Sediment dynamics and improvised control technologies in the Athi River drainage basin, Kenya

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Abstract In Kenya, the changing of land-use systems from the more traditional systems of the 1960s to the present mechanized status, contributes enormous amounts of sediments due to water inundations. The Athi River drains areas that are subject to intense agricultural, industrial, commercial and population settlement activities. These activities contribute immensely to the processes of soil erosion and sediment transport, a phenomenon more pronounced in the middle and lower reaches of the river where the soils are much more fragile and the river tributaries are seasonal in nature. Total Suspended Sediments (TSS) equivalent to sediment fluxes of 13 457, 131 089 and 2 057 487 t year$^{-1}$ were recorded in the headwater areas, middle and lower reaches of the river, respectively. These varying trends in sediment transport and amount are mainly due to the chemical composition of the soil coupled with the land-soil conservation measures already in practice, and which started in the 1930s and reached their peak in the early 1980s. This paper examines trends in soil erosion and sediment transport dynamics progressively downstream. The land-use activities and soil conservation, control and management technologies, which focus on minimizing the impacts of overland flow, are examined to assess the economic and environmental sustainability of these areas, communal societal benefits and the country in general.

Key words land-use systems; soil erosion; sediment dynamics; improvised control technologies