
Preface

Alpine mountains are source areas of major rivers in the world like the Danube River in Europe and the Brahmaputra River in Asia both having glaciated headwaters in the Alps and the Himalayas, respectively. Within the 6th Framework Programme (FP6) of the European Commission (EC), research projects were funded to study Integrated Land and Water Resources Management (ILWRM) issues in ‘twinning basins’. The latter have been selected according to common physiographic and socio-economic features that are related to water resources and most likely will be impacted by climate change (CC).

The EC-project BRAHMATWINN was carried out within this programme between June 2006 and December 2009 in the transboundary twinning Upper Danube River Basin (UDRB) in Europe and the Upper Brahmaputra River Basin (UBRB) in South Asia. Its overall goals were firstly to develop methods and tools to assess, model and analyse scenario based impacts of CC and secondly to develop harmonised ILWRM strategies to adapt to such impacts within the existing institutional and governance framework.

They were addressed by natural and social scientists in cooperation with water law experts and local stakeholders and yielded the following results:

1. Regional Climate Model (RCM) based modelling of IPCC SRES scenarios (IPCC 2000) to quantify CC and providing projected climate forcing as input for hydrological water balance modelling;
2. Comprehensive assessment and analysis of the Natural Environment (NE) and its Human Dimension (HD) of both twinning basins including LULC classification and change detection by means of remote sensing, GIS analysis and stakeholder participation.
3. Comparative assessment of glacier distribution and dynamics of glacier retreat complemented by modelling of permafrost distribution.
4. Assessment and classification of wetlands and their vulnerabilities with respect to hydrological ecosystems functions (ESF), ecosystem services (ESS).
5. Hydrological modelling of the water balance dynamics in the UDRB and the UBRB for historical and projected time periods and analysis of hydrological impacts generated by CC signals from IPCC SRES scenarios (IPCC 2000).
6. Regionalisation of the modelled water balance components with respect to flood generation applying the Response Unit (RU) concept and results from the hydrological model for the delineation of Water Resources Response Units (WRRU).

7. Regional vulnerability assessment and risk analysis against flooding applying the RU approach complemented by statistical indicator analysis.
8. Development of ‘what-if?’ scenario based adaptive ILWRM strategies from stakeholder and expert analysis applying the Delphi approach and selected decision support criteria.
9. Development of a prototype Integrated Land and Water Resources Management System (ILWRMS) to develop and analyse ‘what-if?’ scenario based adaptive ILWRM strategies.

This book will be useful to researchers, professionals, managers and decision makers associated with study and application of sustainable ILWRM strategies in the backdrop of climate change.

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