EVALUATION OF IRRIGATION WATER QUALITY OF THE YATTA CANAL IN MACHAKOS COUNTY, KENYA

Sign:.................................. Date:11-05-2014

Name: Joseph Muli Mang’oka (BSc. Forestry)

Reg No: N50/CTY/PT/21829/2012

Department of Environmental Science

A Research Proposal submitted in partial fulfillment of the requirements for the award of the Degree of Master of Environmental Science in the School of Environmental Studies of Kenyatta University

SUPERVISORS

Prof Shyam Manohar

Department of Environmental Sciences

Kenyatta University

Dr Ezekiel Ndunda

Department of Environmental Sciences

Kenyatta University

AUGUST 2014

KENYATTA UNIVERSITY
PO BOX 43844 00100
NAIROBI KENYA

2 2 SEP 2014

RECEIVED
GRADUATE SCHOOL
The Yatta Canal in Machakos County is a major water resource used by the local community for domestic and small-scale irrigation. The water quality has however degraded over the years due to sequential use and re-use since it's the only single source of water supply. There has been no study conducted to test the quality of this water which acts as a lifeline to the Yatta residents. This study therefore aims to evaluate the irrigation water quality of the Yatta canal in Machakos County, Kenya. The specific objectives are: To analyze the physico-chemical properties of the canal water used for irrigation; To determine the biological composition of the canal water and to compare the levels of contamination with agricultural practices along the canal. The research design is experimental involving laboratory analysis of physico-chemical and biological properties of canal water. For the purpose of this study, twenty water samples (S1, S2, S3,...S20) will be collected during the dry and wet seasons between 8am and 10am using a long-handled plastic scoop and stored in cleaned polyethylene bottles without any air bubbles. Water samples will be collected at 1km intervals along the canal from the main intake of Thika River and preserved according to APHA, 1985. Systematic grid sampling method will be used to identify sample collection points and within mid depth of the canal. The grid and initial sampling points will be randomly selected. At each sampling location, field measurements of unstable water parameters such as colour, odour, temperature, pH, dissolved oxygen, total dissolved solids and turbidity will be performed prior to sample collection. Later on, samples for laboratory analysis will be collected and transported at temperatures of 4°C for laboratory analysis within 24 hours of collection. Data obtained from the canal water analysis will be analyzed using statistical package for the social sciences, tabulated and presented through descriptive and inferential analysis. Analysis of Variance test will be used to determine the level of variation between the concentration of physico-chemical and biological properties of the canal water during the dry and wet seasons as well as current agricultural practices within the various sampling points. The results will be compared with National Environment Management Authority, World Health Organization as well as Food and Agriculture Organization and recommendations made to policy makers and stakeholders.