Abstract

Target research of this dissertation was the development of an erosion and soil erosion risk model for usage in semiarid to semihumid developing countries. The newly designed model is named DESER (Determination of Erosion and Soil Erosion Risk). It is of conceptual character, since empirical and physically based input parameters are utilised.

The study area for developing this model is the watershed of the *Bilate River* that is located in the southern Ethiopian Rift Valley and partially on the Western Ethiopian Highlands. The watershed extends approximately 5,500 km² and high landscape variability demands a differentiation of the watershed into three geomorphological units (*Western Ethiopian Highlands*, *Valleys and Basin* and *Rift Valley*), in order to allow the assessment of erosion and soil erosion damages. These damages were utilised for calibrating and validating the models. Therefore eight selected study areas were selected across the watershed.

The input data of the model were raw data, such as climate data from agencies as well as soil and ground data from FAO, or data and its derivatives obtained from satellite or SRTM data sets. Least, some data were utilised to design special input parameters, such as a rainfall intensity index, since such data were not available for the research area. The model's main advantage is the use of only eleven input parameters, which are easy to record, assess and derive – especially in developing countries, where data availability is in general poor. Output of the model is a gridded dataset, qualitatively displaying the erosion and soil erosion risk in 13 classes from no risk to severe risk.

The model DESER performs satisfactory and thus, the model can be successfully implemented in semiarid to semihumid developing countries. Extensions for further questionnaires can be easily designed and applied.