

**ANALYSIS OF PHYSICO- CHEMICAL PROPERTIES AND MICROBIAL  
DIVERSITY OF WATER SOURCES AND THEIR INFLUENCE ON  
WATER QUALITY WITHIN NAROK NORTH SUB- COUNTY**

**BY**

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**A THESIS SUBMITTED IN FULFILLMENT FOR THE REQUIREMENTS  
OF THE AWARD OF MASTER OF PHILOSOPHY IN ENVIRONMENTAL  
HEALTH OF MAASAI MARA UNIVERSITY.**

**OCTOBER 2015**

## ABSTRACT

This study was carried out to analyze the physico- chemical parameters and microbial diversity and their levels in various water sources and their influence on water quality in Narok North Sub- County. The main water sources in Narok North Sub- County are Enkare Narok, treated water supply, Ewaso Ng'iro River and water pans. The physico- chemical properties assessed during the dry and wet season were; pH, temperature, dissolved oxygen, biochemical oxygen demand, total dissolved solids, total suspended solids and total hardness. Microbial diversity and abundance was determined using the multiple tube fermentation method and biochemical identification panel of tests for enterobacteriaceae. A survey using a structured questionnaire was used to assess the awareness of the population on water quality and treatment. There was variation in physico- chemical properties of water between the two seasons. The pH of the water varied from 7.8 to 9.7 during the dry season and 5.1 to 8.9 during the wet season. Biochemical oxygen demand during the dry season ranged from  $9.434 \pm 0.061$  mg/l to  $8.663 \pm 0.072$  mg/l and wet season  $29.987 \pm 0.544$  mg/l to  $10.157 \pm 0.077$  mg/l. These were beyond the World Health Organization allowable limits for portable water of 1-2 mg/l. The water sources were heavily contaminated with faecal and total coliform bacteria. Total coliforms isolated ranged between  $2.3 \times 10^1$  to  $1.1 \times 10^3$  during the dry season and  $4.6 \times 10^2$  to  $1.1 \times 10^3$  during the wet season. Thermo tolerant coliforms ranged between  $0.9 \times 10^1$  to  $3.9 \times 10^1$  during the dry season and  $2.3 \times 10^1$  to  $2.4 \times 10^2$  during the wet season, the difference being possibly due to contamination of the water sources from rain water runoff and livestock waste. Presence of indicator bacteria in large numbers is an indication of presence of pathogens in the water sources. Bacteria isolated were *Escherichia coli*, *Shigella* spp, *Proteus* spp, *Salmonella* spp, *Enterobacter* spp, *Klebsiella* spp, and *Citrobacter* spp. 96.9% of the respondents were aware of the quality of water and treated the water using various treatments, the most common being boiling and addition of Waterguard®. It is recommended that measures like better waste management practices, use of raised water tanks to prevent infiltration of rain water runoff and separation of water pans for human and animal consumption be put in place to improve drinking water quality at the point of use and protection of water sources from contamination.