1 Introduction

Ethiopia, one of the poorest countries of the world, experiences severe natural resources management problems. Pressure on land and water resources is rising steadily because of a tremendous increase in population during the last decades (Unites States Central Intelligence Agency – CIA, 2005). The necessity of more sustainable natural resources management is demonstrated in this study using the example of soil resources management in the watershed of the *Bilate River* in the Southern Ethiopian Rift Valley.

As part of this thesis a management tool for assessing erosion and soil erosion risk is developed for regional decision makers. In contrast to existing tools, this newly developed tool and its input parameters are relatively simple and easily manageable, but nevertheless scientifically relevant.

The research area is defined as the watershed of the *Bilate River* located in the Southern Ethiopian Rift Valley. The watershed of the *Bilate River* was selected for this study, because it represents two major geographical landscapes and climatic zones of Ethiopia. Thus, geomorphological processes observed in the watershed are a good reflection of major geomorphological processes that take place in Ethiopia as a whole. Additionally, several investigations have been carried out in the Lake Abaya-Chamo Basin within the context of a research project funded by the German Research Foundation (DFG, FO 341/1). Therefore, the research of this dissertation is closely linked to the results of the other research activities under the DFG project.

The watershed of the *Bilate River* extends approximately 5,500 km² and greatly varies in relief: mountainous in the north and west, and lowlands in the east and south with several embedded volcanoes. In this study, the watershed has been subdivided into units of typical erosion and soil erosion processes, which are correlated to specific relief characteristics. These units are based on detailed properties of morphometry and are therefore defined as geomorphological units. Within the units, study sites were selected in order to obtain detailed information of existing erosion and to measure soil erosion processes and damages. In addition, detailed information on soil properties, climate, vegetation, anthropogenic activities and relief parameters were recorded, assessed and modelled. These data are the basis of the newly developed DESER (**D**etermination of **E**rosion and **S**oil **E**rosion **R**isk) model. The model itself is constrained by the limited amount of available input data. However, because it specifically targets the needs of developing countries, the strength of this approach is its

requirement of only few and easily derivable input parameters. The output of the model is a qualitative classification of erosion and soil erosion risk. Modelling the actual erosion and soil erosion risk is realised by modelling multiple scenarios with varying input parameters. In addition, the model can be easily adapted to different landscapes or assessment needs. The model is designed to be easily extendable, which is the subject of ongoing research.