月 3 日, 星期五, 代表返回</b>	
7.00 – 8.30	<b>早餐, 乘汽车前往南昌国际机场</b>

## AVAILABLE SPEAKER'S ABSTRACTS

### 会议主要发言摘要

#### ***Opening Speech***

##### ***Marion Hammerl***

President of Global Nature Fund  
Fritz-Reichle-Ring 4, 78315 Radolfzell, Germany  
E-Mail: hammerl@globalnature.org

##### **CV**

**Marion Hammerl** has been President of the GNF since 2002 and the Director of the Lake Constance Foundation since 1997. Additionally, she is co-founder of the ECOCAMPING Association (environmental management for camping sites) and member of the Board of Directors. She is the co-founder and actual president of the Spanish Foundation Fundación Global Nature in Madrid, co-founder of ECOTRANS-España. This organization is a Spanish member of the European network ECOTRANS, which is a network of organizations and experts in 12 European countries dealing with tourism and sustainability.

#### **Dear Guests, Partners and Friends of Living Lakes,**

Climate change and the acute shortage of water are two of the most critical challenges currently facing mankind. China, our host country, has only 7 per cent of the world's fresh water resources to meet 22 percent of the world's population. The international Water Association (IWA) estimates that in China 340 million people, particularly in rural areas, have no access to clean drinking water.

China's Deputy Environment Minister Pan Yue estimates that since the well documented environmental disaster in the Songhua river more than 130 new pollution accidents have occurred.

China has more than 120.000 lakes, 68.000 of them are man-made. What is the value of intact ecosystems and of their protection? What is the value of intact lakes?

In addition to their practical use ecosystems fulfil important additional intangible functions: swamps and forests are able to absorb CO<sub>2</sub>; large rainforests (and their humidity) contribute to the formation of rain clouds, recharge groundwater reservoirs, boost evaporation and thus produce the cooling effects of lakes.

In the scope of the Kyoto Protocol, for the first time, an intangible achievement of an ecosystem was monetarized: The estimated dollar value of the CO<sub>2</sub> absorption of

swamps is 34 US \$ per square kilometre. Next year, a mechanism will be ratified to allow the global trade with the service “CO<sub>2</sub> absorption by intact swamps”.

In our economic system the tangible value of a lake is highly underestimated and its intangible value not monetarized at all. What is the value of adventure, health, spirituality, expressed in money?

What are the ecological and economic damages and consequences of the drying up of Lake Taitema in the Northwest of China? What are the advantages of the protection of Poyang-Hu, China's largest lake und member of the Living Lakes network?

Unfortunately nature is not yet traded on a stock exchange. Yet, we can determine exactly how much it costs to restore nature - provided it is possible to repair the environmental damages at all.

To clean up rivers, restore lakes and to improve water quality is expensive – all these painful experiences we have made in Europe, and responsible individuals in China are aware of it. It is cheaper to prevent damage than to repair it!

It is therefore reasonable and far-sighted to establish programmes such as the Mountain-River-Lake Development-Programme and to support organisations such as our Living Lakes partner MRLSD.

The huge task to protect lakes and wetlands and to provide good water quality can only be achieved through strict regulations, monitoring and cooperation with private initiatives. Our Chinese Living Lakes partner is committed to sustainable development in many sectors, particularly in the field of agriculture. This economic sector is world's largest water consumer and a major polluter through direct and indirect input of nutrients and pesticides in the lake and is responsible for far-reaching impacts on the lake ecosystem.

The results of a survey within the Living Lakes network show that more than 50 % of the lakes are facing serious problems produced by agriculture: soil degradation, unsustainable water withdrawal for irrigation, eutrophication and water pollution by pesticides.

If we leave nature unchanged, we cannot survive. If we destroy it, we perish (Reimar Gilsenbach, 1925-2001).

During this 11th international Living Lakes Conference we will discuss the compatibility of an environment-friendly and socially acceptable agriculture with wetlands protection. We will discuss about water effective agricultural practises, organic agriculture and its promising market development, agro-tourism as a complementary income for farmers and the necessary legal framework and measures to protect lakes and groundwater from agricultural pollution.

Current status analyses and positive examples from lakes in China and from other Living Lakes regions will contribute towards defining practical solutions for the implementation of sustainable agricultural uses.

Even those who live at the water, should not waste the water (Chinese wisdom).

On behalf of all Living Lakes partners and the Global Nature Fund I would like to thank the Provincial Government of Jiangxi, UNEP, International Convention of Migratory Species, Food and Agriculture Organisation of the United Nations (FAO) and our Living Lakes Partner the Association for Mountain-River-Lake Regional Sustainable Development (MRLSD) for the overwhelming hospitality and the excellent organisation of the meeting.

We all admire and appreciate China's rich history and longstanding traditions. If I may echo the words of a Chinese philosopher which seems to sum up the dilemma with which we are all confronted.

'Those who do not look wisely to the future will soon find problems close at hand'

Let us take these words to heart and in doing so, I wish you all a successful and inspiring conference!

Lake Constance, October 2006

## ***Relationships between lake conservation and agriculture development***

***Prof. Wenhua Li***

Academician

Institute of Geographic Science and Natural Resources Research, Chinese Academy of Science

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### ***Abstract***

The lake constitutes a resource with great economic, cultural, and recreational value. Because of global change and irrational utilization of natural resources by human being, the problems of dry-up of lakes, eutrophication, siltation, degradation of ecosystem and loss of biodiversity of most lakes are occurred in China. The main causes of the deterioration of lakes are summarized. Among others, the rapid development of agriculture and irrational uses of lake resources are the main causes leading to the deterioration of lakes. These include application of too much fertilizer (particularly nitrogen and phosphor) and pesticides; excessive application of irrigated water; insufficient wastewater treatment; reclamation of lake to farming land; over-harvesting of fishery resources etc. In order to obtaining sustainable development of the lake ecosystems, a series of recommendations are made. These include: implementation of the concept of scientific development in lake system management; take comprehensive actions at all levels of government to control non-point pollution; applying the concept of the circular economy to guide the agriculture development and develop models of ecological agriculture; raising the efficiency of fertilizer and manure use, reducing the negative environmental impacts of these inputs; strengthening the management capability and legislative institution building; increasing the investment on wastewater

treatment; intensifying the scientific research on water pollution control, especially on non-point pollution; giving farmers the legal right and financial and technical support.

## ***Sustainability, a key word in lake management and agriculture?***

***Prof. Dr. Manfred Niekisch***

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### **CV**

***Prof. Dr. Manfred Niekisch*** was born in Nuremberg, Germany in 1951. He is biologist and worked as Director for Species Conservation at WWF Germany and Executive Director of OroVerde before he became Professor for International Nature Conservation at the University of Greifswald, Germany. In honorary positions he is a member of the Board of the Frankfurt Zoological Society, of the European Centre for Nature Conservation, President of the Board of OroVerde and Vice President of the German League for Nature and Environment, DNR. He is as well President of the Scientific Council on Species Conservation to the Federal Ministry for the Environment. In 2004 he was re-elected as Regional Councillor of IUCN where he is presently also the Chair of the Programme and Policy Committee. He is co-editor of the Journal for Nature Conservation and International Advisor to the Global Exploration Fund of the National Geographic Society. He is fluent in German, English, Spanish and Italian and has worked in many developing countries with stake holders ranging from grass root organisations to governments and multinational institutions. His work focuses on the conservation of biodiversity and the principles of sustainable development.

### **Abstract**

Although re-activated and propagated all over the world more than a decade ago, the concept of sustainability has not led to a turn around in the trends of species extinction, forest destruction, human induced climate change, expansion of destructive forms of land use and in many other fields. At the contrary, it seems that the environmental problems of the world have been increasing more than ever before. It is one of the negative consequences of globalization that consumption patterns and industry in the Northern hemisphere are now affecting directly and more rapidly than ever before the state of natural resources in tropical countries. Vice versa, poverty induced migration from developing countries towards the industrialized world has increased. More and more people risk or even lose their lives when trying to cross the Mediterranean Sea from Africa to Europe or the border between Mesoamerica and the United States. At the end it is the lack of fertile soils and clean water to provoke this stream of refugees. Even within single countries dramatic demographic and social changes are occurring. People migrate from the poor rural areas to the cities. These develop more and more into mega-

cities with a wide range of social conflicts and even war-like situation, as the last months have shown in Sao Paulo, to mention just one example.

All these developments take place while politicians, companies and organizations of the civil society call for “sustainability” or even claim that they follow this principle. So, there must be something wrong. Is it the concept of sustainability itself? Is the concept ok but not properly applied? Is there a communication problem about the “truth” behind sustainability? Are there (and which?) misunderstandings and misinterpretations which can be identified as the main causes for this lack of success? Sustainable development is often misinterpreted as “permanent growth” and increasingly put at risk by the overexploitation of natural resources, as can be seen for example in commercial fisheries as well as in agriculture. Once the reasons for these negative trends are analyzed, it should be possible to find solutions. Can the Convention on Biological Diversity (CBD) offer any help in this respect or is it part of the problem? This international treaty was especially created as a global instrument to make the use of natural living resources ecologically sustainable and socially just. The Bonn Guidelines have been developed exactly to provide guidance in the very complex and complicated field of access and benefit sharing. However, local communities and indigenous organizations as well as many non-governmental organizations are becoming increasingly concerned that CBD has not yet achieved and will not achieve much and therefore is not helpful on the way towards sustainability. Indeed the level and contents of discussion at the CBD Conferences of the Parties (COP) are so that it is extremely difficult for anybody not deeply involved in the negotiations to understand what the issues are and even more difficult to see any progress. Fortunately, this does not only cause frustration. Local communities are trying to achieve sustainability at their own, local level. These “case studies” can provide excellent examples and guidance to others. UNDP’s Equator Initiative is coordinating these very promising efforts and offering a forum for these initiatives. The next CBD COP 2008 in Germany will provide one more global platform for these success stories and the people behind them and hopefully motivate global leaders to make good use of the lessons learned.

If development cooperation and policy want to achieve the main goal, which is poverty reduction., it must aim with the highest priority at the conservation of biological diversity and at the just distribution of benefits over the globe. Given that natural resources are limited, restrictions in their use may be unavoidable but have likewise to be shared fairly and equally. Social, economic and ecological sustainability are not three equal pillars, as biological diversity and ecological sustainability form the basis for any human economy and even for our social systems.

## ***Poyang Lake Protection and Sustainable Agricultural Development***

***Prof. Dr. Zhengpeng Hu***

Vice-Governor of Jiangxi Provincial Government

### ***Abstract***

For solving the problems of water and soil erosion, ecological and environmental degradation, and frequent dry and flooding disasters of Poyang Lake Watershed in the past, the effective methodologies and mechanisms for regional sustainable development have been adopted, tested and applied. With the strategy of combining lake management, river management with economic development, the measures of surveys, experiment and demonstration, technical extension, ecological rehabilitation and environmental construction have been taken widely and orderly for the harmony of ecological protection, environmental construction, social and economic development of the watershed. The economic situation and regional sustainable development capability of the watershed have been greatly improved through these efforts in the past 20 years. The experience shows that lake protection and development should follow the principles of the harmonized economy development and environmental protection, integrated watershed management, doing scientific and technological experiment, demonstration and extension in the light of local situation.

## ***Addressing poverty reduction through wetland biodiversity conservation***

### ***Mike Ounsted***

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### **CV**

**Mike Ounsted** is an independent advisor on environment–development issues, drawing on his extensive experience gained in both the environmental and social sectors throughout the world. Mike was formerly Manager of the Wildfowl & Wetlands Trust at Slimbridge in the UK and later the Trust’s Director of Conservation Development. In 1991, Mike became Programme Manager for the Asian Wetland Bureau in Indonesia and subsequently Director of Programmes for Wetlands International - Asia Pacific. During this time he became increasingly concerned about the socio-economic relationships between wetlands and socially and economically excluded people. From 1998 to 2003 he was the East Asia Regional Director for Oxfam America and developed and led Oxfam International’s programme in the Mekong. In 2004 he was appointed as the first Chair of the Wetlands and Livelihoods Working Group.

### **Abstract**

Many Least Developed Countries sustain significant populations of globally threatened fauna and flora and frequently understand the protection of rare species to be the primary contribution that they can make to the conservation of biodiversity. However, wetland biodiversity is intrinsically linked to the well-being of significant numbers of subsistence fishers and farmers and can provide the nutrition required for good health. Whilst there may be a need for protected areas and conservation management for some rare species, governments should recognise that by taking a more holistic approach to

wetland biodiversity conservation they can make a major contribution to achieving their priority goal of reducing poverty.

### **Introduction**

Many Least Developed Countries (LDCs) sustain significant populations of globally threatened fauna and flora and frequently understand the protection of rare species to be the primary contribution that they can make to the conservation of biodiversity. This perception is partly the result of Northern conservationists pressuring Southern countries to recognise the intrinsic value of rare and threatened species and to act as responsible global citizens by adopting measures to preserve them. The primary response to this global demand is frequently interpreted as a need to establish protected areas.

### **The policy framework**

The governments of most LDCs rank poverty reduction as their overriding national priority, usually accepting World Bank and Development Bank poverty reduction strategy processes and prioritising the poverty reduction targets of the Millennium Development Goals (MDGs). Conserving biodiversity on behalf of the global community may seem to be at odds with national poverty reduction priorities.

Planners and politicians have found the concepts of sustainable development and biodiversity conservation that were adopted by the Earth Summit in 1992 difficult to understand and implement. Nearly 15 years on from Rio there is still no widely shared vision in decision-making circles as to why biodiversity is important or what the overused phrase 'sustainable development' might mean in practice. Yet, together, biodiversity conservation and sustainable development form the foundation for tackling a number of interrelated global issues such as poverty, inequality, hunger and environmental degradation. The Convention on Biological Diversity helped refine the relationship between these two potentially conflicting concepts by framing development and conservation within an ecosystem approach, and defining an ecosystem as an ecological unit in which people are placed firmly at the centre.

The 2001 MDGs and the analyses of the Millennium Ecosystem Assessment adopted another new term – human well-being. MDG1 identifies poverty reduction, measured in terms of human well-being, to be the world's overriding priority, and sets out a series of inclusive and inter-sectoral processes to achieve this aim.

More recently, and within this framework of global policies and strategies, the Ninth Meeting of the Contracting Parties to the Ramsar Convention (COP9) in 2005 adopted a resolution on Wetlands and Poverty Reduction (Resolution IX 14). This significant development is a particular challenge to the Convention's focal points, which have historically been housed in government wildlife, forestry or environmental protection agencies, which may have limited expertise in socio-economic issues.

### **Environmental services and poverty**

Economists argue that the solution to poverty is growth, and that as economies grow governments can invest in cleaner technologies and less resource-depleting processes. Where the economists miss out is in recognising the existence value of the natural environment.



The goods and services generated by wetlands have tended not to be counted in national statistics, and governments, development agencies and donors have often undervalued the potential that natural resources can play in poverty reduction and economic development. However, the MDGs and other government commitments have encouraged a new interest in wetland valuation in recognition of the way that wetland ecosystems perform key hydrological and biological functions that are critical to human well-being and development.

Less well understood, however, is the fact that human well-being depends on the natural functioning of healthy ecosystems and on the health and diversity of all the species within the ecosystem. Human health is therefore increasingly dependent on the conservation of biodiversity, and we are not yet addressing these links with the commitment and urgency needed.

### ***Basic needs and economic growth***

Impoverished communities cannot start to contribute to economic development unless and until their basic needs of potable water, sanitation, shelter and food security are met. Biodiversity contributes to all of these essential life ingredients. Yet even when basic needs are met, it is only when people are in good health that they can claim any level of well-being and can consider empowerment and development options that will lead them out of poverty.

### ***Biodiversity and nutrition***

The importance of biodiversity in the diets of subsistence fisher people, who represent a sizable proportion of the world's most vulnerable and economically excluded people, has rarely been presented as an argument for biodiversity conservation. For these people, the harvest of common wetland fauna and flora for household consumption is essential for balanced physical growth, health and well-being.

Nutritional status is not only linked to sufficient food consumption. A monotonous diet leading to micro-nutrient deficiencies is typical of poor households, especially in fishing communities, and does not provide the physical ability for an adult (or child) to work, or the mental ability to think and plan – not only for today but for the future. Malnutrition during pregnancy leads to low birth weights; satisfactory childhood growth and development require a balanced, nutritious diet. Only an adequately nourished body develops immunity to disease, can fight illness or speed recovery from injury. Health authorities refer specifically to the importance of vitamin A in resisting and recovering from malaria. A well balanced diet strengthens the body's resistance to tuberculosis, which is prevalent in wetland areas; susceptibility to tuberculosis is directly correlated with poverty levels. Wild plants often provide a basis for traditional medicine and healthcare, especially in areas where modern medicine may be unavailable or prohibitively expensive.

### ***The Tonle Sap: nutrition and poverty reduction***

The significance for poverty reduction of the nutritional benefits derived from wetland biodiversity is well illustrated on the Great Lake, Tonle Sap, in Cambodia. Here, a unique hydrological cycle and vast areas of seasonally flooded lowland forest, in a tropical climate, result in a very high biodiversity of fish, reptiles, birds and mammals: the

Tonle Sap is home to over 200 fish species. Part of the lake is designated as a biosphere reserve and listed as a Ramsar site. Tonle Sap therefore holds particular challenges for the implementation of Ramsar Resolution 14 on Wetlands and Poverty Reduction.

The Tonle Sap fisheries influence fish productivity throughout the Lower Mekong Basin, and each of the Lower Mekong riparian states has given poverty reduction, within the framework of national economic growth, precedence in national development plans. Fish consumption in the basin is estimated at 30 kg per person per year, and the total annual yield value is US\$1.4 billion. Sixty per cent of these fisheries are open-capture fisheries, yielding 2.5 million tons a year.

The Tonle Sap fishers themselves (an estimated population of 3 million) have basic, staple diets of rice and fish, supplemented by plant foods gathered from the wild. Most of these people – 15% of all Cambodians – live by fishing alone, whilst 38% of Cambodians are both fishers and small-scale farmers.

By 'fish' what is actually meant is a wide variety of aquatic foods: fish, crabs, water snakes, snails and frogs. Higher and larger aquatic species may be caught for trade but are rarely taken for personal consumption. Whilst rice is the primary starch intake, the diverse aquatic resources contribute the main protein, calcium and other mineral and vitamin intakes of the people.

Malnutrition rates among children under 5 years of age are the highest in Southeast Asia and are characterised by particularly high levels of stunted growth: about 50% of all Cambodian children are stunted and underweight. Maternal malnutrition is also high, with between 14% and 25% of women dangerously underweight.

However, the stress on national growth as the way to alleviate poverty, with its emphasis on yield values and the implication of increasing the trade in natural resources for the economic development of the country as a whole, increases the vulnerability and poverty risk for the 3 million people living on or by the lake.

Increased commercialism has also increased the pressure to intensify aquaculture, where the motivation tends to be profit rather than food. The ability of aquaculture to flourish will depend primarily upon whether the capture fisheries can provide the industry with wild-caught fingerlings. Without appropriate management, capture fisheries are likely to decline much faster than aquaculture can expand, obliterating gains made from fish farming. A frequent misconception about aquaculture is that it is somehow more environmentally appropriate than catching fish in rivers and other wetlands. Unfortunately, this is not the case. A recent global review (of inland waters) concluded that, although habitat degradation and overfishing are major elements contributing to the decline in fish populations, aquaculture presented the greatest threat to biodiversity.

### **Conclusion**

Wetland biodiversity is intrinsically linked to the well-being of significant numbers of subsistence fishers and farmers and can provide the nutrition required for good health. Whilst there may be a need for protected areas and conservation management for some rare species, governments should recognise that by taking a more holistic approach to

wetland biodiversity conservation they can make a major contribution to achieving their priority goal of reducing poverty.

## ***Vision of Sustainable Lake Basin Management***

### ***Rainer Baake***

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### **CV**

**Rainer Baake** was born August 15th, 1955 in Witten, Germany. Mr. Baake has been appointed Federal Executive Director of the Deutsche Umwelthilfe (German Environmental Aid) in September 2006. He is focusing on the issues of climate protection, energy and biodiversity.

Mr. Baake had been State Secretary (Deputy Minister, head of administration) in the German Ministry for the Environment, Nature Conservation and Nuclear Safety from 1998 until 2005. He has been actively engaged in positioning Germany for the international climate negotiations and has taken a leading role within these negotiations. He played a key role in the implementation of both the Convention and the Kyoto-Protocol. He has successfully led the implementation of the EU Emission Trading Scheme in Germany and shaped Germany's national climate change programmes of 2001 and 2005. Under his direction the national strategy for increasing the use of renewable energy sources was developed and implemented. He has been a member of the German Green Cabinet and managed the Ministry for the Environment with about 800 members of staff.

Mr. Baake served on the executive committee of the "Deutsche Bundesstiftung Umwelt" which is one of Europe's largest foundations promoting innovative and exemplary environmental projects.

In 1991 the former State Environment Minister Joschka Fischer appointed Mr. Baake State Secretary in the Hessian Ministry for Environment, Energy and Federal Affairs, a position he held for eight years. Mr. Fischer and Mr. Baake worked closely together in developing strategies for sustainable energy generation and consumption.

1985 Mr. Baake was elected (and in 1991 re-elected) as county commissioner for environment protection, traffic, housing and economic development in Marburg.

Mr. Baake studied at the University of Marburg, Germany and received his Masters degree in national economics.

At the age of 19 Mr. Baake joined "Action Reconciliation, Service for Peace" and served as a social worker and community organizer for 4 years in Chicago, USA.

## **Abstract**

Water is an economic parameter: without water – no prosperity. The per-capita consumption of water is very closely related to the GDP, i.e. USA (382 litres per capita and day), Germany (127), India (25) or Ethiopia (15). Worldwide 6.000 children die every day (!) because of contaminated water, mainly in Africa and Asia.

Coming from a region with few water problems, Germany, we have nonetheless experienced several mistakes in managing water properly over the last decades. Germany is a region with one of the highest population density in the world (232 inh. per km<sup>2</sup>), and so is China (137/km<sup>2</sup>), particularly the Eastern part of China. Together with urbanisation (surface sealing) and increasing CO<sub>2</sub> emissions, the problems of clean drinking water and sustainable agriculture production are the most challenging for our society.

In that respect lake and wetlands play an important role, as they are most vulnerable to eutrophication and toxic contamination caused by non-point run offs from agriculture. The people living and working at Lake Constance learned a painful - and expensive - lesson. Our lake, a drinking water reservoir for 4.5 million people in a very densely populated area (289 inh. per km<sup>2</sup>), was severely threatened by man made problems. Massive growth of algae and deterioration of water quality was the consequence. It was also noted that the number of migratory birds decreased – and so was the number of visitors and tourists coming to the lake. Tourism is a very important economic factor to the region – hence a large attempt by all three riparian countries was started to tackle this problem. In the end more than 2.000 Million Euros have been invested over three decades in order to reduce the contamination of the lake water.

Many similarities can be seen between Lake Constance and Lake Poyang. Poyang lies in a rural environment with a high population and is mainly exposed to problems caused by agriculture and sewage rather than industrialisation. The Poyang watershed is a diverse and attractive region with a good potential for nature tourism. Therefore some experiences from Europe can be transferred.

What is the lesson learnt? That precaution would have been much cheaper? Most likely! I am convinced that that the Poyang region has the potential to be the spearhead of a sustainable movement in China – in the field of organic agriculture, sustainable fishery as well as sustainable tourism and renewable energies. As we can see on the occasion of this conference, there are many allies such as Ramsar, UNEP/CMS and FAO to foster these sustainable developments. And our friends from the Chinese NGOs have enough expertise to put those visions in top practise.

By now organic agriculture is underrepresented in China as well as in funding schemes worldwide. The IFOAM has called on the FAO Council to increase the investments in organic agriculture in order to achieve food security for all and sustain and protect natural resources at the same time. As a consequence the FAO has included organic agriculture as a priority area for interdisciplinary action (PAIA). One aspect includes the aspect of food security in relation to the alarming threats to natural resources and emerging trans-boundary problems such as Avian Influenza. The dramatic growth in domestic poultry production is part of an explanation.

Having experts from Ramsar and UNEP/CMS with us, I am sure that we will hear more about the importance of not only preserving the few remaining wetlands but also restoring lost and degraded wetlands as an effective measure towards reducing the threat of avian flu pandemics. Various surveys prove that we have lost over 70 % of our wetlands and shallow lakes in Central Europe and over 50 % of all wetlands worldwide during the last 100 years. Most of them have been drained in order to gain arable land. This worldwide dramatic loss of wetlands and shallow lakes is forcing many wild birds onto alternative sites like farm ponds and paddy fields, bringing them into closer contact with farm animals, particularly poultry. This close contact of wild birds and poultry is believed to be a major cause behind the spread of bird flu to farm animals and vice-versa.

*“Future management of water must continue to work towards achieving a sustainable balance between water for agriculture and water for natural ecosystems.”*

## **Conservation for the Reeves Shad in the Yangtze River**

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### **Abstract**

The Reeves Shad (*Macrura reevesii*) is an important, anadromous and rare economic fish. In 1974, its annual yield reached 1577 tons. Now, it is on the verge of extinction. The main threat to the survival of this species came from the construction of hydro-electric projects, the pollution of water bodies, and also from the over-fishing. Based on the results of our long-term research work, we proposed four cardinal measures: the establishing of Xiajiang Natural Reserve for the Brood Stock of Reeves Shad, the instituting of Hukou Natural Reserve for the Larvae Stock of Reeves Shad, the establishing of Xiajiang Artificial Propagating and Releasing Station and the prohibiting of fishing of Reeves Shad in the whole Yangtze River.

## **Irrigation and pollution: The end of Lake Chapala?**

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### **CV**

**Dr. Raquel Gutiérrez Nájera** is President of the Environmental Law Institute Civil Association, founding partner and coordinator of the Legal Program and of Politics of the river basin Lerma-Lake Chapala-Santiago-Pacífico Foundation A.C. Professor and investigator of the Department of Studies and Juridical Investigations of the Division of Juridical Studies of CUCSH of the University of Guadalajara, Mexico.

### **Abstract**

Lake Chapala is the biggest lake in the Mexican Republic; it has an extension of 80 kilometers long and 25 kilometers wide.

It is of great importance in the social, cultural, economic and environmental aspects due to the “hydro-environmental” values it has. It represents the most important hydrologic ecosystem in our country, refuge for migratory birds (like the white fish endemic specie), it is also one of the climatic regulators in the metropolitan zone of Guadalajara and it constitutes the base of the water supply for human use in this city. In addition to its landscape beauty the Lake Chapala Rivera has a huge population import, primarily from near towns as Chapala, Jocotepec and Ajijic.

Lake Chapala is part of the VIII hydrological region, considered one of the most important in Mexico, because of the environmental services it provides to 20: 000, 000 twenty millions of inhabitants that direct and indirectly are supplied by this region. Consequently, Lake Chapala cannot be understood side by side with the Lerma-Santiago-Pacífico hydrological region.

The National Water Commission (CAN) which is the authority that regulates the use of the water resource in Mexico, to have a better administrative management of this hydrological region, divides it in two river basins: the Lerma- Chapala and the Santiago-Pacífico.

The river basin Lerma-Chapala has approximately an extension of 51, 887 km<sup>2</sup> and it goes through the states of Mexico, Querétaro, Michoacán, Guanajuato and Jalisco. It is found in the central region of the Mexican Republic and is among the most vulnerable ones due to the need of resources and the availability of water. It has been qualified by the Mexican authorities themselves as a deficient river basin, meaning that more water is being taken than the one it contains, in the same way referring to its quality it has been qualified as one of Mexico’s most contaminated river basins, producing crisis in the part related to Santiago River.

The Lerma-Chapala river basin has two serious problems: one of them is related to the quantity of water and the other to the quality, problems that have been translated into mistaken public politics concerning the river basin management and an absence of rules that favor the restoring, conservation and protection of Lake Chapala.

Concerning the quality of its water, the results of an auditoria regarding “the “hydrometric seasons and the establishment of the environmental frame of the water quality of the Lerma-Chapala river basin” realized by request of the Special Commission Lerma-Chapala river basin of the Chamber of Deputies of the LIX legislation conclude:

“When valuing the quality of water that the Lerma-Chapala river basin presents, it is considered unqualified for the majority of uses in which the regulations in force contemplates them and that stands for both seasons( rain and drought), except for livestock uses, in some points of examination is considered qualified. The pollutants out of the permissible limits were: SAAM, fecal coniforms, helminto eggs, greases and oils, SST, total phosphates, total nitrogen, cyanide, and heavy metals such as cadmium, chromium, mercury, nickel and zinc.

The majority of the pollutants come from residual waters of nearby communities to the flow of water in which they flow into without previous treatment, followed by the residual waters of the agricultural and livestock activity and the industrial activities.”

One of the activities that have caused more impact in a negative way over the Lerma-Chapala river basin has been the agricultural activity which has developed mostly over its high part, which means, in the estates of Guanajuato and Michoacán where the development of agriculture has favored in a way such that the agriculturists of the high Lerma of Guanajuato, have qualified Lake Chapala as an ecosystem that takes water for irrigation from them being their natural competitor.

Truly, the Lerma river basin faces a serious water availability problem which reaches critical proportions due to the derivations of water volumes with agricultural motives. The majority of the programs, plans, studies and agreements of the Lerma-Santiago-Pacífico river basin, concur in that the region has a total volume for uses of consume that ascends to 15,795 Hm<sup>3</sup> and that is distributed in the following manner:

- a) For agricultural and livestock uses are destined 13,189 Hm<sup>3</sup>, which corresponds to 83% of the total volume.
- b) Use for public abastment that includes urban and domestical public, is destined a volume of 2180 hm<sup>3</sup> , that corresponds to 14% of the total volume.
- c) Industrial use that includes services and generation of electricity with the exception of hydroelectrics, is destined 426 hm<sup>3</sup> , that corresponds to 3% of the total volume.

The total irrigation area in the region is of 1:250,000 ha, that are equivalent to 16% of the national total, which includes 13 Irrigation Districts and 12319 Units of Irrigation for Rural Development( Urderales) and 65% of this area is attended through these irrigation units, whose operation, maintenance and administration is in charge of the producers themselves. The total volume used on irrigation ascends to 13,150 hm<sup>3</sup>, of which the Irrigation Districts demand 2893 Hm<sup>3</sup> meaning 22% of the total volume, while in the Units of irrigation the demand is of 10,257 hm<sup>3</sup>, or 78% of the total volume.

It is pertinent to signal that the major extractions for agricultural use are done in Guanajuato and Michoacán, with more than 90% of the medium annual extraction of superficial water and 83% of subterranean water.

Under the previous referent, is that Lake Chapala, began to suffer a water scarcity since not all of the amount of water form the Lerma river is reaching it, adding that its waters are held in the dam system that exist throughout the longitude and wideness of Lerma

River for different uses in which agriculture prevails. Lake Chapala began to lose water since the government of Porfirio Díaz, who took from it about 50,000 ha for agricultural uses, starting the agony of the lake from those days.

The politics in Mexico that come from the Mexican Revolution prioritized the agrarian distribution and the use of water resources through the development of a devastating hydraulic politic which consisted in constructing dams to encourage agriculture and the economical growth. In the 80's in response to the recurrent crisis that depends on the water cycle for its balance, the Mexican authorities began to sign coordination agreements in order to regulate the water use and not to face the farmers in a direct manner was used the conservation of Lake Chapala (1989, 1991, 1993) in a nonspecifically simulated way. Nowadays even though there was a serious crisis in 2002, the authorities kept bargaining on the Lake, in a clear manner for environmental conservation and signed agreements in which Lake Chapala is still depending on the dams being filled first to guarantee the agricultural use and, once having this covered, the natural drips of the dams reach the lake. (agreement, 2005)

In this order of ideas, it is necessary to quote that all of the oficial documents such as the Hidraulical Program and the regional Programs for the river basin, as well as the technical studies that justify Lake Chapala, inform that the agricultural frontier has been growing to in detriment of the lake and that the main competitor of Lake Chapala is the agricultural use.

Undoubtedly the future of Chapala is depending on a hydrical politic that prioritizes the conservation, protection, preservation and restoring of Lake Chapala and of the resources associated with it, from a perspective of integral management and sustainable of river basin, ander the following principles and premises:

- 1.- That a diverse and different of both river basins, Lerma-Chapala and Santiago-Pacífico administration is established.
- 2.- That Master Programs are approved for the use, conservation, protection, preservation y restoring of the river basin Lerma-Chapala and of Santiago-Pacífico on short, medium and long terms, with annual operative plans.
- 3.- A public registry of the water for each river basin where every permits, consents and authorizations of water use in every basin are established.
- 4.- Programs of residual water monitoring and measuring of water in every river basin to order the uses of water in each one.
- 5.-To standardize the federal and state politics regarding the use of water, as well as the regulations that apply to it.
- 6.- To Project Lake Chapala and to constitute it as a place of international protection through adjudging it a Ramsar place.

The future of the river basin Lerma-Santiago-Pacífico relies on the future of Lake Chapala.



## ***Practice and Prospect of Sustainable Development of Poyang Lake Watershed***

***Prof. Xiaohong Wang***

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### ***Abstract***

The Mountain-River-Lake(MRL) Program aims to sustainable development of Poyang Lake and its watershed. The strategy, working principles and methodologies of the program have been developed and practiced based on the local situation in the past two decades. The study on the achievements and the prospect of sustainable development of Poyang Lake and its watershed in the period of 2006-2020, including achievement assessment of the program during the period of 1995-2020, carrying capacity assessment of resources and environment, ecological footprint, sustainability analysis and forecast of Poyang Lake watershed, have been conducted. Considering the experience and lessons of the program, the new strategy, new guidance, short- and long-term plan for sustainable development of Poyang Lake Watershed have been developed Based on the previous studies and local situations.

## ***Technology and Management for the Control of Non-point Pollution in Countryside in Tailake Region,China***

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### ***Abstract***

Tailake region is the most developed area in China, with the development of industry and agriculture, and high GDP value and living standard for local residents. However the environment problems now become the most important factor to slow down the development of local economy, such as air pollution, non-point pollution, soil pollution and eutrophication of lake or river. The main pollutants caused the non-point pollution are the nitrogen and phosphorus which come from run-off in farmland, sewage, sludge and waste materials in countryside. The investigation showed that about 39% of nitrogen was from farmland, 25% from sewage, 13% from garbage, 10% from raising of livestock and 13% from run-off of surface land. Therefore it is very important to control the nitrogen and phosphorus pollution in countryside. For the control the nitrogen and phosphorus released from farmland, it should be considered to reduce the fertilizer input to and runoff from the farmland. It is a practical way to establish a ecological channel to control the nitrogen and phosphorus release from farmland by runoff. About 50% of nitrogen and 70% of phosphorus can be absorbed by plants planted in both walls of

chnenel. For the control the nitrogen and phosphorus release from sewage, a land treatment system should be set up. About 70% of nitrogen and 80% of phosphorus released from sewage can be reduced when the sewage passes through the land treatment system. For the control of garbage from households it is necessary to establish a garbage collecting system in countryside, then to develop a treatment system such as return to farmland, or to take it as the raw materials to produce organic fertilizer.

For the management of nonpoint pollutants in countryside, a management system must be considered. The system includes reasonable fertilization system, garbage collecting system, sewage treatment system, waste material cycling system. And the protection rules for the local environment must be considered for the control the nonpoint pollution in countryside. The most important work for the management and control of nonpoint pollution in countryside is to improve the environmental protection consciousness of residents in countryside.

## ***Agricultural Non-point pollution from the Overuse of Fertilizers and Agro-chemicals and its Control in Jiangxi Province***

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Director general of Jiangxi Livestock and Veterinary Service Bureau

### **CV**

**Huang Fengyan**, male, born in August 1962, graduated from Jiangxi Agricultural University in 1983. Incumbent director general of Jiangxi Livestock and Veterinary Service Bureau, part-time professor of Jiangxi Agricultural University, tutor of postgraduates of animal husbandry economy major, director of the editorial board of Jiangxi Livestock and Veterinary Magazine, member of the Expert Committee of Integrated Agricultural Development of Jiangxi Province, expert team member of the Integrated Agricultural Modernization Project of Jiangxi Province financed by the World Bank, consultant of Associations of Project Consultancy, Pig Production Sector and Poultry Production Sector of Jiangxi Province.

Having engaged in animal husbandry science and technology, economic research, enterprise management and livestock and veterinary administration for many years. Directed many academic research projects. Edited and published many academic monographs. Many academic results won the national and provincial scientific awards.

### **Abstract**

Both the damage and difficulty in controlling the non-point pollution agricultural pollution from the overuse of fertilizers and agro-chemicals is not less than that of the industrial pollution due to its obvious extensiveness, latency, complexity and concealment.

Jiangxi is a province in which proportion of agricultural sector is relatively large. The annual average fertilizers applied in arable land is 525 kg / hm<sup>2</sup>, over 1 times higher than the maximum fertilizers applied in the soil internationally; the annual average agro-

chemicals used is 20.11 kg / hm<sup>2</sup> , increased by 72.8% in 2003 than that of 1993; the plastic sheets used in the whole province in 2003 was 33,900 tons, doubled that in 1993; in addition, about 100 million tons of excreta and urine of livestock and poultry and 50 billion tons of daily life rubbish each year in the rural areas have not been completely treated and controlled. All the above factors have caused the following consequences: pollution of surface and underground water, eutrophication of lakes, ponds and rivers; quality reduction of arable land, noxious residues left on and in the soil, thus causing pollution of crops grown there; air pollution, greenhouse effect and even directly endanger the survival of living things.

The results of environmental quality monitoring have shown that the main pollution indices of ammonia and nitrogen in the five big river systems, which cover the whole province and finally pour into the Poyang Lake, is one to eight times higher than the standards; water quality of 15.3—46.2% of water sections in the whole province is lower than class III; water quality of the Poyang Lake is class IV, reaching medium eutrophication.

In recent years, under the social and economic development guidelines of “ we need gold mountains and silver mountains (money), but we need limpid water and green mountains more”, control of non-point pollution agricultural pollution from the overuse of fertilizers and agro-chemicals in Jiangxi Province has actually been intensified through a range of measures such as strengthening the leadership of the governments, enhancing efforts in law enforcement supervision, monitoring the non-point pollution agricultural pollution from the overuse of fertilizers and agro-chemicals, spreading formula applications based on soil test results, implementing integrated treatment and control of livestock and poultry production pollution and developing eco-agriculture and non-public-harm farm products etc. Nevertheless, the executive, legal, supervisory, security and technological systems and the ecological compensation mechanisms for pollution control are to be improved and completed due to its later start-up, weak foundations and extensiveness as well as differences in understanding and guidelines.

The treatment and control of non-point pollution agricultural pollution from the overuse of fertilizers and agro-chemicals is a complex, arduous and long-term task and a systematic project, which needs various multi-linked countermeasures from many parties. The principles of “planning balanced, prevention first and protection foremost” should be adhered to and the methodology of “control the pollution sources, implement key projects, take effective measures and set up control models” should be adopted; control should be made from specific spots to large areas, focusing on pollution sources and en route control, combining ecological assets with economic benefits; and the eco-agriculture construction should be sped up and integrated prevention and control measures should be implemented in an all-round way

## ***The Dead Sea – A Living Treasure Though still wild and breathtakingly beautiful will it survive?***

**Gidon Bromberg,**  
Israeli Director,

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## CV

**Gidon Bromberg** is the Israeli Director of EcoPeace / Friends of the Earth Middle East. Friends of the Earth Middle East is a unique regional organization that brings together Jordanian, Palestinian and Israeli environmentalists to promote sustainable development and advance peace efforts in the troubled Middle East. The organization has offices in Tel-Aviv, Bethlehem and Amman.

Mr. Bromberg co-founded the organization under the name of EcoPeace in 1994 and has been the Israeli Director ever since.

Mr. Bromberg speaks regularly on water and peace issues including at the UN Commission for Sustainable Development, before the US House of Representatives, International Relations Committee and before an advisory meeting to the UN High Level Panel on Security. Mr. Bromberg is a member of the Israeli inter - ministerial committee on the future of the Dead Sea, of the Israel UNESCO World Heritage Committee and for the inter ministerial committee for Sustainable Development in Israel.

Mr. Bromberg is an attorney by profession having previously worked in public interest environmental law. He is a member of the Israel Bar Association. He holds a bachelor of Economic and a Law degree from Monash University in Australia. As a fellow of the New Israel Fund he completed a masters degree in international environmental law at the American University in Washington DC. He has published over twenty academic and popular publications concerning Middle East environmental and water issues.

## Abstract

The ancient Madaba mosaic, famous for its map of the city of Jerusalem, depicts the area of the Near East of the 7th Century AD with its human settlement and activities. It is no coincidence that the Dead Sea appears at the center of the mosaic. For thousands of years the resources of the Dead Sea Basin have not only been a source of economic development for the region but the natural beauty of the basin has been a source of religious and cultural inspiration for the many civilizations that have lived around its shores. It is the unique characteristics of the basin, topographical, climatic and biotic that have been the reason for the basin's importance. Today, however, we are nearing a point of no return, where we risk losing key characteristics of this unique basin. Due to destructive development, uncoordinated planning between governmental authorities and unchecked competition between the various economic sectors that exploit the Dead Sea's resources, the uniqueness of the Dead Sea Basin risks irreversible degradation.

## A Potential World Heritage Site

The Dead Sea basin is a unique ecosystem to the world. The Dead Sea, a terminal lake, is the lowest place on earth and the saltiest large water body on



Figure 1 – Satellite view of shrinking Dead Sea

the planet. Dead Sea waters are recognized for their medicinal and health treatment. The areas complex geological form has created a spectacular landscape characterized by high mountain cliffs, deep canyons and green oasis. The springs that feed the green oasis attract unique biodiversity, in stark contrast to the desert surroundings. The Basin is a cradle of cultural heritage of utmost value to the three monotheistic religions of Judaism, Christianity and Islam. For all the above reasons the Dead Sea Basin is treasured by people the world over and is a major site of pilgrimage, tourism and industry.

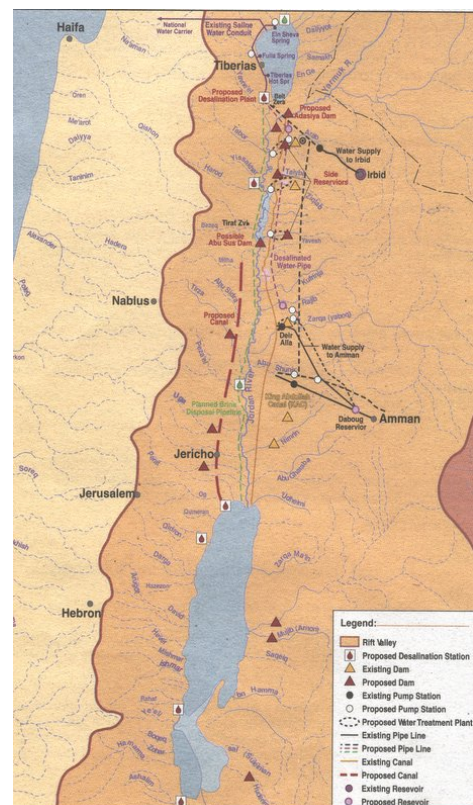
### **Existing Policies that Threaten the Basin**

Despite its uniqueness there exists no integrated development plan for the Dead Sea Basin. The competing sectors, the mineral extraction industry, the water supply sector, tourism, local agriculture and urban development exploit the Dead Sea's resources without consideration of the areas natural carrying capacity. Due to present unsustainable development policies the Dead Sea is a living example of a 'tragedy of the commons.'

Over the last forty years, the Dead Sea water level has dropped by over 25 meters. The current yearly water level decline is by over one meter in depth, and the rate is constantly increasing. This is due to both water diversion of the Jordan and Yarmuk Rivers by Israel, Jordan and Syria mostly for agriculture upstream and industrial mineral extraction activity in Israel and Jordan at the southern basin of the Dead Sea, which account for 75% and 25% of the sea level decline respectively. With the disturbance of the water balance, a sinkhole phenomenon has developed with catastrophic impacts on all kinds of development in the region. Sinkholes have damaged roads, parking areas, industrial and tourist facilities. It is not possible to predict the location, scale and extent of new sinkholes, which places real threat to people's lives and assets.

### **Recent Government Action**

The governments in the Basin have started responding to the situation. In Israel, the World Heritage Committee placed the Dead Sea Basin on its tentative multinational list. The Israeli Cabinet, lead by the Ministry of the Environment, approved the launch of a major research project investigating options to rehabilitate the Basin. In Jordan, King Abdullah II, declared protecting the Dead Sea a national priority issue. At the Johannesburg Summit in 2002 and at the World Economic Forum held in 2003 Jordan lead the call to build a canal to bring sea water to the Dead Sea. Subsequently, Jordan requested the World Bank to prepare Terms of Reference for a proposed conduit from the Red Sea to the Dead Sea. In the Palestinian Authority the Mayor of Jericho expressed support for World Heritage listing. The Palestinian Water Authority has emphasized the need to link Dead Sea issues with the rehabilitation of the River Jordan.



Map 1 – Jordan River Diversions

## ***Preliminary Study of the Ecological Water Demand in the Yangtze Basin***

***Lida Weng***

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### ***Abstract***

Yangtze River is the most important water resources in China. Along with the fast economic growing and social development, the Yangtze is facing with the increasing pressure from both water utilization and protection of the river ecosystem. Balancing the protection and development of the River must be conducted to maintain the health of the Yangtze ecosystem to ensure the sustainable utilization of the River.

## ***Water Resource's Assurance of the Sustainable Development of Agriculture in Jiangxi Province***

***Wenjie Zhang***

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### ***Abstract***

Agriculture is the basis of the national economic in China. The agricultural sustainable development is the basic guarantee and the lead field of the sustainable development in China. It can make agriculture sustainability develop for a long time. These were proposed in *China 21st century Agenda*. The agricultural resources such as land, water resources, labour and fund is the material base and condition of the agriculture production. It directly influences the agricultural development and the social development; it should be paid attention to for us.

Jiangxi is an agricultural province. Agriculture holds an important position in the national economic of Jiangxi province. Now the agricultural increasing output value makes up 20 percent or so of the gross national product of Jiangxi province. The contribution rate of agriculture on the economic development of Jiangxi is high. So the agricultural sustainable development should first be done in order to make the economic of Jiangxi sustainability develop.

In recent years, many researches on the agricultural sustainable development were made. Generally most researchers emphasized land resources. Especially, the restriction of land on the agricultural sustainable development was emphasized. But the

influence of water resources on the agricultural sustainable development was ignored. In China, the serious shortage of water resources is faced on the agricultural development in the 21<sup>st</sup> century now. And the restrict action of the water resource's shortage of the agriculture and the rural economic development may surpass that of the land. It will be an important factor which restricts the agricultural and rural economic sustainable development. Water is the lifeblood of agricultural production. If the serious shortage problem of water resources would not be solved, the dream of the sustainable development of agriculture and society and economic will be hard to realize. So the development and use of water resources in Jiangxi province should put a guarantee for the sustainable development of agriculture in Jiangxi.

The agriculture basic condition and the problem of water resources of the agricultural sustainable development of Jiangxi province were introduced in this paper. At last, the water resource's assurance countermeasure of agriculture in Jiangxi province was proposed.

## ***Sustainable Development and Management of Aquaculture in Laguna de Bay: Challenges, Opportunities and Actions***

***Ms. Adelina (Lennie) C. Santos-Borja***

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### **CV**

***Ms. Adelina “Lennie” C. Santos-Borja*** has broad experience and active involvement in the field of Limnology, Environmental Impact Assessment, Water Resource Development and Management and Lake Conservation. She is currently the Chief of the Research and Development Division of the Laguna Lake Development Authority. Prior to this, she was the Chief of the Lake Management Division, and was instrumental in the implementation of the Revised Zoning and Management Plan (ZOMAP) of Laguna de Bay, a move to ensure the equitable allocation of the lake resource.

In 2004, she entered the field of Clean Development Mechanism (CDM) as Team Leader of the Laguna de Bay Community Carbon Finance Project. Funded through a grant from the Japan Climate Change Initiative, which the World Bank administers. The project pioneers the implementation of carbon emission reducing interventions that address priority environmental issues in the watershed and at the same time build the capacity of the LLDA as an intermediary to enable small-scale environmental projects to result in certifiable emission reductions.

In the local and international arena, Lennie continuously participates in efforts on lake conservation and management. She was twice the recipient of the Ibaraki Kasumigaura Award which was presented during the bi-annual International Conference on the

Conservation and Management of Lakes in San Martin de los Andes, Argentina in 1997 and in Chicago, Illinois in 2003.

Her active involvement in the Living Lakes Network began in the year 2000. Together with Unilever Philippines, they conceptualised and organized the tripartite partnership consisting of representatives from the government, the private sector and the NGO. This gave birth to CLEAR which stands for the Conservation of Laguna de Bay's Environment and Resources and is the official representative of Laguna de Bay to the network.

She is one of the authors of the World Lake Vision and a resource person in the recently published report on "Managing Lakes and their Basins for Sustainable Use: A Report for Lake Basin Managers and Stakeholders," both of which are major projects of the International Lake Environment Committee Foundation (ILEC) in collaboration with different institutions and donor agencies. Lennie is a member-elect of the ILEC Scientific Committee and will begin her term in April 2007.

### **Abstract**

Laguna de Bay is the most strategically located lake in the Philippines in terms of its social, economic, environmental and political significance. Its surface area of 90,000 hectares or 900 km<sup>2</sup> is almost half of the total surface area of lakes in the Philippine Archipelago. The watershed is three and a half times larger than the lake at 3300 km<sup>2</sup> and is divided into 24 sub-watersheds consisting of 5 provinces and the Metropolitan Manila area, 14 cities and 47 municipalities. Tasked by the Philippine Government to manage and conserve the resources within the lake basin is the Laguna Lake Development Authority or LLDA, which at present is the only lake basin management authority in the country.

Open water fishery and aquaculture is the most dominant use of Laguna de Bay. Aquaculture technology was introduced in the early seventies as a result of a pilot study to determine other methods of utilizing the natural aquatic biota of the lake to support a more extensive fishery production. Taken into consideration were high economic return for fishermen as well as maintenance of ecological balance in the lake. Due to the brackish characteristic of Laguna de Bay, milkfish (*Chanos chanos* Forskaal) was introduced and cultured in fishpens. Studies also showed that this species is predominantly a herbivore and thus, would not compete with the native species that feed mostly on benthic organisms and zooplankton. The initial years of aquaculture operation proved very successful with yields of more than 3 times the annual catch from open water fishery. Eventually, fish cage technology was introduced in the late seventies where tilapia gained popularity as a fish cage species.

Aquaculture operation is capital intensive, but when it was introduced in the lake, there was no accompanying financial support program from the government. By the time it gained popularity in the Laguna de Bay Region, those who have the capital and those who have easy access to capital were able to venture into the business. Eventually, it became a significant industry in the region and lured businessmen from different parts of the country to invest in the lake. From a total fishpen area of 5,000 hectares (50 km<sup>2</sup>) in 1973, it swelled to 35,000 hectares (350 km<sup>2</sup>) in 1983, which is one third of the total



surface area of the lake. The increase in the number of fishpens and the corresponding increase in fish stocks created intense competition for the natural food supply in the lake. From a unit yield of 3.8 tons-1 hectare-1 year in 1973 it declined to 2 tons hectare-1 year-1. As a consequence, supplemental feeding became necessary and a semi-intensive culture method became the practice. Correspondingly, there was also a decline in open water fish yield, which has affected the livelihood of fishermen that depends solely on this kind of livelihood. Socio-economic problems were magnified by this situation in Laguna de Bay which led to conflicts on the use of the resource between the fishermen and the fishpen operators. The fishermen asserted their rights on their traditional fishing ground and the fish pen operators put a strong-hold on their fishpens and in the surrounding areas. Unfortunately, such conflicts led to the lost of lives and livelihood.

The socio-economic and environmental problems that spawned because of the over proliferation of fishpens prompted the Laguna Lake Development Authority to develop a management system, part of which is the formulation of a Laguna Lake Zoning and Management Plan (ZOMAP). The primary purpose is to ensure the equitable allocation of the lake resources and to redistribute the economic benefits of the lake fishery resource.

## ***Study On Strategy Of Fishery Sustainable Development Of Poyang Lake***

***Shaofei Guan***

Director

Fishery Bureau of Jiangxi Province

Nanchang, 330046

### ***Abstract***

Poyang Lake, the largest freshwater lake in China, covering an area of 51,0000hm<sup>2</sup>, is located at the southern bank of the mid-lower reach of Yangtze River basin. It holds water from the five rivers -- Gan River, Fu River, Xing River, Rao River and Xiu River, and emptied into Changjian River at Hukou after storing up. Poyang Lake is a seasonal lake with the feature of taking in and sending out water. The annual amplitude of variation of water level is about 9m in commonly but in some years it was higher than 10m, the highest water level 22.2 m, and the lowest 5.90 m in the past years (Wusong Base Level). The quality of the water environment is basically good with a strong self-purifying capability, reaching the water quality standard of national grade II.

Poyang Lake is one of the six largest wetlands in the world, and is protected in good condition. The biodiversity of the lake is especially abundant, there are 122 species of freshwater fishes, two species of freshwater dolphins (finless porpoise and Yangtze River dolphin), 87 species of mollusks, 102 species of aquatic vascular plant, and 266 species of planktons. When the water level is up to 21.69 m, main lake (called outer lake) which conflux to Yangtze River expands to 320,000 ha and the dam lakes (called outer

lake), controlled artificially by building dams, has areas 85,300 ha. The proportion of ponds is about 36,900 ha. in the lake area. The total output of aquaculture of Poyang Lake area increased from 68,300 tons in 1985 to 798,900 tons in 2005; while the gross production fishery had a value of RMB yuan 8.274 billion in 2005, compare with RMB yuan 150 million in 1985. The outer lake has long been an important natural fishing location in Poyang Lake. In order to conserve the fishery resources of the lake, the government of Jiangxi Province has taken many measures, such as the annual fishing ban in spring, the season for fish breeding, preventing porting in the winter, factitious proliferation, fishing permission, restricting and striking pernicious fishing tools and illegal fishing equipment. The annual output of capture fish is quite fluctuant in main lake, generally around 30,000 tons. In 2005, the output of capture fish per hectare and the gross output of the dam lakes were 2299.5 kilograms and 184,400 tons respectively, while both of them in 1985 are 153 kilograms and 9,500 tons respectively. The production of pond culture fish has obviously increased from 974 kilograms per hectare in 1985 to 7794 kilograms in 2005, and total output rose from 24,900 tons in 1985 to 287,900 tons in 2005. The production of pond culture fish make up 44.53% of the total. In Poyang Lake area, there are over 250,000ha low-lying farmland and easy to be flooded. Among them, 17,500 ha. has been exploited for both rice farm and fishery developing special aquaculture with high economic efficiency. Fish culture in rice paddy reached its peak 17,500 ha. in 2002, but decreased to 2,300 ha. in 2005 in Poyang lake area.

At present, exploiting and utilizing the fishery resources of lake district include six major modes: First, integrating those measures of appropriate catching, strengthen protection and factitious proliferation in the outer lake; Second, in the inner lakes, combining factitious proliferation with 'three-netting' culture; Third, in the pond adopting both mix-culture and main-culture mode; Fourth, for low-lying and easy-flood field, constructing high-efficient field for both agriculture and fishery; Fifth, for rice field which is also fit for fishery, developing rice-fish project, the culture fish or shrimp in the rice paddy; Sixth, the equipped fishery should culture rare aquatic product industrialized.

The fishery sustainable development of Poyang Lake area faces on five main problems and challenge: First, the fishery resource of main lake decreased sharply and living condition of fisherman is still hard; Second, the exploitation of a lot of inner lakes far exceeded biological capacity of available stocks and ecosystem has been destroyed; Third, the pond hasn't been repaired for years and the functions has weakened; Fourth, as lack of fund, the exploitation of high-efficient rice-fish field develops slowly and it restricts the utilization of lake district resource and the further development of fishery; Fifth, the exploitation of rice paddy which is also fit for fish culture hasn't been recognized and the extent of fishery utilization is low.

To achieve the fishery sustainable development of Poyang Lake, six measures should be adopted: First, reducing the fishery capture of outer lake, quicken the occupation transform of fisherman in the lake district; Second, controlling strictly the fish breeding density of inner lake, popularizing the artificial grass-planting technique; Third, rebuilding low production pond, modifying produce equipment and improve the comprehensive production ability; Fourth, striving actively for the support of national agriculture integration exploitation project and enhancing the exploitation of low-lying and easy-flood field; Fifth, emphasizing importance to the exploitation of rice field which is fit for fishery

and improving the comprehensive utilization of rice field; Sixth, quicken the industrialization management of aquaculture, further extending the fishery industry chain, and improving the whole efficiency of fishery.

## ***The sustainable development in the Lake Trasimeno area***

***Dr. Fiorello Primi***

Province of Perugia, Italy

The Lake Trasimeno is situated in the Umbria Region, in the middle of Italy and bordering the Tuscany region. It is the fourth Italian lake by extent with a circumference of about 50 km and with a nearly circular shape and an extent of 124 sq km. Its catchment area is 380 km sq. The maximum depth is about of 6.5 meters and the average one of about 3.5 meters. The average of annual precipitations is 723 mm per year on the water surface and 749 on the catchment basin.

It is a closed lake of tectonics' origins and its formation goes back, according to recent studies, to about 3 millions years ago with the retreat of the Tyrrhenian Sea's waters. Because of its particularity it is subjected to notable water's-level changes due to the rains that each years fall directly on the lake. The years until 2003 have been very difficult, due to the drought the lake did loose about a third of its water quantity (two meters). In the last two years, thanks to the rains and to major maintenance works on the lake basin, 1.3 have been recovered. In the mean time the works to build an artificial tributary, that will bring water from a dam 120 km away, are nearly finished.

The environment, the landscape, the protection of the lakes-waters, the culture and citizen's service ( healthcare, schooling, assistance etc.) have been the base principals with whom a development model has been built and that has given excellent results. There is a tight bond between territory and agricultural activities, between environment and craftsmanship and between all of them and tourism and vice versa.

The upkeep of the traditional landscaping of Umbria and Tuscany, could not be possible without an attentive and respectful widespread agricultural activity. Even the craftsmanship and industrial productions are carried out in small factories conform to the healthiness and environmental fitness. Arts, culture, traditions, landscape and environment together with the typical agricultural productions, crafts and wine and food (enogastronomia) are what the Trasimeno offers to the tourism to attract international and domestic tourists.

All of this in addition to a spread and consolidated Informational-and-welcoming system it has guaranteed a strong growth of the tourism sector thereby a growth of the production and commerce especially of the quality agricultural products.

Among them, in first place there is oil and wine, both products have reached such an excellent qualitative level to the point of deserving the appellations D.O.C. (Denomination of Controlled Origins) for the wine productions and the D.O.P.

(Denomination of Protected Origin) for the oil productions. In the mean time the production and retail of oven baked products and the manufacturing of pork meats have grown stronger and have expanded. But the most important result has been the rediscovery of the lake fish, especially thanks to the catering industry. The Province of Perugia ensures the control and development of ichthyic species in the Trasimeno Lake through its “Centro Ittiogenico” (Ichthyic centre) in which many ichthyic species are reproduced to be put in the lake to maintain the balance of the species.

It is extremely evident, following the experiences, that the integrated economical development of the area around the Trasimeno Lake needs to be based on the tight bond that exist between environmental resources, culture, history, agriculture and quality crafts and needs to be enhanced through a strategic plan of sustainable development of the area. To warrant an offer of quality it has been produced, with an Agenda 21 process, the Manifesto of the quality, of the environment and services of the Trasimeno Lake.

The first and most important result that has been gained is the acknowledgement of the Trasimeno Lake as the cleanest lake of Italy. The surveys that the “Goletta Verde dei Laghi di Legambiente” has carried out in two thousand and six, on the principal Italian lakes, have ruled that the analysis of the water samples collected on the Trasimeno lake are ninety eight percent good. An important example of integration is that the tourism has become an important economical activity when, with the development of the rural tourism (agritourism and holidays’ houses), all the territory and not only the lake has been “sold” to the tourism market. The regional and local governments have supported, with laws and funding, the recovery of hundreds of traditional rural buildings for over 400 businesses with about 5.500 sleeping accommodations. This way many tourist businesses are born integrating the agricultural activities that today represent the largest offer of tourist accommodation with the camping on the lake.

The activities of renovation of farmhouses or rural homes have allowed the rebirth of many small businesses involved in the works of renovation and construction. These are works of the highest quality because of the rules and regulations to safeguard and recover of the rural building heritage are very strict and they allow the upkeep of the traditional rural landscape. Today the global tourist offer of sleeping accommodation is of approximately 15.400 places. The importance of the Trasimeno Lake as a tourist attraction is given in addition by the fact that over half of the tourists (1.150.000/ year) are foreigners and they choose the Trasimeno for their regional cultural itinerary. In these years we have notice that it exist a tight link between the quality of the territory and of the services and the economical development.

In conclusion we wish to thanks Living Lakes association for the possibility that it offers to confront various experiences. Regarding our lake, due to the positive results achieved in these last few years, the Province of Perugia has elaborated a new “plan of sustainable strategic development” for the Trasimeno and its area. The objective is to continue to tackle in a positive and integrated manner the problems of the maintenance of the territory, of the renewable energy and of the global quality. We want to achieve, in the space of few years, the total environmental certification of the whole area about the tourism and agricultural activities and public services.

## ***Problems of Fresh-Water Lakes in Southeast China and the Sustainable Development of Poyang Lake***

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### **ABSTRACT**

Lakes play an important role in ecosystems, however, many problems encountered in the management and utilization of lakes in Southeast China. The reasons were summarized here that includes seven aspects. Firstly, lake area was reduced dramatically by irrational utilization. Pollution and eutrophication deteriorated the eco-environment of lakes.

Sedimentation degraded the original functions of lakes. Excessive and unreasonable utilization of lake made its bio-resource diminished. Exotic species invasion damaged the balance of lakes original ecosystem. Ineffective management and policy decision resulted in a dilemma of lake management. Finally, related science and technology to lake management were lagged obviously. In this presentation, we took Poyang Lake as an example to analyze problems and propose effective corresponding countermeasures. In order to keep lakes ecosystem integrality, improve lake biodiversity and ensure bio-resource sustainable utilization, nine items were proposed here. It is important to control the problems of lakes through the outside and inside. Incorporated into the local economical development, the lake ecosystem can be protected effectively. It is necessary to bring the lake protection into the regional programming. The crucial problem in lake protections should be determined and solved extensively and deeply. The lake biodiversity is an effective indicator that should be emphasized. Values in recreation of lakes should be noted and signified. It is important to construct the information network of lake detection. Lake management should be enhanced to restrict the irrational utilization. Finally, it is important to collect all social powers to protect and maintenance lakes.

## ***Healthy Lakes & Wetlands and Healthy people***

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### **CV**

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Peter Bridgewater is presently the Secretary General of the Ramsar Convention. He worked as Chief Executive in the Australian Nature Conservation Agency from 1990 to 1999. From 1997 to 1999 he became Chief Science Adviser for Environment Australia

and Supervising Scientist in the Alligator Rivers Region. In the years 1999 to 2003 he worked as director in the Division of Ecological sciences of the UNESCO and Secretary of the Man and the Biosphere Programme.

He was awarded with the UNESCO Picasso Gold Medal, 1995, jointly with the Chair of the Uluru-Kata Tjuta National Park Board of Management, for excellence in managing a cultural landscape and with the degree of Doctor of Resource Management, *honoris causa* from the University of New England in 1997.

He released over 170 publications on nature conservation, vegetation science and biodiversity issues. His current research interests are conservation and management of biodiversity, landscape ecology (especially its role in sustainable development), conservation and management of the coastal zone and dynamics and management of cultural landscapes.

### **Abstract**

Concern about health and the environment is concern about the relationships which exist between people and the rest of the biosphere and while there have been isolated successes; people have generally handled these relationships poorly. The need to integrate more fully the goals of conservation and health ethics for a sustainable society is becoming ever clearer. The quality of any life, any living system cannot over time exceed the quality of the environment.

From these perspectives, Wetlands, including lakes, have a real identity crises. They are often seen simply as human health hazards, with malaria, bilharzia and a whole host of other parasitic diseases typically associated with them. And yet Air France currently has an advertisement which has a young woman sitting on a wooden pier jutting into a lake, apparently in complete peace and relaxation.... Yet also a veritable magnet for mosquitoes!! Two centuries ago, the dank surroundings of lakes were enough to provoke people into believing that to be simply close to a lake was to risk catching a fever. And then came Avian Flu, to give it its popular title. So should we just drain lakes and wetlands, or cover them with a blanket of DDT? Or are there other approaches?

Firstly we need to look at the synergy of health, synergy of disease, and the ecosystem context of health. The extent of communication between environmental and human health professionals has, in some instances, been excellent. The 1999 Protocol on Water and Health under the UN-ECE can be taken as an example of success. The main aim of the Protocol is to protect human health and well being by better water management, including the protection of water ecosystems, and by preventing, controlling and reducing water-related diseases. The Protocol is the first international agreement of its kind adopted specifically to attain an adequate supply of safe drinking water and adequate sanitation for everyone, and effectively protect water used as a source of drinking water.

To meet these goals, its Parties are required to establish national and local targets for the quality of drinking water and the quality of discharges, as well as for the performance of water supply and waste-water treatment. They are also required to reduce outbreaks and the incidence of water-related diseases.

But how should we react to water borne disease? Our natural reaction is to fight each disease as it appears a one to one battle. Yet over time it is clear this approach has limited successes and is costly economically and ecologically.

The Millennium Ecosystem Assessment defined a new conceptual framework, placing emphasis on the management of the environment to deliver ecosystem services, and through those services to enhance human well-being. Well-being is more than human health, and reflects a more holistic approach. But to deliver better human health outcomes, we need to have healthy ecosystems – i.e. ecosystems which continue to deliver services to people and the biosphere.

## ***Avian Influenza, Wildlife and the Environment***

### ***Robert Hepworth***

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In August 2005, concerns about the role of migratory birds as potential vectors of Highly Pathogenic Avian Influenza (HPAI) virus subtype H5N1, led the UNEP Convention on Migratory Species (CMS), in close cooperation with the Agreement on the Conservation of African Eurasian Migratory Waterbirds (AEWA), to establish a Scientific Task Force on Avian Influenza and Wild Birds. The Task Force, which meets regularly by teleconference, brings together the best scientific advice on the conservation impact of the spread of avian influenza, assessing the role of migratory birds as vectors of the virus, and issuing advice on the root causes of the epidemic as well as technically sound measures to combat it and develop early warning systems.

The Task Force comprises 13 members and observers, including UN bodies, wildlife treaties and specialist intergovernmental and nongovernmental organizations. It draws on the expertise of conservation scientists, hunters, veterinarians, epidemiologists, virologists, land managers and other experts.

The spread of HPAI H5N1 is of public concern, and receives a lot of attention in the media. Yet there remains widespread misunderstanding of the issue, especially about the different ways in which the virus might be spread. Misinformation has led to wild birds being automatically blamed. This creates political pressure for ill-advised and disproportionate policies such as the culling or harassment of wild birds and the destruction of wetland habitats. Other modes of transmission, such as the trade in poultry and poultry products, and human movements may well play a far more significant role in the spread of HPAI H5N1. In some cases, these modes of transmission have been underestimated and do not receive proportionate exposure in the media. We need to present an accurate and balanced view which acknowledges that there are a number

of factors whose relative importance can change, depending on the area or outbreak concerned.

The HPAI virus subtype H5N1 infecting poultry, other domestic animals, wildlife and humans almost certainly originated from the mutation of a low or non-pathogenic virus on poultry farms in East Asia. The virus then spread rapidly within and between farms, taking advantage of local practices in the feeding, housing, slaughtering and trade of domestic ducks, chickens and geese. Lack of hygiene, overstocking and mixing of different domestic animals greatly increases the risk of spreading the infection. Movements of people (e.g. farmers, veterinarians, and even journalists and tourists) and legal and illegal trade in caged birds are factors in the spread. As a result the virus may now be endemic in poultry of East and South - East Asia. Globalization has led to extensive and intensive movements of people, poultry and materials around the world at an unprecedented pace which provides greater opportunity for the spread of the virus.

The paper will also summarise a series of practical recommendations made by the Task Force including (i) Action to reduce the risk of further spread and infection (ii) Action to minimise the role of wild birds in the spread of HPAI (iii) Existing work by conservation scientists to understand and combat HPAI H5N1.(iv) What science needs to explore further about the role of migratory waterbirds (v) the role of Governments.

A new website on Avian Influenza set up by the Task Force will also be unveiled.

## ***What we learned from H5N1 in Germany: Risk Assessment and the Role of Wild Birds***

***Dr. Wolfgang Fiedler***

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### **CV**

Wolfgang Fiedler, born 1966, is Biologist in Germany and works in the field of bird migration, breeding biology and population ecology. Since 1998 he is the head of one of the three German bird ringing Centres and since 2005 he is head of the research group "Vogelwarte Radolfzell" at the Max Planck Institute for Ornithology. He is General Secretary of the German Ornithologist's Society and the European Union for Bird Ringing.

### **Abstract**

Waterfowl are known to be the major reservoir for all 16 H- and 9 N- Subtypes of low pathogenic avian influenza viruses (LPAIV), including the subtypes H5 and H7 being a serious economic threat to the poultry industry as well as H1, H2, H3 that are the main source for human influenza. LPAI neither cause any signs of disease in the infected wild birds nor in poultry. However, low pathogenic avian influenza virus of the subtypes H5 and H7 can be introduced into poultry holdings. Especially in industrial holdings with



large numbers of highly susceptible animals, the previously stable viruses of low pathogenicity begin to evolve rapidly and may mutate into highly pathogenic avian influenza (HPAI) (known as „bird flu“) causing up to 100% mortality in infected birds. Afterwards, infections of HPAI are usually spread by movement of stock, infectious faeces, contaminated water or bird products. Free flying birds are usually also blamed to spread the disease, but until now this could be never proven to have happened.

Since 1959 none of the outbreaks of HPAI has approached the size of the ongoing epizootic in Southeast Asia, which most probably originated in the late 1990ies presumably in captured ducks in Southern China and is caused by a new HPAI virus of the subtype H5N1. In February 2006 cases of highly pathogenic avian influenza virus Asian lineage H5N1 occurred in wild birds mainly at two locations in Germany: in the North in the Southwestern Baltic area, including the Island of Rügen, and in the South around Lake Constance. Other cases occurred also in other parts of Germany, mainly in Bavaria (also in the South) and eastern parts of the country. The total number of positively tested wild birds with H5N1 high pathogenic virus in Germany is 344 until early September 2006 with a maximum in February and March and very low numbers afterwards. Between February and May 2006 a total of 60,000 birds was tested within the member states of European Union with approximately 750 positive cases of HPAI (0,013 %).

As a consequence of the outbreaks, issues related to disease control measures against HPAI in wild birds were intensively discussed in Germany and lead to a series of scientific projects, such as sentinel ponds and intensive sampling of wild birds to detect possible vector birds which might be asymptomatic. A bundle of those scientific approaches are currently being started under the international cooperation project "Constanze" focussing on Lake Constance.

The role of migratory birds in the long range transportation of HPAI viruses is still controversially discussed. The patterns of occurrence of HPAI outbreaks and bird migration as well as the pattern of virus isolations in wild birds and HPAI outbreaks in many cases do not fit convincingly. Therefore the risk of transmission of HPAI virus through man (legal and especially illegal trade of birds and bird products) appears to be as high as through migratory birds. There is still the unanswered question, whether a bird infected with HPAI virus H5N1 is able to perform migration flights before or during the virus shedding period (few days) at all. So far there are very few and poorly documented cases of isolation of HPAI virus H5N1 from clinical healthy wild birds and there is the evidence that most reported cases of HPAI virus H5N1 in wild birds originate from infected poultry. Subsequently, even wild birds died. Within the member states of European Union between July 2005 and January 2006 39,000 birds (90 % ducks and geese) have been tested and 314 cases (0,8 %) of low pathogenic Avian Influenza cases have been detected while no single high pathogenic case was found. However, as it is not known whether the virus may be transported by asymptomatic migratory wild birds it is recommended to monitor the situation carefully. Many Avian Influenza outbreaks in central Europe during the 2005/2006 winter involved a virus type that was closely related to a H5N1 virus isolated from a dead „Grebe“ (likely Podiceps sp.) in Siberia suggesting that this virus might have been transported westwards by migratory birds.

The outbreaks in Germany had several important features to note:

- (1) before and during the time period with most dead wild birds (February and March) no cases in domestic poultry occurred; in the German state of Saxonia the first (out of two until October 2006) HPAI case in domestic birds in Germany occurred on 4th of April, while the first positively tested wild bird in Saxonia was found 21 days later.
- (2) no increase in mortality compared to previous winters has been observed due to Avian Influenza;
- (3) the first cases occurred 2 months after the seasonal influx of migratory birds from known bird flu areas (i.e. Moscow area). In the days before the first detected HPAI cases the level of bird migration into Germany was very low and next to zero;
- (4) at both focal sites Southwestern Baltic and Lake Constance most dead birds containing H5N1 virus occurred in a time with maximum ice coverage and very high density of waterbirds in "ice holes". It was not the time of winter with highest numbers of wild birds in the area, but with highest densities of waterbirds.

On the base of these observations the classical risk assessment approaches regarding wild birds as a special threat mainly during migration need to be adjusted.

During the outbreaks in Germany and other member states of the European Union measures applied were primarily based on strategies derived from HPAI cases in domestic poultry or even from the veterinary's arsenal to restrict the spread of foot and mouth disease between farms. Those measures were i.e. the implementation of protection and surveillance zones, accompanied by movement restrictions of domestic animals and animal products. At the same time, surveillance was increased in both domestic and wild bird populations using active and passive surveillance approaches. The epidemiology of the outbreak of HPAI in wild birds at Lake Constance demonstrates that such disease control strategies are not adequate for cases of HPAI in wild birds. Therefore, for the winter 2006 / 2007 strategies have been modified. In future surveillance areas can be adapted using local epidemiological and ornithological information.

In Germany the legal protection of wild birds at no time during the outbreak was seriously questioned. However, reactions in the media and in the public showed a large level of insecurity among people according to the risk of contacts with wild birds. Few cases of destruction of bird's roosts and nests have been reported. Public information about the realistic risks of Avian Influenza is crucial. It is necessary to inform about higher risk situations (such as unprotected touching of dead birds in outbreak areas and unintended transportation of virus into and out of poultry farms) as well as about unriskey situations (such as songbird feeders in gardens, Swallow's nests in the barn or swimming in a Lake which is also used by waterfowl).

## ***Farming systems, trade and cultural practices in developing countries that influence the emergence of Avian Influenza***

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## CV

**Dr Vincent Martin** is a member of the animal health service of the FAO. His responsibilities are in the area of early warning and response to disease emergencies. He graduated from the National School of Toulouse, France; obtained his Doctorate of Veterinary Medicine in 1993; and then entered the French National School of Veterinary Services where he studied veterinary public health and animal disease control and worked with various disease surveillance and disease control programs including at the epidemiology unit of the Central Veterinary Laboratory in Zimbabwe. Vincent also has a Masters in Animal Production in tropical regions and a post-graduate certificate in exotic disease and epidemiology.

## Abstract

The emergence of Highly Pathogenic Avian Influenza (HPAI), H5N1 strain in Asia and its subsequent spread to other continents is the result of years of fast and unregulated development of animal production to meet the increased demand in animal protein. Highly concentrated domestic poultry production in densely populated regions, a rapid evolution of animal and farming production systems in the region associated to centuries-old cultural practices that place humans and poultry in close mutual proximity, as well as the constant evolving nature of the virus have provided the ideal conditions for the emergence of new pathogenic strains of avian influenza.

Understanding the underlying farming and cultural practices that influenced the emergence and spread of Avian Influenza in developing countries have been instrumental to develop effective risk reduction measures. Indeed, through a better understanding of farming systems, trade and market chains as well as cultural practices in Asia, it has been demonstrated that control efforts should be focused on production sectors with low biosecurity standards, namely sector three (free-ranging chickens and ducks, pond ducks) and four (scavenging chickens and ducks) which represent a greater challenge, from a disease management and cultural point of view, for reducing the risk of Avian Influenza occurrence and subsequent human health infection.

## **Can Integrated Fish Farming Influence the Spread of Avian Influenza?**

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Strain H5N1 of the Highly Pathogenic Avian Influenza (HPAI) caused extensive culling of poultry and severe wild bird mortalities over the last several years. This disease has had a severe direct economic impact on poultry producers and back-yard farmers, particularly when the infection has established or where emergency management operations have had to be implemented. While it is known that this is primarily a poultry disease, certain wild birds are apparently susceptible to the virus, and mortalities of wild birds in Eastern and Western Europe suggest that infected wild birds are capable of migrating long distances before death. Although it has not been confirmed that these birds shed virus while migrating, it is possible that they could introduce the virus to new locations.

In poultry, H5N1 HPAI is transmitted among birds either through respiratory excretions or through the faecal-oral route. Due to the high concentration of virus excreted from infected birds (one infected duck can excrete up to 6 log<sub>10</sub>/gram and EID<sub>50</sub> [median egg infective dose] in 24 hours), significant concern exists over the use of poultry manure as feed or fertilizer in fish farming. It has been demonstrated that H5N1 HPAI virus can remain viable for at least 20 days in feces when stored at 4°C, and 4-6 days in wet feces stored at 37°C. Studies on avian influenza viruses other than H5N1 HPAI also showed that they can persist in water for different periods of time depending on temperature, pH and salinity, ranging from 1.5 days in 28°C water with 20 ppt salinity and a pH of 8.2 to 17 days at 17°C, pH of 8.2, and low levels of salinity.

Traditional “Integrated Fish Farming” practices directly use fresh poultry waste as a production input, thus posing a risk of H5N1 HPAI exposure to fish-eating birds, if they come in contact with such farming systems containing live virus. In such systems with little or no biosecurity measures in place, the likelihood of multiple wild species interaction and possibility of disease (H5N1 HPAI, other AI viruses, or other diseases) transmission could be considerable.

Historically, the high number of ducks, geese and swans that died from H5N1 HPAI over the past years suggests that the Family Anatidae are most susceptible to the virus. However, in most cases, members of this family forage on vegetation and they are not likely to frequently visit aquaculture ponds unless for drinking water. Nevertheless, it has been also been shown that multiple fish-eating species from several other families have also died from H5N1 HPAI including Ardeidae, Phalacrocoracidae, Laridae, Podicipedidae and some species of raptors. The extent of the species within the families listed above, their potential to acquire disease via integrated fish farms, and the possibility of transmitting the disease to other birds (both migratory and non-migratory bridge species) frequenting nearby wetlands or natural habitats, underlines the importance of better understanding the relationships between integrated fish farming and H5N1 HPAI.

Although FAO recommends and promotes hygienic farming practices, including pre-treatment of poultry waste, to ensure farm inputs are clean, hygienic and free from

pathogens, the traditional practice of introducing fresh poultry waste directly into ponds under integrated fish farming will continue to pose the risk of contamination of such water bodies with H5N1 HPAI virus, if infected birds are present in the rearing units used to produce the waste. The challenge for the future would be to better understand the behaviour of the H5N1 HPAI virus, including its persistence in the aquatic environment, and to make proper science-based risk assessments on the relationship between shedding of the virus by poultry and its potential spread through integrated fish farming, so that effective management measures could be put in place if necessary.

## ***Restoring Living Hong Lake through sustainable fishery and wetland conservation***

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### ***Abstract***

The Hong Lake, with an area of 348 sq km, is the seventh largest freshwater lake in China. Due to the overexploitation particularly the fishery development in 1990s, the lake was facing huge challenges such as decreasing water quality, loss of freshwater biodiversity, and decreasing income from fishery.

Starting from a demonstration project on 3.3 sq km by WWF and its partners in 2003, a sustainable fishery model has been developed through restoring aquatic plants, restructuring the fish farming, and other habitat rehabilitation efforts. Currently at the demonstration site, healthy wetland ecosystem has been fully restored, with abundant aquatic species and more than 10 water bird species recovered. The water quality of the site has been improved from Grade IV to Grade II, and income of the farmers has also been doubled.

Inspired and convinced by the demonstration, the Hubei Provincial Government developed a plan to restoring a living Hong Lake with a total investment of more than 70 million RMB (1 USD = 8 RMB) in 2005. Currently more than 80 per cent of the fish farming net has been removed from the lake, and an overall management authority for the Hong Lake has also been established. A living lake in the Central Yangtze is recovering.

## ***Sustainable Farming and Effective Marketing Strategies at Lake Constance***

### ***Patrick Trötschler***

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## CV

**Patrick Trötschler**, age 36, born in Radolfzell / Lake Constance, 1991-1997 studies of agriculture, protection of environment and development of rural areas at the University of Giessen / Germany, 1998-2000 scientific assistant for evaluation of agri-environmental programmes for rural areas at the University of Giessen / Germany, since 2000 project manager at Lake Constance Foundation including all agricultural activities.

## Abstract

### **Agriculture at Lake Constance**

The part of the Lake Constance landscape which traditionally was cultivated in a natural way is even today dominated by agriculture. In comparison with other structurally weak regions in Middle Europe, farming in the lake Constance region still has economic importance and potential. Land-use and landscape management are characteristic in 47 % of the watershed. The particular natural conditions (climatic, geological, soil related) have created a diverse and regionally differentiated land use with unique landscape patterns. About 433,000 hectares of the Lake Constance area are being used for agriculture. Farms around Lake Constance produce a wide diversity of goods. Most land used are green fields and pasture land which make up 76% (330,000 ha). Crops are grown on 16.4% (71,000 ha) and 6.9% (30,000 ha) is taken up by so called special cultures. In order of importance these are: fruit plantations, hop, vegetables and vines. The grassland portion eastward and on the Southern side of the lake towards the inclining hill land is increasing considerably. Agricultural use increases in the western direction. In the plain areas bordering the Rhine and Lake Constance intensive cultivation (farming, horticulture) is predominant. Close to the shore, with the exception of the eastern part of Lake Constance, specialist cultivations i.e. fruit farming, viticulture and hop farming are prevalent.

High level of production in farming is often connected to high levels of environmental degradation. Even with the high proportion of organic farms (~8%) and the conversion of many areas to integrated production methods, agriculture is still causing considerable environmental pollution and represents a high potential for ecological problems for the natural area and the drinking water reservoir Lake Constance. It has been proved that the use of chemicals and synthetic fertilisers and pesticides is causing extraordinary high nutrient charges in the lake and its tributaries.

### **Promoting sustainable farming at Lake Constance**

Developing new sale opportunities is a main strategy of Lake Constance Foundation to support sustainable farming. Due to the big variety of general natural conditions, Lake Constance area offers a big variety of products in high quality. About 3.5 million people live in the Lake Constance area. Together with the tourism centres, the high-quality gastronomy and canteen kitchens (canteens, refectories, conference centres, hospitals, ...) the Lake Constance area has the potential for high sales of regional organic and eco-friendly food products.

The objectives of all our marketing activities are:

- Increase the share of organic and eco-friendly cultivated area
- Reduce the environmental impact by farming
- Create alliances and co-operations between farmers, food fabricators, whole and retails dealers and caterers
- Rising of regional value added tax

***Practical Experience: Creating a brand for regional and sustainable food***

The original idea behind the project „Good dishes from the Lake“ was to develop the infrastructure for the supply of canteen kitchens and gastronomy with regional organic and eco-friendly produced food. On the one hand this should contribute to increased marketing of regional environmentally friendly produced food, on the other hand regional economic cycles should be developed and strengthened. Under the coordination of Lake Constance Foundation and with financial support by PLENUM (a programme of the state of Baden-Württemberg for supporting sustainable development), about 10 to 15 farmers, food fabricators, whole retailers and caterers started in 2003 to develop a concept for such an infrastructure. But with every new meeting the logistics project turned more and more into marketing project with the goal of developing a brand for sustainable food out of Lake Constance area. First special criteria for the products were established:

- Definition of the regional provenance: Products must be produced and processed within 40 kilometres around the shoreline of Lake Constance.
- Definition of the environmental quality / sustainability: Products must be produced according to integrated or organic cultivation criteria and farmers must cultivate at least 10% of their area in an extensive way (according to certain measures of the regional agri-environmental programme and the landscape conservation guidelines).

With support of the marketing department of Unilever Germany, the working group developed a brand key and later on a marketing strategy.

The brand key was very important to expose the features of the regional products and their marketing environment. It is a short form description of competitive environment, target groups, main reasons for a positive buying decision, advantages and values of the products, reasons to believe, differences to other products and the essence of all this: a claim.

Basing on the brand key, the marketing strategy was developed. It contents a mission statement, descriptions concerning the four Ps (product, price, place (distribution channels) and promotion) and concrete measures. Out of this the brand “Good dishes from the Lake” and a homonymous logo were created which stands for guaranteed environmentally friendly or organic produced food from the Lake Constance region.

A quality management system was developed and established. The criteria are controlled by authorised control institutions of the quality label QZ Baden-Wuerttemberg or the eco-labels.

First public appearance of the association members with their new branded products was in spring 2005 with a kind of one-day fair in Constance. 35 association members presented their products and dishes. Over 10.000 visitors were a very good argument

that “Good dishes from the Lake” is on the right way. Since then the marketing strategy has been put in practise step by step:

- Creating marketing material (flags, brochures, special material for supermarkets)
- Organising seasonal promotion weeks especially in supermarkets
- Catering and front cooking for cultural and society events
- Publishing a website ([www.gutes-vom-see.de](http://www.gutes-vom-see.de))
- Capacity building for sales personnel

Meanwhile over 60 farmers, food fabricating enterprises, whole and retail dealers, gastronomes and canteen chefs are organised in the association „Good dishes from the Lake“. Currently they represent over 750 products and over 60 selling points at western Lake Constance.

### **Conclusion**

Up to now this kind of co-operation and mutual promotion is unique in Germany and even in Middle Europe. Usually brands for regional food are initiated by farmers. “Good dishes from Lake Constance” was initiated by an environmental NGO and dedicated food fabricators, retailers and gastronomes. This intersectoral alliance stabilises the association and was very important for the exchange of know-how and experience. One of the associations basic principle is to grow slow and to accept new members only by recommendation and after inspection.

The funding by PLENUM Westlicher Bodensee (a programme of the land Baden-Württemberg for a sustainable development) was very important in the beginning (about 100.000,- Euro). A milestone for the project was the willingness of the pioneers to pay an amount for the coordination.

The brand “Good dishes from the Lake” represents eco-friendly and organic food. It works because the main claim is the origin, not the environmental quality.

The entrance of 25 local EDEKA-supermarkets (EDEKA is a big german quality orientated food trade chain) was another milestone. Together with the remaining regional food fabricators, retailers and some very big caterers (e.g. catering department of the number one tourism destination Island of Mainau) the association represents all key partners in regional food business. The importance of this strong community for the economic area can be deduced from the number of provided jobs (over 1700 jobs and over 120 apprenticeship training positions).

The quality management system is a strong argument for developing new sale new sales opportunities for regional and sustainable food. Due to our range of controlled products, it is much easier to convince gastronomes to offer regional products. “Good dishes from the Lake” was very helpful to install a new project this year called “Lake Constance Breakfast” which is focussing on hotels.

## ***Transhumanz – Preservation of Culture and Environment***

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### **Abstract**

PROJECT 2001: The Rescue of transhumance in Spain: Striving for a sustainable future for our rural world, while preserving cultural and biological diversity.

The Iberian Peninsula, western Europe's natural bridge with Africa and the Mediterranean world, has played a key role in the evolution and dispersal of species. Its strategic position, the variety of its landscape, have made it one of Europe's most important centers of biological diversity. Even today, Spain has an extraordinary natural wealth and harbours some of Europe's most valuable habitats.

As elsewhere in Europe, the evolution of natural ecosystems has been greatly influenced by human activities. Nevertheless, in many areas in Iberia the very slow pace of transformation and the wise adaptation of local economies to environmental constraints provide remarkable examples of sustainable resource use and integration into the natural environment. Indeed, the interaction of traditional agrarian activities and nature has shaped some of Iberia's most valuable habitats, hand in hand with a fascinating variety of cultural expressions and traits which give character to its people's identity.

Transhumance, the seasonal migration of livestock from highlands to lowlands, has allowed for an extensive, diversified use of the countryside. Transhumance permitted an optimum use of high mountain meadows and of Mediterranean pastures, incorporating otherwise non-usable energy and biomass into productive cycles; it constituted a valuable fire-prevention strategy, preventing the accumulation of dry matter in the summer months; it helped recycle and incorporate organic matter into poor soils; it contributed to the conservation of woodlands, avoiding excessive grazing pressure at critical times and thus allowing for natural regeneration to take place; it contributed to the diversification and preservation of habitats, and to the conservation of threatened wildlife species such as the wolf, vultures, and great bustard.

In the Middle Ages, up to five million heads of livestock -mainly merino sheep- journeyed for weeks along the complex network of drover's roads -the "cañadas"- throughout the Peninsula. Protected by law since medieval times, the cañadas total 125.000 km in length, are up to 75 metres wide and cover 400.000 hectares of common lands.

The Project 2001 developed by the Fundación Global Nature it is a contribution to fight against the extensive livestock farming and transhumance disappearing, threatening the conservation of the valuable cultural and natural wealth linked to them. Abandonment of Mountain areas, environmentally sensitive economies replaced, lost of local breeds and resource management knowledge accumulated through generations of sheperds and country folk, increasing road infraestructure and urbanisation, are the causes of disappearing Cañadas. Used but rarely in recent decades, also are literally disappearing.

Unwilling to accept the irretrievable loss of such a valuable heritage and convinced of the need for learning from the past in a world searching for sustainable alternatives, the Fundación Global Nature, Spain, has set out to rescue ancient transhumant traditions in Spain. Project "2001", aimed to reclaim the ten main cañadas crossing the country from north to south, and to prove the feasibility and rationality of transhumance and of traditional economies adapted to the local environment, thus preserving a living countryside and its cultural and biological diversity. Project 2001 combines practical demonstration work with the quiet, less-evident effort of education and awareness raising, striving to reverse the trend of abandonment and environmental deterioration that wonderfully rich rural Spain is undergoing, and to preserve cultural and biological diversity and ancient traditions of great environmental, and economic value for a sustainable future.

In the frame of the project different measures were developed:

- seminars and congress on extensive livestock-raising and transhumance
- support for transhumant livestock owners in order to promote the practice of transhumance on the Royal Drover's Routes
- maintenance of a Legal Service and Office of Information for the protection of the drover's routes.
- coordination of the involvement of extensive livestock-owners in the management of a seasonal wetland.
- organization of international workcamps for the drover's routes
- restoration of some drover's routes
- inclusion of transhumance in the Spanish Agroenvironmental Programme

On the other hand, contributions from various conservation groups and private donors, and financial support from the European Union LIFE programme, have enabled Fundación Global Nature to acquire land in valuable natural areas in the periphery of Monfragüe Natural Park (Cáceres), and in Sierra de Gata (Salamanca) where are being developed conservation and stock of breeds of transhumant livestock in danger of extinction (Blanca Cacereña cow, Black Merino sheep) and woodland recuperation activities, complementary to extensive farming in Spanish agro-silvo-pastoral economies.

All these works are coordinated by the Fundación Global Nature, Spain, in Environmental Educational Center "La Dehesa", a center for research and education -also in the outskirts of the Natural Park of Monfragüe and in the heart of the Biosphere Reserve of the same name, where training courses and youth exchanges are organized all-year-round. A great effort is being devoted to information and education, involving the local population as much as possible, enhancing local culture and promoting local crafts and protected natural areas.

## ***Agriculture and Ecotourism***

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## CV

**Jorge Cardenas Robles** studied Civil Engineering in Bolivia until 1987, since then he participated in many courses and seminars related with culture, marketing and sustainable tourism. In 2002 he attended a Post Graduation in Tourism Management in Bolivia. Further he obtained his Master Degree in Management of Sustainable Tourism Development in Costa Rica.

He worked as a consultant in the range of tourism particularly for the product design of the “Lenca Route” in Honduras. In 2002 he was invited to be member of the board of TROPICO, a leading NGO organization in sustainable development and conservation in Bolivia. In October of 2003 he was elected President of the Board and reelected for the second period 2006-2007.

## Introduction

The big mass of water of Lake Titikaka due to the strong sun radiation at this high altitude of 3,810 mts, has a thermoregulatory effect in the surrounding areas and islands of the basin, avoiding two of the main problems of the highlands in this Humid Puna ecosystem from 3,000 - 4,200 m: drought and freeze. That from sure was one of the main natural reason of development of the Andean civilizations.

These rich soils formed the Aymara and Quechua cultures, starting with the highest developed Tiahuanaco (1580 bC – 1150 aC) with great stone, pottery, mining and the starting of a good agricultural production of potato and quinoa, to the great Inca Empire until the Spaniards came in the XV century aC. The Incas were the ones who really improve the agricultural production, using the rich conditions of the belt surrounding lake Titikaka.

Lake Titikaka is the principal entrance gate of tourism to Bolivia, connecting the main tourist corridor from Cusco and the Machu Picchu ruins in Peru, crossing the lake to the city of La Paz and the Andes Range in Bolivia.

Is important to see that tourism is one of the main activities of the area, but with two very different levels of operations:

- One from the organize private sector of tour operators in Bolivia, that are working over 40 years in the area with hydrofoils and catamarans navigating the lake.
- Local basic operations done in Copacabana and the different Islands of the lake, like the islands: of the Sun, Moon, Suriqui and Pariti in the Bolivian side, and Urus, Amantani, Taquile, Suasi and Anapia in Peru.

A regional funding institution Corporación Andina de Fomento (CAF) in its program Fondo de Apoyo Social y Territorial (FAST), has as main purpose improve the living conditions and organize productive micro enterprises of the local people. The project is working together with the government, that was incharge by the Ministry of Economic Development, that was divided in 5 Viceministries: Tourism; Culture; Micro and Small

Producers; Urbanism Development and Housing; and Industry, Commerce and Exports.<sup>1</sup>

The CAF gave a loan of 1,140,609.- \$US with a counterpart of the government, 4 NGO's and the three communities of the island of the Sun: Yumani, Challa and Challapampa.

### **Case study CAF – FAST – Island of the Sun / Lake Titikaka**

In 2004 started the program whose main purpose was to reduce poverty and create better incomes to the rural communities of the Island of the Sun. The island is divided in three communities Yumani, Challa and Challapampa with a total population of 2,025 people<sup>2</sup>.

Around 70% of the project was done between 2004-5, but not finished until present times due to a lot of problems, like the different mentalities and attitudes of the people involved. Also the lack of regulations provided by the state at all levels.

It is surely an ecotourism project, because it uses the sustainable management of the local tourism operations, mentioning the main objectives:

- The environmental management with the treatment of waste water and garbage in the 3 communities, produce by the tourist activity and the locals.
- The proper involvement of the local communities of Yumani, Challa and Challapampa in tourism, by starting a continue process of education and training in tourism, production, environment and culture.
- The creation of productive micro community enterprises, in a proper way and with a good quality of artisan production, pottery and stone carving.
- Improve the local production of agriculture, restoring the pre-Inca terraces, to supply the high demand of tourism in the area.
- Organizing the fishing production at all levels.
- The restoration of the old pre-Inca trails, signing the main routes and constructing resting points with bathrooms, as well as viewpoints.
- The construction of a center of interpretation in the community of Yumani and improving the small museums in Challa and Challapampa.
- The conformation of a regional Committee of the Island of the Sun, where all the actors of the local, regional and national level work together for the proper development of the area.

At the other hand improve the living conditions of the locals people as a main priority, working with the improvement of 470 bedrooms, 270 kitchens and 180 bathrooms.

The did also a wrap of the bad planning in urbanism, due to the lack of regulations, that from sure will help in the future the bad constructions done mainly in the community of Yumani.

This case study allows to see what is been missed in the community projects in the Bolivian side, that can be summarize in:

- No education and proper knowledge of tourism of the local actors.

<sup>1</sup> The actual government of Evo Morales has change its structure and now tourism belongs to the Ministry of Production.

<sup>2</sup> INE 2001 – From the last census done in Bolivia by the National Institute of Statistics.

- No regulations apply in the rural areas.
- No real connection of the tourism chain.
- No marketing strategy of the local actors.
- Basic consumptions basis production of the local agriculture and fishing, needs to be oriented as an effective productive supply for the big tourist industry visiting the island.

This learning lessons in the effort to change the present situation in lake Titikaka, are important to show, that gives different answers for the different tools to use in the future in the rural areas of Bolivia.

Self production of agriculture is a reality that can be change into a productive economy, if the programs put together all the actors involved in this case supplying its production to the growing tourism industry.

Fighting for this objective is the goal for a better future of the local communities and a sustainable development of the ecotourism operations.

## ***Agriculture and rural-tourism in lake Balaton Region, Hungary***

***Dr. Gábor, Molnár***

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### **CV**

***Dr. Gábor Molnár*** is the Managing Director of the Lake Balaton Development Coordination Agency in Siófok, Hungary. He is a member of the Hungarian Chamber of Engineers and has extensive academic and professional experience in Europe and Asia. He obtained his PhD in Civil Engineering from the University of Tokyo in 1997 where his research focused on the sustainable use of land and water resources. Since then he has worked on several international projects specializing in water and environmental management, hydrology, and GIS and remote sensing applications in environmental problem solving.

### ***General Overview***

#### ***Hungary***

According to the typology used in the European Union (EU), 96% of the territory of Hungary is classified as rural areas. 75% of the total population lives in rural regions. The percentage of those living in predominantly rural areas (31%) is three times higher than the EU average (approximately 10%).

The living environment of rural areas is basically healthy, suited for leisure and recreation. These areas have rich natural, architectural and historical heritage and

significant local traditions, including well-preserved handcrafts and trades. Quality food products and gastronomic traditions also represent an important asset in terms of the attractiveness of these areas to tourists.

### **Lake Balaton**

As the largest shallow lake in Central-Europe, Lake Balaton is located in the south-west part of Hungary. The catchment area of the lake is 5.775 km<sup>2</sup>, while the Lake Balaton Resort Area (LBRA) covers 3.623 km<sup>2</sup> (3.9% of the total land mass of Hungary) including the lake itself. The lake surface area is 594 km<sup>2</sup> at medium water level. The resort area consists of 164 municipalities: 148 villages and 16 towns, among them 41 municipalities are bordering the Lake, while the great majority (123) are not; they are referred to as "background municipalities". The permanent population of the area is about 258.000, 2.5% of the total population of Hungary. The average population density is 71 persons/km<sup>2</sup>, which is well below the national average.

### **Agriculture**

Agricultural businesses in the LBRA produce some 3.3% of net business revenues and employ 6.4% of the workforce. Although it is much less important than manufacturing, commerce, tourism or construction, its unique profile and its role in employment in small "background" communities increases its significance.

The Lake Balaton Region is not well suited for agricultural production, with the exception of the eastern part of the region, soils are generally of low quality and the proportion of extremely low-quality moor and shallow topsoil areas is high. However, almost all sectors of agriculture (arable land, horticulture, vine growing, orchards, livestock breeding, fishery, wild game management, forestry) can find favourable areas in the region. The portion of arable land is well below the national average (approx. 2/3), while the orchard and vine categories are several times higher than the national figure.

Of the branches of plant cultivation, vine-growing is the most important. It is a definitive, characteristic feature of the regional landscape and represents an important tourist attraction as well.

Land use category	LBRA area, ha	LBRA %	Country %
<b>Cultivated land</b>	<b>227,041</b>	<b>77.2</b>	<b>85.6</b>
Agricultural	144,338	49.1	66.5
Arable land	95,256	32.4	51.8
Orchard, vinery	19,973	6.8	2.4
Meadow, pasture	13,827	4.7	12.3
Other(reed, fishpond)	15,364	5.2	0.7
Forest	82,703	28.1	19.1
<b>Non-cultivated land</b>	<b>67,094</b>	<b>22.8</b>	<b>14.4</b>

### **Tourism**

In Hungary, tourism is a significant sector of the national economy. According to a wider definition (including accommodation services and the catering sector) and considering

secondary economic effects as well, it contributes 9-10% of GDP and 9-10% of the total number of employees.

The Lake Balaton region is the second most important tourist region in Hungary, only superseded by the capital, Budapest, in terms of importance. About one-third of the national income from tourism is generated in this region.

Tourism is highly seasonal in the LBRA, therefore, some 75% of the accommodation facilities are closed around the end of autumn. Four-star hotels are open all year round but all campgrounds are closed in the off-season. The share of private ownership in accommodation and catering businesses is over 60%, while the figure is only 39% at the national level. Almost 10% of the accommodation and catering businesses in the country are operating in the LBRA.

In 2005, 1.124 million guests were registered in commercial accommodations (419 thousand foreign and 705 thousand domestic guests). In addition, 324.000 guests were registered at private accommodation providers (92% of which in lakeside municipalities). The mean length of stay of guests was 5.7 days at lakeside municipalities while it was 6.8 days at background communities. In the last decade, there was a decrease in guest nights in the LBRA on a whole, but the background municipalities registered an increase.

## ***Plans and Programs***

### ***Perspectives on rural tourism***

Concerning rural tourism, in most countries national markets still dominate this growing segment and this is the case in Hungary. Whereas in the sector of private accommodation in Hungary, guest nights are on the decline, rural tourism is on the rise. The share of guest nights in rural tourism is about 20% of private accommodation in Hungary and has experienced steady growth over the past years.

Accepting the broader definition of rural tourism it covers not only farm tourism or agro tourism, but also special interest nature holidays, touring in rural areas, etc. The corresponding services thus includes not only accommodation, but events, outdoor recreation, production and sale of handicrafts and agricultural products, etc. Although Lake Balaton possesses remarkable endowments, rural tourism in the area is just beginning. Accommodation on farms, wine routes, cycling tourism, horse riding, national park tourism and cultural heritage sites are not yet integrated into a rural tourism profile for the Lake Balaton Region. Organisation, networking and promotional efforts are largely overshadowed by lakeshore tourism marketing. Nonetheless, rural tourism products and activities lie at the core of a modernisation process that has started in the Region as well as on the national level.

### ***Programming documents***

It is the declared aim of the National Tourism Development Strategy (NTDS) to promote rural tourism as a long-term perspective for rural regions and as a competitive new product to attract foreign guests. The development of rural tourism is further detailed in the regional planning documents.

Based on the Balaton Tourism Development Concept, a mid-term tourism development programme was prepared in 1999 for the period of 2000-2006. The main objective of the concept is to align sustainable development with the prosperity of tourism at Lake Balaton. The view of eco-tourism, suggested by the concept, is to preserve the environment, avoid unsustainable volumes of visitors and achieve economic benefits, which contribute to both the host population and to nature preservation.

The medium-term objectives were defined as to improve efficiency and to enhance regional socio-economic cohesion leading to the development priorities for the period of 2000–2006: to eliminate bottlenecks and to commence development of the most important new products. In order to achieve these objectives, projects were prepared and detailed in the Operational programme. Among the most important tourism product potentials, requiring new development, especially in rural tourism, such as: nature walks and trails; hunting; village tourism; horse riding; and wine tours.

The tourism development programme was incorporated into the Regional Development Strategy of the Lake Balaton Region prepared for the period of 2002-2006. The implementation of both programmes lacked appropriate financing, thus the objectives could only be partially fulfilled. Based on the experience of the implementation of the tourism and regional development plan, a renewed tourism development strategy was prepared and a regional development plan is being prepared for 2007-2013. The plan is in line with the 7-year budgeting and programming period of the European Union that could not only orientate development objectives but also guarantee mid-term implementation perspectives.

In the Lake Balaton development plan, close to 45 million USD investment is planned in the field of rural tourism. It is estimated that about 50% of the costs could be covered jointly by the European Agricultural and Rural Development Fund and by the European Regional Development Fund. The development plan is due to be finalised by the end of 2006 following the negotiation process with the government.

## ***Renewable Energy Technologies: Applications in Sub-Saharan Africa***

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### **CV**

***Herick Othieno*** has a Ph.D degree in Applied Physics specialising in Renewable Energy Conversion Principles. He was a founder Director of the Appropriate Technology Centre at Kenyatta University in Kenya – a centre whose main focus was on energy conversion devices. He also served as Deputy Director of Kenya National Institute for Industrial Research and Development. He has been energy consultant for



several development organizations and has written three books one of which is a textbook on Energy Resources in East Africa.

### **Abstract**

More than 80% of the population in Sub-Saharan Africa have no access to national grid electricity. Still a large fraction of them either do not have access to commercial energies such as fossil fuels or cannot afford them. This means that they have to use their own individual energy initiatives in order to satisfy their energy needs. The use of the available energy resources such as solar and wind require relatively sophisticated technologies that are too expensive for these communities. The use of rudimental technologies for harnessing biomass energy is therefore common. there are however social structures that can be established to to enable the communities to acquire decentralised but relatively expensive renewable energy technologies. This paper discusses some of these technologies, their advantages and disadvantages when used for various purposes.

The common and most pressing energy requirements are cooking, lighting, food preservation and clean water provision Effective management and satisfaction of these needs can go along way in reducing prevalence of some diseases, reduction of poverty and improvement of food security. Of the available renewable energy, solar energy is the most abundant and promising in the region. Although biomass is also available, accessing it is increasingly becoming more and more difficult. Furthermore, its use is associated with unpleasant environmental consequences some of which have immediate negative effects on the health of the users. It is also not easy nor cost-effective to produce clean energy such as electricity from biomass. This paper therefore focusses on the use of solar energy technologies to produce heat and electrical energy for a wide range of applications.

## ***Constructing Biogas Ecological Pattern to Control Comprehensively Non-point Resource Pollution***

***Rensheng Fang***

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Provincial Complex in Nanchang

### **Abstract**

The life of lakes is water, the life of water is water environment. Water is essential to agriculture and irrigating water is the major factor which affects the quality of water environment. Jiangxi province is the main rice production area and the principal water resource of the Boyang Lake that is the first fresh water lake in China. Therefore, the non-point resource pollution from agriculture makes seriously an effect on the water environment of the Boyang Lake. As we known, the virulent deleterious pollutants discharging and eutrophication are essential factors of water pollution. Eutrophication becomes the social issue and focus all over the world resulting from mineral fertilizer

and pesticide overrating, husbandry waste water discharging directly and industry organic sewage contaminating. Controlling and preventing non-point resource pollution from agriculture is not only a complex social project but also a national affair involving in all the farmers.

Biogas is a kind of inflammable gas originating from microorganism fermentation in anoxic condition and is used widely in our country after the phenomena was found. Amount of scientific trials and productive practice show biogas is a kind of high-quality gas that can provide good energy for farmers. Anoxic fermenting can deal with harmlessly manure, excreta and other organic material, which get rid of incidence of some diseases and enhances people health level. The bio-chemic technology can degenerate organic materials in the sewage as many as possible, above all high-concentration organic waste water. Biogas liquid and sediment from fermentation abounds nutrition and activity matter, which is good organic fertilizers for crops and forages for livestock. In addition, biogas sediment used as a fertilizer for corps can prevent effectively crops diseases and pest and decrease rate of fertilizer and pesticide. Basing on biogas own function to protecting environment, set-upping a scientific ecological pattern and extending it all over the country is urgent to protect the water environment of lakes.

How to build a biogas complicated ecological pattern according with farmers demand and rural condition? how to widespread and practice it in order to exert synthetically many functions and improve the water environment of lakes?The paper will introduce the scientific basis of the project, ecological pattern building and succeed practices extending widely in Jiangxi province in detail, then discuss the problems during the development of the project and advance the reasonable countermeasures or suggestion.

## ***Renaturation of Wetlands in Nanning***

### ***Johann Senner***

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### **CV**

1982 Completion of study: Dipl.Ing.(FH)

1982-1987 Cooperation in the landscape design office Holste in Frickingen

1987 Member of the Architectural Society of Baden-Württemberg (Al.Nr. 034573)

1987 Founding of the Planning office Planstatt Senner

1993-1998 Professor at the College of Biberach: architecture, fieldwork, design of open spaces

1994-2002 Member of the presidency of the Architectural Society of Baden-Württemberg

2000-2001 Member of the Institut of Architecture of Vorarlberg

2003 Member in the Vereinigung für Stadt-, Regional- und Landesplanung e.V. SRL

2000-2002 Member of the presidency of Bund Deutscher Landschaftsarchitekten BDLA (Union of German landscape architects) in Baden-Württemberg

2003 Member of Verein Chinesischer Gartenkunst (Society of Chinese garden art) in Stuttgart

2004 Opening of the Shanghai Representative Office

### **Abstract**

The proposal tries to find a balance between nature and human intervention. The most important is the establishment of a working ecosystem and the protection of it. Human accessibility needs to be planned very sensitive. This not only profits the nature, but also the people living close to it. People can enjoy better air and water and use the green areas for recreation. The proposal protects the nature and raises the quality of living.

### **Introduction**

The Planstatt Senner (PS Design) was founded 1987 in Ueberlingen Germany. It is now one of the biggest landscape offices in the South of Germany and has planned and built projects worldwide. Since 2003 the office is active in China and has designed, built and won several projects in the whole country.

Together with the Landscape and Art Institute of the Tongji University, the Planstatt Senner planned in 2005 a residential project in Nanning. The site area is located between small hills along several fish ponds and wetlands. The main idea was to renaturate the wetlands and integrate the residential project.

### **Location and surrounding**

The project is located in the north east of Nanning, close to the highway and 15km far from the city center. The site is surrounded by other residential projects. It also is a famous tourist area in Nanning. In the north, just above the project site, is the Dongshan water reservoir, which feeds the fish ponds and wetland with water.

### **Existing site**

The fish ponds in the site measure a total water surface of about 400.000 m<sup>2</sup>. Their depth varies between 1-1.5 m. The water quality is very poor and eutrophic. The water reservoir above, which feeds the ponds, also is polluted.

### **Analysis**

The water is eutrophic, which means the lake is ageing and exposed to algae growth due to an imbalance in the ecosystem. A working ecosystem is based on balance.

The principal element of clear water is a healthy bacteria population. Bacteria are the base for the animal food chain within a pond or lake. Bacteria consume (decompose) waste products and assimilate nutrients by converting this material to other bacteria through the process of growing, reproducing, and multiplying. Bacteria then become the food source for other aquatic organisms such as zoo-flagellates, ciliates, and rotifers, which in turn become food for fish. These living organisms compete for the nutrients (nitrogen and phosphorus) necessary for the growth of algae. If this system is disturbed, the algae and scum evade the water and make the water dirty and smelly. That is why it is important to establish a working ecosystem.

### **Water concept**

Due to the size and further outside pollution, the idea was to create a controlled eco system. The idea of the water concept is to join some of the lakes together and form “blue fingers” in the landscape. These fingers are easier to maintain and can be controlled more efficient. The landscape between these “water fingers” can be used to clean the water. Another function of the “water fingers” is to collect the rainwater from the adjacent residential areas and roads. In the proposal several lakes are connected and in some parts the water surface is increased.

### **Proposed steps to clean the water**

1. Stop the outside pollution of the lake, through filtering and cleaning the water in filtration beds.
2. Clean the lake bottom surface of organic material and eliminate the algae.
3. Reduce the amount of fish and introduce new fish with a low reproducing and less active habit. For example like Silver carps and Bighead fish.
4. Introduce snails and mussels, which feed on algae. For example Pearl mussels and Apple snails.
5. Introduce under water cleaning plants, which sustain the ground and absorb organic material and produce oxygen for the water.
6. Establish swimming plants, which give shadow to some parts of the lake and absorb the nutrients.
7. Establish waterside planting, which absorb Nitrates and Phosphates (necessary for algae growth) and provide a habitat for waterside animals feeding on algae. For all planting it is necessary that it varies in height, shapes and species.
8. Establish special wetland areas, which filter the particles and absorb them. Plants work as bio-filters capable of reducing the polluting substances found in the water. For example reed bed treatment. This plant favors the growth of micro-organisms by means of which the cleaning is carried out.
9. Make sure of an overall circulation of the water.
10. Create a natural waterside with stones and planting, which helps to deal with the different water levels and keeps the good look of the waterside.
11. Create special habitats for birds and other small animals. Make sure several parts are not accessible for pedestrians to maintain the eco system.
12. Plan a maintenance schedule.

Additional alternative steps (more costly) to clean the water:

1. Aerate the water with the help of under water pumps, which also collect the dirt on the lake bottom. Another form of aeration is through the help of oxidation-air filtration-cascades. A proper aeration system provides adequate oxygen for both the increase in decomposition of dead plant and for fish life.
2. Improve the circulation of the water with the help of local pump systems.
3. Install a dam system, to control the water level.
4. Create Ultraviolet-Exposure zones (flat water zones), where the water gets exposed to the sun and sterilized. This also encourages plants and algae to add oxygen to the water as a by-product of photosynthesis.
5. Build carbon filtration beds, which absorb many pollutants and remove the bad smell of the water.
6. Build slow sand filters beds.

7. Construct sedimentation tanks, which cause the fine sediment in water to collect into larger particles and settle to the bottom of a cistern or waterbed, before the water reaches the filter.
8. Build different water levels and topography, which provides a diverse habitat for flora and fauna.
9. Install floating reed islands.

### ***Landscape design***

To create the wetlands and filter beds is one of the main cleaning elements for the project. The design of these areas also is important and to integrate them into the landscape and let them be accessible for the people. Several solutions are proposed.

## ***How Businesses and NGOs Can Succeed Through Strategic Alliances In China***

### ***Haoming Huang***

Executive Director of the China Association for NGO Cooperation

### ***Abstract***

China's economic boom has accelerated social development during the past three decades. This process has also effected the relationship between business and NGOs in China. This paper describes existing cooperation models between companies and NGOs in the field of environment protection.

One case study is the 26 Degree Campaign, which was a collaborative initiative launched in 2004 by six Chinese environmental NGOs, i.e. the China Association for NGO Cooperation (CANGO), Global Village of Beijing (GVB) etc. It aimed at convincing the big electricity consumers, such as hotels and shopping malls, to switch their air conditioners to 26 degree or above, thus alleviating the electricity shortage in Beijing city as well contributing to protecting the environment by reducing the release of heat generated by air conditioners. A kick-off press conference was held on June 26, 2006 in order to raise public awareness for the campaign issue. In the following weeks and months, the campaign team contacted big air conditioner consumers, in particular four and five star hotels. This exercise proved to be a rather difficult process. The involved campaigners experienced some resistance from hotels, especially those run by Chinese managers. They claimed that they had to abide by international standards, which would require them to keep a certain temperature to maintain a certain rating. Despite such challenges, campaigners kept on sending emails and faxes to hotels in Beijing and engaged both public relations officials as well as the top management of hotels. This case study thus reveals how NGOs manage to successfully engage the business sector.

A second case study is a project on Afforestation and Desertification-Control in Wangying Township, Fengning County, Hebei Province (hereafter referred to as the Wangying Project). In order to improve the ecological environment, reduce the harm of sandstorms to Beijing and Tianjin, improve the environment of the local area that is affected by sandstorms, the Wangying project's objective was to plant 11,000 new trees. The project received support from two companies and one environmental NGO amounting to RMB 117,900 Yuan. The Wangying project emphasized community participation based on the cooperation between business and NGOs. It did so by improving people's skills through training programs. Local farmers as well as

students from primary schools and middle-schools were invited to join community trainings, thereby raising their awareness for the need of environment protection.

What are the findings from the two case studies? The author would like to give the following suggestions for NGOs and companies:

- 1, To encourage and support employee volunteering from the business sector
- 2, To provide a family-friendly and gender sensitive environment for employees
- 3, To be willing to employ members of vulnerable groups
- 4, To develop partnership projects with the social service sector
- 5, To share business expertise with social service organizations
- 6, To donate or give in-kind support to the local community

Strategic partnerships between companies and NGOs can contribute both a balanced economic and social development. Any cooperation model should consider the needs among stakeholders, such as companies, local farmers, people at the grassroots, as well as the media.

## ADDITIONAL INFO

### 背景材料

#### ***Brief Introduction of China***

The People's Republic of China is a vast country with rich natural resource. The Pacific Ocean and the South China Sea lap its shores, and great mountains and rivers adorn its territory. Superior natural conditions provide not only a vast room of subsistence for the Chinese nation but also a strong material foundation for China's social progress.

China is one of the important birthplaces of ancient human beings. More than one million years ago ancestor of the Chinese nation began a primitive social life on this vast land. More than 10 sites of primitive men have been discovered in the reaches of the Yangtze and the Yellow River. They include Yunnan's Yuanmei Man who lived about 1.7 million years ago, Shaanxi's Lantian Man of 800,000 years ago, and the Peking Man of 600,000 years ago.

The Chinese civilization is one of the earliest in the world: it has a recorded history of more than 5,000 years. Chinese agriculture and handicraft industry were among the most developed in the world in history. Chinese culture not only is rich and splendid but also has strong vitality. Among the best-known cultural attainments and pursuits of the Chinese people are silk, pottery-and-porcelain making, architecture, gardening, stone carving, stone engraving, traditional Chinese medicine, wushu (martial arts) and ancient books and records. Many ancient construction projects, which are a crystallization of the wisdom and strength of the Chinese people, have become part of the cultural heritage of the nation. Such projects include the Great Wall, the Grand Canal, an ancient plank road built along the face of cliffs in Sichuan Province, the Dujiang Water Diversion Project in the same province, the Lingqu Canal in Guangxi and the karez – an irrigation system of wells connected by underground channels used in the central Asian region of Xinjiang.

Places of historical interest, scenic areas and nature reserves for the protection of rare animal and plant species – these are important heritages left behind by past generations and natures; they also important conditions for the development of a tourist industry and scientific research. In China at present, with fast economic development propelled by the policies of reform and opening to the outside world, tourist resources are being developed on a massive scale. A total of 119 areas have been designated as state-level places of scenic beauty and/or historical interest, including 19 that have been listed as World Cultural and Natural Heritage sites by the United Nations. Through a recent national poll, the following have been recognized as the Top Ten Places of Scenic Beauty and/or Historical City in China: the Great Wall, the Forbidden City in Beijing, Mount Huangshan in Anhui, the West Lake in Hangzhou, Guilin landscape, the Three Gorges of the Yangtze, gardens in Suzhou, the Terra-Cotta Solidiers and Hourses of Emperor Qin Shihuang in Xi'an, the Summer Resort of Chengde and the Sun and Moon

Lake in Taiwan. Mao Zedong said in one of his poems: "Our motherland is so rich in beauty." This is a most concise summation of China's geographical feature.

### **Physical Geography**

Located in East Asia, on the western shore of the Pacific Ocean, the People's Republic of China (PRC) has a land area of about 9.6 million sq km, and is the third-largest country in the world, next only to Russia and Canada.

From north to south, the territory of China measures some 5,500 km, stretching from the center of the Heilongjiang River north of the town of Mohe (latitude 53° 30' N) to the Zengmu Reef at the southernmost tip of the Nansha Islands (latitude 4° N). When north China is still covered with snow, people in south China are busy with spring plowing. From west to east, the nation extends about 5,200 km from the Pamirs (longitude 73° 40'E) to the confluence of the Heilongjiang and Wusuli rivers (longitude 135° 05' E), with a time difference of over four hours. When the Pamirs are cloaked in night, the morning sun is shining brightly over east China. China has land borders 22,800 km long, with 15 contiguous countries: Korea to the east; the People's Republic of Mongolia to the north; Russia to the northeast; Kazakhstan, Kirghizstan and Tajikistan to the northwest; Afghanistan, Pakistan, India, Nepal and Bhutan to the west and southwest; and Vietnam, Laos and Myanmar to the south. Across the seas to the east and southeast are the Republic of Korea, Japan, the Philippines, Brunei, Malaysia and Indonesia.

The Chinese mainland is flanked to the east and south by the Bohai, Yellow, East China and South China seas, with a total maritime area of 4.73 million sq km. The Bohai Sea is China's continental sea, while the Yellow, East China and South China seas are marginal seas of the Pacific Ocean. A total of 5,400 islands dots China's vast territorial waters. The largest of these, with an area of about 36,000 sq km, is Taiwan, followed by Hainan with an area of 34,000 sq km. Diaoyu and Chiwei islands, located to the northeast of Taiwan Island, are China's easternmost islands. The many islands, islets, reefs and shoals on the South China Sea, known collectively as the South China Sea Islands, are subdivided into the Dongsha, Xisha, Zhongsha and Nansha island groups.

### **Climate**

China has a marked continental monsoonal climate characterized by great variety. Northerly winds prevail in winter, while southerly winds reign in summer. The four seasons are quite distinct. The rainy season coincides with the hot season. From September to April the following year, the dry and cold winter monsoons from Siberia and Mongolia in the north gradually become weak as they reach the southern part of the country, resulting in cold and dry winters and great differences in temperature. The summer monsoons last from April to September.

The warm and moist summer monsoons from the oceans bring abundant rainfall and high temperatures, with little difference in temperature between the south and the north. China's complex and varied climate results in a great variety of temperature belts, and dry and moist zones. In terms of temperature, the nation can be sectorized from south to north into equatorial, tropical, sub-tropical, warm-temperate, temperate, and cold-temperate zones; in terms of moisture, it can be sectorized from southeast to northwest into humid (32 percent of land area), semi-humid (15 percent), semi-arid (22 percent) and arid zones (31 percent).



### ***Fauna and Flora***

China is one of the countries with the greatest diversity of wildlife in the world. There are more than 4,400 species of vertebrates, more than 10 percent of the world's total. There are nearly 500 animal species, 1,189 species of birds, more than 320 species of reptiles and 210 species of amphibians. Wildlife peculiar to China includes such well-known animals as the giant panda, golden-haired monkey, South China tiger, brown-eared pheasant, white-flag dolphin, Chinese alligator and red-crowned crane, totaling more than 100 species. The giant panda is an especially attractive sight. Heavily built, it has a docile disposition, and is delightfully adorable. The 1.2-m-tall red-crowned crane is a snow-white migratory bird. A distinctive patch of red skin tops its grey-brown head, hence its name. The white-flag dolphin is one of only two species of freshwater whale in the world. In 1980, a male white-flag dolphin was caught for the first time in the Yangtze River, which aroused great interest among dolphin researchers worldwide.

China has some of the most abundant plant life in the world. There are more than 32,000 species of higher plants, and almost all the major plants that grow in the northern hemisphere's frigid, temperate and tropical zones are represented in China. In addition, there are more than 7,000 species of woody plants, including 2,800 tree species. The Metasequoia, Chinese cypress, Cathaya tree, China fir, Golden larch, Taiwan fir, Fujian cypress, Dove-tree, Eucommia and Camptotheca acuminata are found only in China. The Metasequoia, a tall species of arbor, is considered as one of the oldest and rarest plants in the world. The Golden larch, one of only five species of rare garden trees in the world, grow in the mountain areas in the Yangtze River valley. Its coin-shaped leaves on short branches are green in spring and summer, turning yellow in autumn. China is home to more than 2,000 species of edible plants and 3,000 species of medicinal plants. Ginseng from the Changbai Mountains, safflowers from Tibet, Chinese wolfberry from Ningxia and Notoginseng from Yunnan and Guizhou are particularly well-known Chinese herbal medicines. There is a wide variety of flowering plants. A flower indigenous to China, the elegant and graceful peony is treasured as the "color of the nation and the scent of heaven." Three famous species of flowers--the azalea, fairy primrose and rough gentian--grow in southwest China. During the flowering period, mountain slopes covered with flowers in a riot of colors form a delightful contrast with undulating ridges and peaks.

In a concerted effort to protect the nation's zoological and botanical resources, and save species close to extinction, China has established 1,146 nature reserves to protect forests and wildlife, with a total area of 88.13 million ha. The 15 nature reserves in China, namely, Sichuan's Wolong and Jiuzhaigou, Jilin's Changbai Mountains, Guangdong's Dinghu Mountains, Guizhou's Fanjing Mountains, Fujian's Wuyi Mountains, Hubei's Shennongjia, Inner Mongolia's Xilingol, Xinjiang's Mt. Bogda, Yunnan's Xishuangbanna, Jiangsu's Yancheng, Zhejiang's Tianmu Mountains Nanji and Islands Guizhou's Maolan and Heilongjiang's Fenglin, have joined the "International People and Bio-sphere Protection Network." Heilongjiang's Zhalong, Jilin's Xianghai, Hunan's Dongting Lake, Jiangxi's Poyang Lake, Qinghai's Bird Island, Hainan's Dongzhai Harbor and Hong Kong's Mai Po have been included in the listing of the world's important wetlands.

### ***Population***

China is the most populous country in the world, with 1.25909 billion people at the end of 1999, about 22 percent of the world's total. This figure does not include many Chinese in

the Hong Kong Special Administrative Region, Taiwan Province and Macao Special Administrative Region.

The population density in China is 130 people per sq km. This population, however, is unevenly distributed. Along the densely populated east coast there are more than 400 people per sq km; in the central areas, over 200; and in the sparsely populated plateaus in the west there are less than 10 people per sq km.

When New China was founded in 1949, China had a population of 541.67 million. Owing to China's stable society, rapid production development, improvement of medical and health conditions, insufficient awareness of the importance of population growth control and shortage of experience, the population grew rapidly, reaching 806.71 million in 1969. In the early 1970s, the Chinese government realized that the over-rapid population growth was harmful to economic and social development, and would cause great difficulties in the fields of employment, housing, communications and medical care; and that if China could not effectively check the over-rapid population growth, and alleviate the tremendous pressure that the population growth was exerting on land, forests and water resources, the worsening of the ecology and the environment in the coming decades would be disastrous, thus endangering the necessary conditions for the survival of humanity, and sustainable social and economic development. Then the Chinese government began implementing a family planning, population control and population quality improvement policy in accordance with China's basic conditions of being a large country with a poor economic foundation, a large population and little cultivated land, so as to promote the coordinated development of the economy, society, resources and environment. Since then birth rates have steadily declined year by year. China's birth rate dropped from 34.11 per thousand in 1969 to 15.23 per thousand at the end of 1999; and the natural growth rate decreased from 26.08 per thousand to 8.77 per thousand, thus basically realizing a change in the population reproduction type to one characterized by low-birth, low-death and low-increase rates.

### ***Fifty-six Ethnic Groups***

China is a united multi-ethnic nation of 56 ethnic groups. According to the fourth national census, taken in 1990, the Han people made up 91.96 percent of the country's total population, and the other 55 ethnic groups, 8.04 percent. As the majority of the population is of the Han ethnic group, China's other ethnic groups are customarily referred to as the national minorities.

The Han people can be found throughout the country, though mainly on the middle and lower reaches of the Yellow River, the Yangtze River and the Pearl River valleys, and the Northeast Plain. The national minorities, though fewer in number, are also scattered over a vast area (see the attached table, and can be found in approximately 64.3 percent of China, mainly distributed in the border regions from northeast China to north, northwest and southwest China. Yunnan Province, home to more than 20 ethnic groups, has the greatest diversity of minority peoples in China. In most of China's cities and county towns, two or more ethnic groups live together. Taking shape over China's long history, this circumstance of different ethnic groups "living together in one area while still living in individual compact communities in special areas" continues to provide the practical basis for political, economic and cultural intercourse between the Han and the

various minority peoples, and for the functioning of the autonomous national minority areas system.

### **Administrative Division System**

China's administrative units are currently based on a three-level system dividing the nation into provinces, counties, and townships:

—The country is divided into provinces, autonomous regions, and municipalities directly under the Central Government;

—A province or an autonomous region is subdivided into autonomous prefectures, counties, autonomous counties, and/or cities;

—A county or an autonomous county is subdivided into townships, national minority townships, and/or towns.

Municipalities directly under the Central Government and large cities are subdivided into districts and counties; autonomous prefectures are subdivided into counties, autonomous counties, and cities. Autonomous regions, autonomous prefectures, and autonomous counties are all autonomous national minority areas.

The Constitution specifically empowers the state to establish special administrative regions when necessary. A special administrative region is a local administrative area directly under the Central Government.

At present, China is divided into 23 provinces, 5 autonomous regions, 4 municipalities directly under the Central Government, and 2 special administrative regions.(see the following table).

### **China's Provinces, Autonomous Regions, Centrally Administered Municipalities and Special Administrative Regions**

Name	Seat of	Area	Population
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	<b>Government</b>	<b>(100,000km<sup>2</sup>)</b>	<b>(100,000)</b>
Beijing Municipality	Beijing	0.168	125.7
Tianjin Municipality	Tianjin	0.113	95.9
Hebei Province	Shijiazhuang	1.900	661.4
Shanxi Province	Taiyuan	1.560	320.4
Inner Mongolia Autonomous Region	Hohhot	11.830	236.2
Liaoning Province	Shenyang	1.457	417.1
Jilin Province	Changchun	1.870	265.8
Heilongjiang Province	Harbin	4.690	379.2
Shanghai Municipality	Shanghai	0.062	147.4
Jiangsu Province	Nanjing	1.026	721.3
Zhejiang Province	Hangzhou	1.018	447.5
Anhui Province	Hefei	1.390	623.7
Fujian Province	Fuzhou	1.200	331.6
Jiangxi Province	Nanchang	1.666	423.1
Shandong Province	Jinan	1.530	888.3
Henan Province	Zhengzhou	1.670	938.7
Hubei Province	Wuhan	1.874	593.8
Hunan Province	Changsha	2.100	653.2
Guangdong Province	Guangzhou	1.860	727.0
Guangxi Autonomous Region	Nanning	2.363	471.3
Hainan Province	Haikou	0.340	76.2
Chongqing Municipality	Chongqing	0.820	307.5
Sichuan Province	Chengdu	4.880	855.0
Guizhou Province	Guiyang	1.700	371.0
Yunnan Province	Kunming	3.940	419.2
Tibet Autonomous Region	Lhasa	12.200	25.6
Shaanxi Province	Xi'an	2.050	361.8
Gansu Province	Lanzhou	4.500	254.3
Qinghai Province	Xining	7.200	51.0
Ningxia Autonomous Region	Yinchuan	0.664	54.3
Xinjiang Autonomous Region	Urumqi	16.000	177.4
Hong Kong Special Administrative Region	Hong Kong	0.01092	68.4 (in mid 1999)
Macao Special Administrative Region	Macao	0.00024	4.3
Taiwan Province		0.360	217.4 (1997)

## ***Brief Introduction of Jiangxi Province***

### ***Location***

Jiangxi Province, called "Gan" in brief under the reign of Emperor Xuan of Tang Dynasty, is one of the inland provinces of the People's Republic of China. It lies in the southeast of China and on the southern bank of the middle Yangtze River at latitude between 24°29' and 30°05' and longitude between 113°34' and 118°29'. Jiangxi borders Zhejiang and Fujian to the east, Guangdong to the south, Hunan to the west and Hubei and Anhui to the north. The province has a total area of 166,900 Square Kilometers. With the shape of a leaf on the map, the province stretches 620 kilometers from south to north and 490 kilometers from east to west.

### ***Administration and population***

Jiangxi Province has eleven cities and 99 counties. The cities are Nanchang, the capital city; Jiujiang, Jingdezhen, Pingxiang, Xinyu, Yingtan, Ganzhou, Yichun, Shangrao, Ji'an and Fuzhou. The province's total population is 41.398 million.

### ***Climate***

Jiangxi has distinct seasons. The climate in spring is changeable with wet rainy days when spring turns into summer. It is hot and dry in summer, but it is cold and dank in winter with a short frost period. The annual average sunshine is 1473 to 2077 hours. The province enjoys plentiful rainfall with a mean annual precipitation of 1341.4 to 1934.4 millimeters.

### ***Topography***

In terms of topography the province is characterized by mountains and hills. Mountainous areas take up 36% of the total land, hills 42% and plains and water field 22%. The chief mountain ranges are along the border areas. In the northeast is Mt. Huaiyu, embracing the largest copper reserves of the province. In the east stands Mt. Wuyi. In the south is the famous Dagengling, nicknamed "the home of tungsten" and Mt. Jiulian. In the west stands Mt. Luoxiao and in the northwest Mt. Mufu and Mt. Jiuling. There are more than 2400 rivers of various sizes running across the province. Of these, 160 have water all year. The rivers have a combined total length of about 18,400 kilometers. The five major waterways in the province are the Ganjiang River, Fuhe River, Xinjiang River, Xiuhe River and Raohe River. The Poyang Lake in northern Jiangxi is the largest fresh water lake in China.

### ***Mineral and Water Resources***

Jiangxi is unusually rich in mineral resources. Among the 150 minerals discovered in the World, Jiangxi has more than 140, 33 are among top five in volume and quality in the country. Of these minerals, the reserves of nonferrous metals, precious metals, rare metals and rare-earth minerals occupy a dominant position in the country. Jiangxi has

set up the largest copper mine in Asia and the largest copper-smelting base in the country.

The water resources in Jiangxi total 141.6 billion cubic meters. The amounts in terms of both personal average and per *Mu* of cultivated land are higher than the average national level. Ample water resources create a favorable condition for industrial and agricultural development of the province.

### **Forestry**

Jiangxi is located in the middle of subtropical zone, which possesses mild climate, abundant rainfall, fertile land, predominant natural conditions and plentiful natural resources. Jiangxi province has got more than 4800 species of higher plants, including more than 2000 kinds of woody plants. There are 644 species of terrestrial vertebrates, including 22 species under the first-class state protected animals including China tiger and White stork. There are 67 species under the second-class state protected animals including Whistling swan and Asiatic golden cat.

Bamboo and oil-tea camellia are special forest resources in Jiangxi. There are 0.733 billions hectares of bamboo land and 137 millions stems of growing stock. Chongyi and Yifeng county are among the ten biggest “bamboo countries” in China. There is 0.833 millions hectares of land for oil tea tree in Jiangxi, which is more than 60% of provincial total land for economic forest and more than 30% of the state land for oil-tea tree. It can produce 30-35 millions kilograms tea oil every year. Land for oil-tea tree and annual output all occupy second place in China.

Jiangxi is an important forestry province in southern China. The total provincial land is 166,900 square kilometers. Forest has played a very important role in Jiangxi economic and social development. The forest coverage ratio is 59.79%, which occupies second place in China.

## **Nanchang City**

Nanchang, capital of Jiangxi province, has been a prosperous cultural city south of the Yangtze River for 2,190 years. Poet Wang Bo (649-676) of the Tang Dynasty described it in the "Preface to Tengwang Tower" as a place "boasting rich resources and people of talents". With an area of 7,402 square kilometers and a population of 4.3 million, the city has jurisdiction over five prefectures and four counties.

Nanchang is a heroic city. In 1927, Zhou Enlai, Zhu De and He Long led the August 1 Nanchang Uprising forming the army of the Chinese Communist Party (Chinese Peoples' Liberation Army).

Three rivers, Ganjiang, Fuhe and Jinjiang, flow through the city. Mt. Meiling, known as "small Lushan Mountain", lies in the west suburb of Nanchang and southwest of Poyang Lake. Streams meander among deep gorges and beautiful peaks, making Mt. Meiling an ideal summer resort.

In the city proper there are the ancient Shengjin Pagoda, Ruzi Pavilion, Shui Guan Yin Pavilion and East, South, West and North Lakes. Qingyunpu, a Taoist temple over a thousand-year old is located in the south suburb of the city. Zhu Da, a descendent of the tenth generation of Zhu Yuanzhang, founding emperor of the Ming Dynasty (1368-1644) developed a school of freehand brushwork in traditional Chinese painting and became an outstanding painter and Taoism believer. His paintings are on display in Qingyunpu.

A famous landmark in Nanchang is the Tengwang Tower in the style of the Song Dynasty. The 54.4-meter-high tower consists of three open stories and six hidden stories. The glazed tiles, gilded double eaves, carved screens and vermilion corridor columns produce an effect of archaic simplicity and elegance. Outside the pavilion are courtyards, rockeries, terraces, pavilions and a lotus pond, covering an area of 40,000 square meters.

Flat and fertile soil and many rivers and lakes make Nanchang one of China's leading commodity grain-producing bases. The area also produces a great variety of fresh-water fish such as catfish in spring, carp in summer, mandarin fish in autumn and bream in winter. A number of bases producing farm, animal husbandry and side-line products for export have been set up in the suburbs of Nanchang.

Nanchang is also a rising industrial city. Over the past 30 years its urban area has been expanded fivefold. Today, there are 2,400 modern factories and enterprises in metallurgy, machinery, aviation, electronics, textile, chemical industry, building materials, medicine, foodstuffs, paper-making and printing. Over 180 varieties of products in 9 categories and 480 designs are sold at home and overseas market. In recent years Nanchang has signed a number of joint-venture projects with firms from 14 countries and regions. More are expected.

## **Poyang Lake**

### **Geographical Situation**

Poyang Lake is located at 28°22′- 29°45′ north latitude and 115°47′- 116°45′ east longitude. It lies in the northern part of Jiangxi Province, at the southern bank of the middle and lower reaches of Yangtze River (or Changjiang River as commonly called by Chinese people). It is divided into two parts by Songmenshan Mountain. The northern part is the water channel joining the Changjiang River, with the length of 40km and the width of 3-5km (the narrowest point is 2.8km or so). The southern part is the main lake, with the length of 173km and the furthest width of 70km with a mean width of 16.9m from west to east

Poyang Lake is the largest fresh lake in China. The lakeshore is 1200km long, and the area of the water body 3,283 km<sup>2</sup> (when the water level at Hukou is 21.71m), mean depth 8.4m, and the inmost depth about 25.1m. Its volume is 27.6 billion m<sup>3</sup>. It holds water from the five rivers — Gan River, Fu River, Xing River, Rao River and Xiu River, and emptied into Changjiang River, the longest river in China. Its annual afflux of water to Changjiang River exceeds the total water amount of the three rivers -- Huanghe River, Huaihe River and Haihe River. It is a seasonal lake with the feature of taking in and sending out water. The area of the watershed is 162.2 thousand km<sup>2</sup>, taking up 97% of Jiangxi provincial territory, 9% of the Basin of Changjiang River. The annual mean runoff of the watershed is 152.5 billion M<sup>3</sup>, accounting for 16.3% of that of the watershed of Changjiang River.

The mean water level of Poyang Lake in many years is 12.86m, the highest 22.59m on July 31, 1998, the lowest 5.9m on Feb. 6, 1963 (at Hukou Hydrological Station, Wusong Base Level). The amplitude of variation of water level is from 9.79m to 15.36 in a year. The absolute fluctuation of water level is up to 16.69m. With variation of water amount, the fluctuating range of water level is relatively large. It can naturally store floodwater. The area of the Lake greatly varies with the fluctuation of its water level. The water level rises at flood season and then the water surface suddenly expands. And it drops at low water and bottomland comes out, and only several wandering watercourses remain. The landscape looks like a line at low water and an ocean at flood.

### **Culture and History**

Poyang Lake was called Pengli Pond, Guantinghu Lake and many other names in ancient period. Over very long time, Pengli Bog expanded to the south and water went over Songmenshan Mountain and reached over the vicinity of Poyang County, under the interaction of geological, meteorological and hydrological factors. So its name is changed to Poyang Lake. Before the invasion of water to the south, the south to Songmenshan Mountain is originally a well-populated Xiaoyang Plain. With gradual expansion of water to the south, Xiaoyang County and Haihun County in the Basin of Poyang Lake is submerged into water successively. There is a saying that “Xiaoyang submerged and Duchang appeared, and Haihun submerged and Wucheng appeared”. Over long-term evolution, the modern miniature of the mist-covered and vast Poyang



Lake formed about 1600 years ago. It is like a big precious gourd tied with the girdle – Changjiang River of thousands of miles long.

Poyang Lake Watershed has been one of the rich, economically forward areas in China since ancient time. Many historically distinguished characters of our Nation, such as Xu Zhi, Tao Yuanmin, Lin Shihong, Liu Shu, Hong Shi, Zhu Yuanzhang and Zhu Da, had lived in the lake area. Many powerful heroes' stories have taken place here. For example, Zhou Yu trained his marine; marine war in Poyang Lake brought about between Zhu Yuanzhang and Chen Youliang; Taiping Army won great victory at Hukou; and Li Liejun launched "Secondary Revolution" at Hukou. Poyang Lake was the only waterway to Jiangxi from the north in ancient time. Anecdotes and legends arising from Poyang Lake are countless. The well-known lines – "fisher boat singing in the sunset glow and echoing at the Pengli Shore", of "Protasis of Tengwang Pavilion" wrote by Wang Bo, a poet in Tang Dynast, has depicted the fishers' cheerful scene of harvesting of fish back from Poyang Lake. Su Shi, a great poet in Song Dynasty, wrote that "Green Mountains around, water without boundary, in the middle was painted small or big island" in the poem of "Li Sishun's Drawing of Splendid Island of Changjiang River", which has given us a picture of the beautiful scenery of Poyang Lake.

Splendid mountains and wonderful islands can be found everywhere around Poyang Lake. Mt. Shizhongshan and Mt. Dagushan in Hukou County, Mt. Nanshan and Laoyemiao Shrine in Duchang County and Mt. Luoxingdun in Xingzi County are intriguing tourist attractions. All scenic spots are connected to form a tourist route through cruisers, under the efforts of Jiujiang Tourism Administration.

### ***The Important International Wetland***

Poyang Lake is an important international wetland, and an important storing lake of the main tributaries of Changjiang River. It possesses very important ecological functions, e.g. floodwater storage and biological diversity protection, in the watershed of Changjiang River. It is one of the 10 ecological conservation areas in China, and also one of the global important ecological areas regulated by GEF. It plays very important roles in maintaining the ecological safety of the region and the Nation.

### ***'The World of White Cranes' and 'The Kingdom of Rare Birds'***

Poyang Lake has the annual mean precipitation of 1,636mm, because of the contribution of warm and humid monsoon. Since it possesses humid monsoon climate, Poyang Lake becomes accordingly "the country of rivers and green grass, and blooming plums in the misty rain", and "a land flowing with milk and honey". Its environment and climatic conditions are suitable for migratory birds to live through the winter. In late autumn and early winter in every year, thousands and thousands of birds migrate over here from Siberia of Russia, Mongolia, Japan, Korea, and northeastern and northwestern China. In spring (April) of next year, they gradually migrate away. So far, there are more than 300 kinds and a million (?) of birds, among which 50 kinds are rare birds, in the conservation area. It becomes one of the biggest bird conservation areas in the world. Especially, it is here where the biggest group of white cranes was found in the world. The total number of wintering populations was above 4,000 in 2002, accounting for more than 95% of total of white crane in the world. This is why Poyang Lake comes to be known as "the world of white cranes" and "the kingdom of rare birds".

### **Agricultural Situation**

The primary industry accounts for 28.6% of the industry composition in the Lake area, much higher than the 17.9% for the entire province; but the secondary industry accounts for 40.4%, much lower than the provincial 47.3%. This demonstrates fully that agricultural economy still holds a relatively important position and industry is relatively under-developed in the Lake area. Farming (crop planting and fishery) dominate in the agricultural economy, representing 71.2% of the total agricultural output value. The agricultural structure in the Lake area is somewhat different from that in the whole province, in which crop plantings and animal husbandry dominates (accounting for 76.6% of the total output value). The percentage of crop plantings in agriculture is similar to that of the whole province, but the percentage of fishery output value in the Lake area doubles that in the whole province; the percentage of animal husbandry output value in the Lake area is relatively lower; however, the percentage of animal husbandry output value of the entire province is higher than that of the Lake area. All this fully shows that the economy in the Lake area has started to enter the initial stage of industrialization, but agriculture still holds relatively larger percentage. Crop plantings and fishery dominate in the agricultural structure.

There exist big differences in the agricultural production activities among farmer households in different living places in the Lake area. Villagers in the market areas and lakeside villages consisting of the countless hamlets distributed along the natural banks or islands of Poyang Lake make a living by fishing, forming specialized fishing villages, or make a living by farming, forming farming areas in the markets, or lakeside hamlets of half-farming and half-fishing. The households on the Lake include the specialized fishermen living in the boats and boatmen making a living mainly by transportation.