Effects of Pollution on the Motoine River Dams, Kenya

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The study assessed the status of the environment of Motoine River dams in Nairobi area. The main aim of the study was to assess the physical and chemical quality of water in dams with an emphasis on nutrients and heavy metals loading as well as land use and management practices between September and December 2005. This is important because the area forms the catchment for Ngong River and is the main source of water for the Nairobi Dam. The Motoine River is heavily used in the Dagoretti area for irrigation agriculture and other domestic purposes. The water samples were collected from each of the three dams studied, namely, Ngong Forest Station Dam, Karen Dam and Racecourse Dam at points located within transect zones established in the dams. The parameters determined in the field included temperature using mercury glass thermometer, pH using Oaklon 510 series, and electrical conductivity using Jenway Probe model 4075 conductivity meter. The samples were analyzed in the laboratory for turbidity using an Egkelkamp AI1000 model, and DO and BOD using the Azide modification iodometric method. Water samples for nitrates were digested by steam distillation then measured using an EL 021060 variac spectrophotometer. Total Phosphorus was measured photometrically using model 6300 spectrophotometer. Heavy metals, Zn, Cu, Cd, Cr, Mn and Pb were analyzed by spectroscopic methods using an AAS model AA-1275. They were subjected to statistical package for social sciences (SPSS) for analysis. The results showed that the mean measurements for Karen Dam were 22.9°C for temperature, pH 6.99, turbidity 51.75 NTU, conductivity 325.7 μS/cm, DO 5.3mg/l, BOD 37.2 mg/l, Total Phosphorus 0.62 mg/l and Nitrates 2.17 mg/l. The mean values for heavy metals in the Karen Dam were 0.17 mg/l, 0.009 mg/l, 1.51 mg/l, 0.02 mg/l; 0.09 mg/l and 0.22 mg/l for Zn, Cu, Mn, Cd, Cr and Pb respectively. For Ngong Forest Dam the mean values for temperature, pH, turbidity, conductivity, DO, BOD, Nitrates and Total Phosphorus were 22.8°C, 7.16, 25.2 NTU, 226.2 μS/cm, 4.36 mg/l, 22.7 mg/l, 1.56 mg/l and 0.24 mg/l respectively. For Racecourse Dam, the values were 23.6°C, 7.0, 25.15 NTU, 242.4 μS/cm, 5.52 mg/l, 31.1 mg/l, 2.06 mg/l and 0.26 mg/l respectively. The mean heavy metals values for Racecourse Dam were 0.09 mg/l, 0.003 mg/l, 1.51 mg/l, 0.004 mg/l, 0.08 mg/l, and 0.35 mg/l for Zn, Cu, Mn, Cd, Cr, and Pb respectively. The conclusions made in the study are based solely on water analysis. The study shows that the Motoine River dams are
experiencing pollution caused by anthropogenic activities in the catchment. Agricultural and municipal run-offs, geo-chemical sources, domestic effluents and leaching of nutrients and sewage are some of the possible sources of pollution in the dams. The findings indicated that the concentrations of copper, cadmium, zinc, total phosphorus and nitrates were generally lower than the KEBS specifications. However, turbidity, Pb, Mn, Cr and BOD were found to pose a health risk since their levels were found to be above KEBS specifications. It is recommended that the use of inorganic fertilizer should be minimized and deforestation be discouraged. There is need to change the land use practices and apply conservation techniques such as mulching and timely fertilizer applications. There is need to also analyze the sediments so as to make alternative recommendations on how to use the water for domestic chores without posing any risk to human health.