

# **Report of the International Advanced Training Workshop on Integrated River Basin Management**

27 July to 3 August 2009 Beijing, China

*Organized by International Research and Training Centre on Erosion and Sedimentation (IRTCES) in cooperation with World Association for Sedimentation and Erosion Research (WASER)*

*Sponsored by International Sedimentation Initiative (ISI)-UNESCO-IHP and Ministry of Water Resources, P.R. of China*

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The International Sedimentation Initiative (ISI) has been launched by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The overall objective of the ISI is to promote and interact with activities that will result in:

- Increased awareness of sedimentation and erosion issues;
- Improved and sustainable management of soil and sediment resources;
- Better advice for policy development and implementation.

The International Research and Training Centre on Erosion and Sedimentation (IRTCES), in Beijing, China, plays a key role in implementing the ISI and has been identified as the ISI Project Technical Secretariat. The Advanced Training Workshop on Integrated River Basin Management, from 27 July to 3 August 2009 in Beijing, was a major activity of the ISI of UNESCO. It met one of the objectives of ISI "Education and Capacity building for Sustainable Sediment management". The workshop was also one of the activities for the Silver Jubilee of IRTCES.

The training workshop on integrated river basin management aimed at coordinating various sectors in the river basin to protect the safety of the people living by the river and to promote sustainable use of the land and water resources, arriving at economically productive, socially equitable and environmentally sustainable solutions.

The workshop was attended by participants with high standard background. The total number of 51 participants came from 18 countries and regions distributed in Asia, Australia, Africa and Europe. Through lectures, discussions and laboratory study the participants have improved their knowledge on river basin management. They received the latest concepts, techniques and information, and established network among participants.

The total seven lectures focused on three topics: integrated river basin management; water resource management and allocation; and water and soil conservation. Several presentations focused on the integrated river basin management under global climate change, which gave the opportunity for the participants to receive the latest information on the topic.

During the workshop all participants showed their strong interest in exchanging information. On the seminar sixteen presentations from different countries focused on various fields to share their

experience and to widen their knowledge. Cooperation among the trainers, the trainees and the course organizers was strong and efficient.

The workshop consisted of:

## 1. **Integrated river basin management:**

### 1.1. *Principles of Integrated River Basin Management* (Prof. Zhaoyin Wang)

Management and restoration of river ecosystems are based on an understanding of the relations between physical, chemical, and biological processes at varying time scales. Often human activities have accelerated the temporal progression of these processes, resulting in unstable flow patterns and altered biological structure and function of stream corridors. The lecture discussed river ecology, disturbances of the ecology, and restoration strategies.

### 1.2. *Key technologies of Integrated Management of water, sediment, and aquatic ecology of rivers* (Prof. Zhaoyin Wang)

River regulation and river training have been performed for various purposes and negative effects have been shown in numerous cases. In some cases the negative effects are so serious that humans have to consider “renaturalizing” the regulated rivers. Only by using the strategy of integrated river management the diverse river uses and natural fluvial processes and ecological systems may be harmonized. Based on analysis of case studies and data collected from literature the lecture presented the concept of integrated river management and four principles of river training. The integrated river management comprises of: 1) taking the watershed, upper stream basin including the tributaries, middle and lower reaches and the estuary as an integrated entity in the planning, design and management; and 2) mitigating or controlling the negative impacts on hydrology, erosion and sedimentation, fluvial processes, land use and river use, environment and ecology while achieving economic benefit from water resources development, flood safety management and hydropower exploitation. River training and management should be in accordance with four interconnected principles: 1) extending the duration of river water flowing on the continent, which may be achieved by extending the river course or reducing the flow velocity; 2) controlling various patterns of erosion and reducing sediment transportation in the rivers; 3) increasing the diversity of habitat and enhancing the connectivity between the river and riparian waters; and 4) restoring natural landscapes.

### 1.3. *Guidelines on Strategic Planning of Basin Water Resources with some Cases* (Prof. Heng Liu)

The lecture gave a guideline from the concept of IWRM for challenges such as operational and development management; water tariff and pricing; decision support systems; and institutional issues. It introduced a whole set of technical, institutional, managerial, legal and operational activities required to plan, develop, operate and manage water resources for sustainable development.

Many technical guidelines for infrastructural projects have been developed by professional technical networks to ensure high engineering and quality standards. What is lacking is a comprehensive and integrated framework for decision making on the provision of water and energy services. At the end of the lecture a decision-making framework was presented that emphasised a structured process, incorporating the full range of social, environmental, technical, economic and financial criteria and standards. The cases were taken from China.

1.4. *Introduction to IWRM Manual from UNESCO-IHP – IWRM Guidelines for River Basin Management (NARBO / Japan Water Agency)*

The principles and concepts of IWRM have been widely recognized, but the implementation of IWRM is not satisfactorily progressing in many basins. This is, perhaps, because the practitioners responsible for water resource management at the basin level encounter difficulties in understanding where and how to begin, or the advantages of applying IWRM with respect to their actual situation may not be apparent enough. On the other hand, policy makers with dedicated approaches for setting up enabling environments and political frameworks that strongly support sound and sustainable water resource management are necessary prerequisites for IWRM to function effectively. Therefore, it is desired that practitioners and decision makers absorb the ideas and needs of IWRM, and understand the effectiveness of applying these within a basin-wide approach. The aim of the IWRM Guidelines by the Japan Water Agency is to put the principles into practical applications and also it is intended to be used as a tool to fill that “gap”. Every river basin is different but the guide should help with necessary information to recognise and overcome such difficulties and problems.

**2. Water Resources Management and Allocation:**

2.1. *Water Resources Development and Allocation Measures with Typical River Basin (Prof. Jun Xia)*

The lecture presented that due to pressure of population and social and economic development, North China is facing a serious problem and challenge on water security. Climate change and human activity are two major factors that resulted in such water crisis in this area, particular in the Yellow River domain and the Haie River basin. Therefore, understanding the water cycle process to change the environment should be emphasized. Science plays a very important role in that. Wisely managing water resources, particularly in water saving is the major challenge in the future. Introducing the Global Water System Project (GWSP) was also part of the presentation. The purpose of the GWSP is to understand the ways in which humans influence the dynamics of the global/local water system and to inform decision makers on how environmental and socio-economic consequences of these impacts can be mitigated. With respect to risks of floods, droughts, water shortage and degradation of aquatic ecosystems, China has adopted the global water system approach to managing water resources in a sustainable way. The two key bodies are: The Chinese National Committee of the Global Water System Project (GWSP-CNC) and The Asia Network Science Office of Global Water System Project (GWSP-ANSO).

**3. River Basin Water and Soil Conservation:**

3.1. *Mechanism of Soil Erosion, Water and Soil Conservation Measures and Effect with Typical River Basin* (Prof. Zhanbin Li)

The main content of the presentation was: typical soil erosion; dynamic of soil erosion; mechanics of soil and water conservation measures; and soil and water conservation in watersheds.

**4. River Ecology and its Restoration Methods:**

4.1. *Ecology and Restoration in a Typical River Basin* (Prof. M. Spreafico)

Thanks to efficient river basin management, cooperation between the riparian countries and also by implementing international law successfully, the River Rhine has been a successful case study in Europe, introduced by Prof. Manfred Spreafico. However, there are still ongoing projects and problems to face in the future.

**5. Case study:**

5.1. *Introduction of South-to-North Water Diversion Project in China* (Prof. Jiang Yunzhong)

As the longest trans-basin and trans-provincial water diversion project, the China North-to-South Water Diversion Project is one of the greatest strategic infrastructures with the aim to mitigate severe water shortage in the north of China and optimize distribution of water resources. The plan is to contribute to sustainable economic and social development and the long term interest of human society.

**6. Visit to the Laboratory of China Institute of Water Resources and Hydropower Research (IWHR)**

**7. Seminar (Presentations by the participants of the workshop)**

**Conclusion:**

Overall, the conference had been successful and very efficient. The participants have widened their knowledge on river basin management and received the latest concepts, techniques and information to be able to refer to their local water management system. The established network among participants during the conference will help to exchange further information in the future.

*Orsolya Korsos*