Title: Assessmment of Water Resource Accessibility and Conservation in Ngaciuma/Kinyaruthia Sub-Catchment, Imenti North District, Kenya

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Abstract: The aim of the study was to assess water resource accessibility and conservation in Ngaciuma/Kinyaruthia sub-catchment in Imenti North District, Kenya. The study was prompted by unsustainable use of water resources in the study area which has drastically affected the volumetric flows of Ngaciuma River rendering some of the tributaries seasonal. People are therefore forced to move longer distances in search of reliable water sources, especially during the dry season. To contribute to the improvement on this situation, the study sort to expose the status of water resources in the sub-catchment by analyzing both trends in rainfall (1986-2008) and stream flow for both Ngaciuma and Kinyaruthia minor river both serving the community in this sub-catchment. Water use and water conservation activities were also documented. The influence of water accessibility on water use and adoption of Water Conservation (WC) practices at household level was evaluated. The study identified the constraints faced by the community. To realize the objectives of the study, both primary and secondary data were utilized. Primary data were collected using open and closed ended questionnaires administered to households. The households were selected through the guidance of zones in the sub-catchment. Secondary data involved rainfall data and stream discharge data which were acquired from the Kenya Meteorological Department (KMD) and Water Resources Management Authority (WRMA) sub-regional office in Imenti North district, respectively. Statistical package of Social Sciences (SPSS) was used for data analysis. Descriptive statistics were used to analyze social economic characteristics of the respondents. Regression, correlation, spearman test and Mann Whitney U test were used to compute the relationship between variables. Tree planting, rainwater harvesting and bench terraces were identified as the main WC practices. Lack of capital and lack of technical knowledge were the "major" constraints to adoption of WC practices. Stepwise regression analysis revealed that lack of technical knowledge could explain 83.5% of variations of adoption level of WC practices by respondents. The Upper zone of the sub-catchment had poor access to water resources as compared to the Middle and Lower zones. A correlation analysis between distance to and from water sources revealed a negative association statistically significant at p<0.05. However, a correlation analysis between distance and number of WC practices adopted revealed no significant relationship at P<0.05. Spearman rank test revealed a significant decreasing trend during the long rains (March-May) during the period 1986-2008 at P<0.05. No change was observable for the short rains (October-December) from the same period. The flow duration curve revealed than Ngaciuma River had a longer lag time for the low flow as compared to Kinyaruthia Minor River. The spearman rank test revealed significant decreasing trend in discharge for Ngaciuma River at P<0.05 and an increasing trend for Kinyaruthia Minor River at P<0.01. The level of adoption of WC practices was fairly low with only a few respondents highly adopting to WC practices. The aforementioned gaps need to be bridged through ensuring uniformity in adoption of WC practices. Urgent solutions from the community, the government and donor agencies need to be hastened. To achieve this, alternative energy sources, water use efficient methods of irrigation and potential water harvesting need to be evaluated.