

## COUPLING SOCIO-ECONOMIC FACTORS AND ECO-HYDROLOGICAL PROCESSES USING A CASCADE-MODELING APPROACH

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Most hydrological studies do not account for the socio-economic influences on eco-hydrological processes. However, socio-economic developments often change the water balance substantially and are highly relevant in understanding changes in hydrological responses. In this study a multi-disciplinary approach was used to study the cascading impacts of socio-economic drivers of land use and land cover (LULC) changes on the eco-hydrological regime of the Lake Naivasha basin. The basin has recently experienced substantial LULC changes exacerbated by socio-economic drivers. The simplified cascade models provided insights for an improved understanding of the socio-ecohydrological system. Results show that the upstream population has transformed LULC such that runoff during the period 1986-2010 was 32% higher than during the period 1961-1985. Cut-flower export volumes and downstream population growth explain 71% of the water abstracted from Lake Naivasha. The influence of upstream population on LULC and upstream hydrological processes explained 59% and 30% of the variance in lake storage volumes and sediment yield respectively. The downstream LULC changes had significant impact on large wild herbivore mammal species on the fringe zone of the lake. This study shows that, in cases where observed socio-economic developments are substantial, the use of a cascade-modeling approach, that couple socio-economic factors to eco-hydrological processes, can greatly improve our understanding of the eco-hydrological processes of a catchment.

WEDNESDAY 11:15