

## Abstract

The inefficient water use, varying and low productivity in Kenya public irrigation schemes is a major concern. It is therefore necessary to periodically monitor and evaluate the performance of public irrigation schemes. This informed this study where a comparative performance analysis using benchmarking process was carried for Ahero, West Kano and Bunyala irrigation schemes in Western Kenya. The study aimed at evaluating performance of Western Kenya rice irrigation schemes using benchmarking indicators and principal component analysis; determining factors influencing performance and formulating best management practices needed to improve performance. The performance of the irrigation schemes was measured using thirteen standard performance indicators for the period between 2012 and 2016. The indicators were weighted using principal component analysis and combined to form a single performance score using linear aggregation method. Factor analysis method was used to group and quantify the level of influence of various factors on productivity of irrigation schemes. Finally best management practices of irrigation schemes were developed. Analytical hierarchical approach method was used to rank the selected best management practices according to the level of importance attached by farmers. Data was collected using field surveys, observation, interviews, focus group discussion and literature review. The irrigation schemes were found to be performing sub-optimally relative to similar irrigation schemes in the world. The relative irrigation supply ratio ranged between 0.68 - 3.38 while and relative water supply ratio varied between 1.44 -2.44. Ratios above 1.0 indicate water wastage. Water fee collection performance was between 45% and 97% indicating lack of full compliance in all schemes. Land productivity ranged from 3.06 tonnes/ha to 6.6 tonnes/ha which was relatively good compared to average global yield of 3.8 tonnes/ha. The average overall performance relative to threshold values in Ahero, West Kano and Bunyala irrigation schemes was 48%, 49% and 56% respectively. Bunyala irrigation scheme was identified as the best performing scheme while Ahero irrigation scheme was the poorest performing irrigation scheme. Technological and knowledge factors were found to have the highest influence of 24.57 % on performance of irrigation scheme. Farmer capacity building was identified as the most important strategy needed to improve productivity in western Kenya rice irrigation schemes. The study concluded that the performance of the three rice irrigation schemes is poor and unsustainable. The study recommends capacity building of farmers, mechanization of farming operations and system

of rice intensification to be implemented to increase productivity. This study provides useful information to policy and decision makers on areas of weakness that require policy interventions.