

Ksh. 3,000

**ANTHROPOGENIC EFFECTS ON THE WATER QUALITY AND QUANTITY  
OF RUIRU RIVER IN KIAMBU COUNTY, KENYA**

**By**

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**Reg. No. N50/CE/20273/2010**

**A Research Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of  
Master of Environmental Science in the School of Agriculture and Environmental  
Sciences of Kenyatta University**

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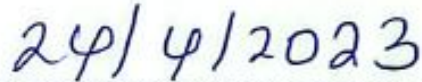
## DECLARATION

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This thesis is my original work and has not been presented for a degree or award in any other University.



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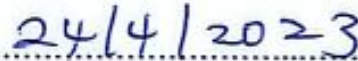
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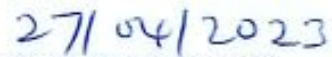
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## ABSTRACT

River water contamination is the most challenging concern mainly in developing countries especially in urban areas and ASAL areas. The use of contaminated water both surface and ground water results to health problems among the water users mainly in the slums areas of Africa and Asia. The purpose of this study was to assess the quality and quantity of water along Ruiru River. Google Earth Pro, SAGA-GIS, and ArcGIS software (ESRI), was used to generate various thematic layers. For the classification purposes, and the area was classified into five Land Use and Land Cover types (Urban or Built-up Land, Agricultural or cropland, Forest Land, Bare Land, and water bodies). From 2010 to 2020, a significant change occurred in the built-up/settlement/urban area category of land use with an increase of 21.44%. A substantial change from agriculture and bare land to built-up was registered within the watershed from 2010 to 2020. The decrease of agriculture (-6.99%), bare land (-10.55%), and forest land (-3.25%) cover means more and more degradation of the environment. The study indicates an alarming increase of 21.44% of the total watershed area under built-up land. In contrast, agriculture/cropland, bare land, forest land, and water body classes of Land uses are undergoing a continuous negative change in terms of composition and extent over the last ten years. The Physio Chemical study was done through assessment of Ruiru River samples collected along the river. The water samples were collected from 7 sampling stations i.e. S1 to S7. From the samples analyzed using SPSS with descriptive analysis used to give simple summaries while analysis of variance (ANOVA) was used to test for significant differences ( $p \leq 0.05$ ) between water quality parameters among seven samples. It was determined that Temperature, Turbidity, Conductivity, Alkalinity, Iron, Phosphorous, Potassium, Magnesium, Manganese and Aluminum exhibited a significant difference ( $P < 0.001$ ) while Chloride and Sulphate exhibited a significance difference ( $P < 0.05$ ). pH was the only parameter that had no significant difference ( $P < 0.020$ ). The findings showed that the samples downstream, when compared to the upstream levels, had high concentrations of the several parameters measured. Temperatures, pH, Dissolved Oxygen Turbidity and Alkalinity measured were higher than the recommended WHO levels, while conductivity was lower than the recommended WHO levels. Iron, Chloride, Sulphate, Potassium, Magnesium and Aluminum were found to be higher than the recommended WHO levels. The amount of water stored at S3 is about 2.9 million  $m^3$  mainly due to various tributaries and contributes approximately 4% of Nairobi's current water supply. The S6 has a capacity of 7 million  $m^3$  due to the three rivers draining into it, namely is Rarura, Githika and Kayuyu. S6 contributes approximately 84% of Nairobi's current water supply. The S7 has a capacity of 4.6 million  $m^3$  and contributes approximately 90% of the water consumed by Ruiru town and its environs. The river was found to be at a risk of not being suitable for human use due to increased pollution from farms and industries. The study recommends good farming practoces nalong the river and treatment of water before being used for domestic use.