

## **Abstract**

### **Study region**

The Upper Athi River Basin (Lat: 1°25'17.61°S and Long: 37°15'29.55°E) in Kenya, East Africa.

### **Study focus**

The effects of land use/land cover type on suspended sediment concentrations and yield were investigated in the upper Athi river basin in Kenya. The suspended sediment concentrations and yield, river discharges, water levels and flow velocities were monitored in stations established at the outlets of sub-basins and also at the outlet of the main basin in period 2012–2015.

### **New hydrological insights**

The magnitude of river discharge in the upper Athi river basin is not only a function of the magnitude of rainfall, but combination of land uses/land covers determined the magnitude of sediment yield in the sub-basins. The highest sediment yield occurred in a semi-arid sub-basin dominated by savannah grassland and livestock grazing. The lowest occurred in the high rainfall sub-basins dominated by forest with mixed farming and settlements. Significant sediment transport commenced at an effective river discharge of  $405 \text{ m}^3\text{s}^{-1}$  which is a frequent discharge event resulting in significant sediment load transport in most rainy seasons and years. The magnitude of suspended sediment discharge is a function of the magnitude of rainfall such that the greatest sediment transport occurs during the long rainy seasons (54%) as compared to 41% during the short rainy season. The total annual suspended sediment load in the basin ranged  $2.11\text{--}3.77 \times 10^6 \text{ tons.yr}^{-1}$  and sediment production rate ranged  $205\text{--}366 \text{ tons.km}^{-2}\text{.year}^{-1}$ .