

**ENVIRONMENTAL CONSIDERATION OF INTER-BASIN WATER TRANSFER
SCHEME IN NORTHERN WATER COLLECTION TUNNEL, MURANG'A COUNTY,
KENYA**

BY

**JOSEPH M. KAMAU
(REG. NO.N50/24345/2013)**



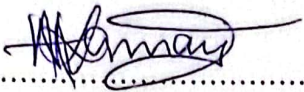
**RESEARCH PROJECT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE AWARD OF MASTERS OF ENVIRONMENTAL PLANNING AND
MANAGEMENT DEGREE IN THE DEPARTMENT OF SPATIAL AND
ENVIRONMENTAL PLANNING, SCHOOL OF ENGINEERING AND
ARCHITECTURE.**

JUNE 2023

DECLARATION

Declaration by Student

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

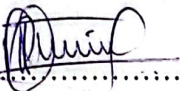
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Declaration by Supervisor

This research project was done and submitted with my approval as the university supervisor.

Signature:..........Date:.....1st June 2023.....

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ABSTRACT

Rapid urbanization has led to significant challenges in ensuring adequate water supply with minimal adverse impacts on the catchment areas. The adverse impacts on catchment areas affect more than 18 million people in Kenya and are predicted to affect six billion people globally by 2050. The Nairobi Northern Water Collector Tunnel was a flagship National Government Project aiming to address the perennial water shortages in Nairobi City. Diverting water from rivers to collect at the dam significantly affect those downstream as they are limited to clean and enough water. For that reason, the project does not achieve the desired goals, therefore Proper understanding of environmental considerations to be observed by stakeholders is the key in solving the impacts. It is therefore imperative to assess environmental considerations to ensure sustainable water supply. The objectives of the research are to determine the hydrological issues related to the Nairobi tunnel project in the project area, to assess environmental considerations for addressing bulk inter-basin water transfer schemes and to examine techniques adopted by the NCT project in addressing the concerns. The study location for the research was in Murang'a County, particularly Maragua, Gikigie and Irati areas. Primary data was obtained from key informant's interviews, questionnaires and observation checklists. Secondary data was obtained from reports, historical data and records. Purposive sampling technique was applied for key informants' interviews while stratified sampling was applied for household questionnaires. Data analysis were done using SPSS software version 24 where the questionnaires are coded, analysed and interpreted. Presentation of data was done in form of tables and figures. T-test analysis were done to assess the relationship between the respondent's demographic attributes and their responses regarding the environmental consideration. The study was used in decision making on appropriate interventions on hydrological issues related to water collection points. Most of them have basic education, signifying that the project would be a significant boost to their economic development through employment, increased business opportunities, increase water available for farming. The findings further demonstrated that partial river diversion was the primary water abstraction technique stakeholders in the NCT project adopted. It involved building tunnels to divert most of the river's waters to dams for treatment. Hence, the strategy affirms the project's sustainability goals since it was energy efficient as water flows from the rivers to the dams through gravity. The NCT project's impacts vary according to the area's communities benefiting from the three rivers are situated. For instance, the findings showed that those living around the project are not affected by flood management but could experience deforestation and landslides due to effects of the dam. Conversely, communities downstream could experience reduced water supply and lowering water tables that could reduce capacity of the boreholes leading to acute water shortage. On the flip side the project could contribute significantly towards flood management. Downstream communities in the Arid and Semi-arid areas face perennial flooding that led to substantial socioeconomic losses including disruption of agricultural production, and destruction of property and life before facing another season of drought. It was evident that limiting flooding, deforestation, and siltation are the primary measures the NCT project stakeholders are focusing on based on the information the feasibility studies generated. Besides, stabilizing water flow to communities downstream was paramount to minimize its adverse socioeconomic impacts on their livelihoods. The national government, ministry of water, sanitation and irrigation and NEMA should institute a policy that will guarantee environmental protection as well as sufficient water for all the surrounding communities.