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Editorial

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Dear Readers,

Geographic Information Systems (GIS) are now the principal tool for land resource planning and municipal management in most parts of the developed world. However, GIS technology has only recently been applied in mountain environments owing to inaccessibility, lack of high resolution base maps, scarce information about resources, and relatively low land use pressure by comparison with lowlands. The emerging issues of rapid glacial melt, hydrological extremes, biodiversity loss, land use changes, land degradation, mass tourism, increased demand for water, hydropower development, and dam removal all demand urgent attention. Geographic Information Systems are innovative tools that can address all of these issues.

A GIS should not be considered the ultimate tool for addressing all resource issues in mountains. It does, however, offer a number of advantages that merit closer attention. Chief among these are quantitative assessment of land use and land cover change; spatial extrapolation; development of georeferenced resource information systems; integration of complex information that can be rapidly accessed; and the capability to link a GIS with models to predict outcomes and develop future scenarios. The greatest advantage is probably the capacity to integrate, which allows for the incorporation of socioeconomic and biophysical information that can be used as a decision-making tool by resource managers and planners.

The editors of MRD *took the initiative to dedicate the current issue to GIS applications in mountains, with a view to promoting the use of GIS applications. Despite considerable effort, we failed to attract a very large set of case studies that make full use of all GIS capabilities. Most applications presented here still focus on land use change in mountains. A few incorporate socioeconomic information into their GIS, but there are no research papers in which the authors used a GIS to support decision-making or linked models with a GIS to develop and compare different development scenarios.*

The papers in this issue draw attention to the complex problems of land use change taking place in mountains. Several address afforestation issues in different parts of the world. The rate of natural afforestation due to depopulation is described in case studies in Poland and in Spain. The results appear to have a positive impact on hydrology and biodiversity. In contrast, two case studies are presented from China, where population pressure is high and historic deforestation and cultivation on sloping land have resulted in large-scale degradation. Women play a key role in managing mountain resources, and, in one case study from Nepal, a GIS application is presented that evaluates the workload of women, determines distances to markets, and assesses other socioeconomic conditions. The lead article in the Development section deals with the institutional, technical, and conceptual challenges of using a GIS in mountain environments, while the others illustrate the potential of a GIS in relation to biodiversity in the Rocky Mountains, participatory resource management in the Peruvian Andes, assessment of possible expansion of traditional agroforestry in Madagascar, and forest rehabilitation in Tibet.

We hope that this issue will stimulate more interest in GIS applications in mountains and will encourage authors to take advantage of this new tool to provide new and expanded GIS applications.

Hans Schreier, Guest Editor

Hans Hurni, Editor-in-Chief

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