

**THE IMPACT OF CLIMATE VARIABILITY ON PERFORMANCE OF
ON-FARM WATER HARVESTING SYSTEMS IN MATUNGULU
DIVISION, MACHAKOS COUNTY, KENYA**

By

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ABSTRACT

Climate variability affects rainfall and increases evaporation, exerting increasing pressure on ecosystem services. Developments by the growing population are also affecting the ecosystem as demands for services, including need for clean and reliable water increases. Rainwater harvesting continues to be an adaptation strategy for people living with high rainfall variability, both for domestic supply and to enhance crop, livestock and other forms of agriculture. Vulnerability of the water harvesting strategies to impacts of climate variability is a less researched but potentially important facet of the larger global climate change question. This study will examine how the performance of on-farm water harvesting systems in Matungulu Division, Machakos County, has been affected by impacts of climate variability. The objectives of the study will be; to determine the on-farm water harvesting systems used by households in Matungulu Division, to establish the main climatic parameters that exacerbates water stress in Matungulu Division, to determine to what extent increase in frequency and intensity of the climatic parameters has increased drenching and stabilization frequency of on-farm water harvesting systems in Matungulu Division and to establish to what extend intensified erratic rainfalls affects the performance of on-farm water harvesting systems in checking surface run-off in Matungulu Division. Two hundred and ten households will be selected from 2086 households in the division, 42 from each of the five sub-locations. Two sub-divisions based on livelihood of the target population, i.e. cash crop farms (coffee) and grain crop farms (maize and beans) will be used. Twenty-one households for each livelihood strategy from each of the five sub-locations taking the odd-numbered items will be sampled. Questionnaires will be administered on impacts of climatic variability to water harvesting and storage systems. Interviews will be held with key water informers from the area. Other relevant information will be obtained from secondary sources. Descriptive research method (design) will be used and data will be analyzed using descriptive statistics and multiple regression analysis to show the relationship between the independent variable (performance) and the dependent variables of rainfall variability (flash rainfall, droughts and erratic rainfall). The data will be statistically analyzed by use of SPSS and results discussed and presented in terms of frequency distribution tables, bar and pie charts and graphs. From the study, ways to increase performance of appropriate water harvesting and conservation systems in the area in light of increased rainfall variability will be suggested together with areas of further research.