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*DOI: 10.1016/j.ecohyd.2013.10.008*
*Ecohydrol. Hydrobiol. 13(4), 2014*
*Preface*

# UNESCO-IHP Year of Water Cooperation

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*Preface*

# UNESCO/DAAD/Exceed Conference “Water in Africa”, Kisumu, Kenya

# October 1–3, 2012

Professor Ali Müfit Bahadir (Exceed Chairman)

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*Research Article*

# The extent of nutrient removal by wastewater treatment plants along the Nyalenda Wigwa Stream and the River Kisat (Kenya)

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## Abstract

Kisat Wastewater Treatment Plant (KWWTP) and Nyalenda Waste Stabilization Ponds (NWSP) clean wastewater before discharge into Winam Gulf (Lake Victoria), but there is lack of information on their efficiency. The current study was carried out to determine the efficiency of nitrogen and phosphorus removal from Kisumu City wastewater disposal by KWWTP and NWSP. Samples of water were collected from the inlet, within and outlet of the treatment plants, preserved, processed and analyzed using standard methods. The concentrations varied significantly ($P \leq 0.05$) between inlet, within and outlet at KWWTP and NWSP except for $NH_3$-N which had no significant difference. Percentages of nutrient removal at KWWTP were 41.3% $NO_2^-$-N, 13.7% $NO_3^-$-N, −5% $NH_3$-N, 27% $N_{Org}$ and 10.4% (T-P); while at NWSP the levels were 50%, 10.4%, 0%, 16.6% and 30.8%, respectively. These percentage removals of nitrogen and phosphorus in both the treatment plants were below the internationally acceptable minimum values. Hence urgent mitigation steps are necessary to modernize KWWTP and possibly widen and deepen the NWSP to counter this problem.

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*Research Article*

# Modeling River Sosiani's water quality to assess human impact on water resources at the catchment scale

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## Abstract

To investigate the water quality status at catchment scale, the MIKE 11 modeling system (DHI) was used on the Sosiani, western Kenya. The river's catchment was delineated according to land-use practice into forested (Fz), agricultural (Az) and urban (Uz). Rainfall-runoff processes were modeled using NAM (DHI) and the hydrodynamic model was built using the MIKE 11 HD module. Water quality (WQ) modeling was limited to the oxygen cycle. Model calibration was done on the basis of available measured WQ data at Fz–Az; Az–Uz boundaries. Simulated data versus observed data show model efficiency of 0.70. The Uz contributes 75% of BOD flux in the catchment.

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*Research Article*

# Antimicrobial susceptibility patterns of Enterobacteriaceae isolated from domesticated animals and the environment in Lake Victoria, Kenya

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## Abstract

Faecal coliform levels in Lake Victoria waters progressively reduced away (0–150 m) from the lake shores. *Enterobacter*, *Escherichia coli*, *Klebseilla*, *Proteus* and *Citrobacter* were recovered at high frequencies from water and fish than domesticated animals. Goats, chicken, donkey and cattle are important reservoirs of *E. coli* susceptibility to antimicrobials varied, based on the bacterial species, with about 53.8% of the isolates showing resistance to at least one class of antibiotics. The study provides a picture of resistance factors readily retained by the Enterobacteriaceae within the basin and implies that the lake may be an important reservoir of antimicrobial resistance genes.

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*Research Article*

# Occurrence and effect of *Diplostomum* parasites in cultured *Oreochromis niloticus* (L.) and distribution in vector snails within Kisumu City, western Kenya

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## Abstract

Freshwater snails and larval trematode communities were studied in relation to diplostomiasis infection in fish. Out of 680 fish examined, 52.2% were positive for *Diplostomum* parasites. *Lymnea*, *Biomphalaria*, *Bulinus* and *Ceratophallus* snail species occurred, however *Diplostomum* larvae were only in *Biomphalaria* at a prevalence rate of 21.69%. There was no significant relationship between parasite abundance and fish condition factor in all the study sites, hence the wellbeing of the fish was not compromised by the parasites. Values of the regression co-efficient obtained for the length–body weight relationship in all the farms suggested isometric growth.

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*Research Article*

# Microbial assessment of selected earthen fish ponds in western Kenya

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## Abstract

Water-borne infections are among the most recent emerging and re-emerging infectious diseases throughout the world. WHO estimates that 80% of all illnesses in the world are caused by water-borne disease pathogens that thrive due to inadequate sanitation and polluted water. This study determined the presence of enteric microbes in medium earthen fish farm ponds and waters in the region. Fifty-seven *Oreochromis niloticus* L. and 36 water samples were collected over three months from 12 ponds within Maseno and Luanda Division. Sixty-six enteric microbes were found – *Vibrio hollisae* (18.2%), *Proteus vulgaris* (12.1%), *Yersinia* spp. (7.6%), *Salmonella typhi* (7.6), *Aeromonas hydrophilia* (7.6%), *Edwardsiella tarda* (6.1%), and *Escherichia coli* (6.1%) were the most isolated Enterobacteriaceae from water. Fifty enteric microbes were collected from fish intestines; *Citrobacter freundi* (62%) and *Proteus* spp. were the most common. Thirty-nine bacteria were isolated from the macerated fish flesh with *Citrobacter* spp., *Proteus* spp. and *Pseudomonas* being the most common. Water temperature, salinity dissolved oxygen and pH were within the expected range. Earthen fish ponds harbor enteric microbes that could be pathogenic to humans, although they had low faecal bacterial indicators signifying minimal contamination from human waste.

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*Research Article*

# Efficiency of pre-treated *Moringa oleifera* for the removal of $Cd^{2+}$ and $Zn^{2+}$ ions from wastewaters

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## Abstract

Increased human activities have led to a rise in environmental pollution. Conventional methods of wastewater treatment are costly and sometimes not efficient. Use of *Moringa oleifera* has been promoted as a cost effective method. Its use as a biosorbent for sequestration of Zn and Cd for both single and mixed systems was investigated. The results show that metal uptake increased with contact time, based on a solid-to-liquid ratio of 1:100 with maximum adsorption occurring at pH 4. However, metal biosorption decreased drastically with increasing pH and $Zn^{2+}$ ions were more efficiently biosorbed than $Cd^{2+}$. The data fitted into both the Langmuir and Freundlich adsorption isotherms and *Moringa* treated with $KMnO_4$ further enhanced heavy metal biosorption by offering better properties.

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