

Pattern of bank gullies on erosion-susceptible sediments: case study in Kenya

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In recent years, land degradation caused by environmental human impacts such as over grazing and deforestation became extreme in East Africa. Especially thick soft deposits of quaternary deposits and dam sediments are sometimes susceptible to severe erosion, which seriously damages agricultural fields and infrastructures of these area concerned.

Large individual gullies exceeding 30 meters in width and 10 meters in depth, that are not very rare to be formed in the study sites, have grown with new gully head erosion triggered by bank failure. Gully head development triggered by bank failure have busily been studied as bank gullies in Mediterranean regions (L. Vandekerckhove et al., 2000 and others) but it was not very frequently done in East Africa. We report the erosion activities of the two study sites in Kenya focusing on the relation between the geology and horizontal patterns of the bank gullies to discuss environmental backgrounds of this gully erosion.

The two study sites are set in Kenya, which are located on a dam deposits at Maragua district, Central province of Kenyan highland and quaternary deposits in Nyando district, Nyanza province near Lake Victoria. The gullies in these study sites were observed and surveyed in 2002 and 2003 and the patterns of the gully development were mapped from the survey results. Soil samples for the gully-incised sediments and upstream catchments of these erosion sites were collected. Difference of the physical properties of the samples indicates that geological setting controls runoff rates of a rainfall event. This runoff rate difference according to the geological background is considered to influence the pattern of the bank gully development, and therefore, these relations can be applied on assessments for recovering programs of degraded lands and installation of infrastructures in East Africa.