

## Preface

This Publication is based on the contributions presented at a 2-day workshop on *Sediment Problems and Sediment Management in Asian River Basins*, which formed part of the Scientific Assembly of the International Association of Hydrological Sciences (IAHS) and the International Association of Hydrogeologists (IAH), held in Hyderabad, India from 7 to 11 September 2009. The workshop was a collaborative venture between the International Commission on Continental Erosion (ICCE) of IAHS, the UNESCO International Sediment Initiative (ISI) and the World Association for Sedimentation and Erosion Research (WASER). The involvement of the UNESCO ISI was particularly important, because UNESCO provided funds to support the attendance of several invited speakers. Additionally the UNESCO ISI has provided funds to support the publication of this Proceedings Volume.

The workshop represented an explicit attempt to strengthen the interaction of ICCE, ISI and WASER with sediment specialists in Asia, and particularly in India and the surrounding countries, and to focus attention on the many important sediment problems faced by the region. The programme of the workshop included the presentations made by the invited speakers and by others who had offered papers to the workshop. The submitted papers provided coverage of a wide range of specific issues and problems. In compiling this collection of papers, the contributions presented at the Workshop have been supplemented by a number of additional contributions by authors who had expressed interest in the Workshop but who were unfortunately unable to attend. These additional papers provide a valuable complement to those presented at the Workshop and usefully expand the coverage of this volume.

The papers included in this publication have been subdivided into two groups. The first group comprises overview papers, which describe the sediment problems experienced by particular countries or focus on particular issues relating to the wider region. The second group comprises papers documenting case studies that deal with particular problems and their management. The overview papers include contributions highlighting the various sediment problems faced by India and Iran, including soil erosion and reservoir sedimentation; recent changes in the sediment loads of the Hindu Kush-Himalayan rivers and their wider implications; the impact of human activity on the sediment loads of Asian rivers; and new challenges for research on erosion and sedimentation in China linked to key contemporary issues.

The case studies provide valuable examples of a range of current sediment problems in Asian river basins and the development of management strategies to address these problems. Two contributions focus on soil erosion. One describes the problems of channel aggradation and reduction in drainage density encountered in many small rivers in Siberia as a result of land clearance and intensification of agricultural activity, and the other addresses the important issue of establishing the magnitude of 'natural' or background erosion rates, using an area of the hilly Sichuan Basin in China as an example. Such information is frequently an important requirement when defining management objectives. Problems of developing sediment measurement programmes that are capable of providing reliable information on the response of sediment loads to changing catchment conditions are addressed by two papers. One deals with a small catchment in northern Thailand subject to land-use change and the other describes the establishment of a new monitoring programme for the Upper Ramu River on New Guinea Island, aimed at documenting changes in sediment and related contaminant fluxes associated with the expansion of mining activity within the river basin. The value of using the sediment budget as a tool for characterizing the sediment response of a river basin is usefully

demonstrated by a study undertaken in the 3800 km<sup>2</sup> Lake Inle catchment in Myanmar and this contribution further demonstrates the wider socio-economic implications of the sediment budget. Taiwan is well known for its high sediment yields and another paper emphasises the sensitivity of this environment to recent climatic change, and particularly the increasing incidence of typhoons. Prediction and modelling of sediment yields are frequently important requirements for developing improved sediment management strategies, because of the need to identify key source areas within a river basin, and two papers report the development and application of such models in the Upper Citarum basin in Indonesia, where landslides are an important driver of sediment mobilisation, and in the catchment of the Sriramsagar Reservoir in India. The impact of human activity on rivers and their sediment loads provided a key theme of the Workshop and case studies of the impact of sand mining in Sri Lanka and the problems of channel degradation along the Yangtze River in China, resulting from the reduction in the sediment load of this river caused by the construction of the Three Gorges Dam, provide additional evidence of the importance of such impacts. .

Reservoir sedimentation represents an important problem in many areas of Asia and four papers provide valuable perspectives on different aspects of this problem. One paper focuses on the potential for using satellite remote sensing imagery to support reservoir sedimentation surveys in India, and another reports on sedimentation in the Akdarya Reservoir in Uzbekistan and its implications for water resource management. The problems of managing reservoir sedimentation in a reservoir constructed on a large river with a high sediment load are well illustrated by a paper describing the development of a sediment management strategy for the Xiaolangdi Reservoir on the Lower Yellow River in China, and the local problems associated with the development of oblique flows in close proximity to many barrages on Indian rivers are described by a further case study. The deltas and estuaries located at the outlets of river basins frequently face many problems associated with sediment management and their significance is emphasised by a final case study that describes the problems of managing the densely populated Meghna Estuary in Bangladesh, which channels water from the Ganges, the Brahmaputra and the Meghna River into the Bay of Bengal and which is highly sensitive to floodwater and sediment inputs from the contributing river basins as well as potential changes in sea level.

Thanks are extended to all those who helped in the organisation of the workshop, including Manfred Spreafico, Jim Bogen, Chunhong Hu and Anil Mishra, who were co-convenors with myself, and Bhanu Neupane, Ramasamy Jayakumar and Anil Mishra from UNESCO, who worked behind the scenes to secure financial support for several participants and to make their travel and accommodation arrangements. Anil Mishra, from the UNESCO Division of Water Sciences in Paris, is also thanked for his encouragement and support throughout the production of this publication. Finally, very special thanks are due to Penny Perrins and Cate Gardner at IAHS Press in Wallingford for coordinating the production and publication of this volume.

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