

2 Definitions and Explanations

2.1 Erosion and Soil Erosion

Academic research on erosion and soil erosion problems are the focus of several different disciplines, such as geography and soil science but also engineering, mathematics and physics. Scientific definitions differ significantly across these fields. This chapter defines and explains the terms and processes utilised in this dissertation.

Erosion: Erosion is a natural process levelling the relief of all landscapes. Erosion processes are dependent on climate and other environmental factors and are caused by wind and water (RICHTER, 1998).

Soil Erosion: Soil erosion refers to the natural erosion process and additionally incorporates processes caused by the anthropogenic impact on the land surface, such as agricultural practices or deforestation. The anthropogenic impact amplifies natural erosion (MORGAN ET AL., 1998).

Erosion and soil erosion can only be differentiated through detailed investigation in the field and thus, the term ‘erosion and soil erosion’ is used for both, environmental and anthropogenic processes. Erosion and soil erosion damages are the results of erosion and soil erosion processes. Damages from the following processes have been investigated in this research:

- Sheet erosion is a process caused by surface runoff, where ‘runoff actually is concentrated in many small rivulets of water’ (TOY ET AL., 2002). Overland flow is of very high frequency and very low magnitude, and thus, occurs area-wide between rills (HOGG, 1982). This area is also called the inter-rill area and erosion occurring here is defined as inter-rill erosion (TOY ET AL., 2002). Sheet erosion and inter-rill erosion are therefore synonymously used in this context.
- Rill erosion is a process caused by the concentration of surface runoff. ‘Rills are channels that are so small [that] they can be obliterated by normal tillage operations’ (TOY ET AL., 2002). Rill erosion is of lesser frequency but higher magnitude than sheet erosion. Areas of both, rill erosion and inter-rill erosion ‘make up the overland flow areas of landscapes’ (TOY ET AL., 2002).
- The moment rill erosion concentrates gully erosion can start to develop. HUDSON (1995) defines a gully as ‘a steep-sided eroding watercourse which is subject to

intermittent flash floods'. MORGAN (1996) provides a detailed description of gullies, their origin and shape characteristics.

- Badland erosion takes place where gullies concentrate into clusters or where the area-wide frequency of rills is preventing the establishment of any vegetation cover (BOARDMAN ET AL., 2003). Within the context of this research, badlands are defined as areas of high rill frequency and area-wide inter-rill erosion and a more or less entirely bare of vegetation cover.
- In the context of this dissertation, the term barren degraded land is defined as an area where different erosion processes are causing area-wide degradation. These degradation forms are generally flat at the bottom and boundaries to non-degraded areas are determined by a sudden and severe change in the landscape level. This erosion form is investigated for the first time in the research area during this research and therefore no literature-based definition can be provided. Published research on barren degraded land, such as KABORÉ & REIJ (2003) describes different processes and forms.

2.2 Risk Assessment

Potential risk is determined by all natural phenomena, which could cause erosion damages (AUERSWALD, 1993).

Actual risk is the potential risk plus human induced intensification of the potential risk. The actual erosion and soil erosion risk is determined by all natural and human caused phenomena, which lead to erosion and soil erosion (AUERSWALD, 1993).

2.3 Explanations of Terms

In the context of this dissertation, the term 'watershed' is used to refer to the area of the river catchment of the *Bilate River*.

Italic words assign names of areas, locations, study sites or climate stations in Ethiopia.