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Technical Performance Assessment of Small-scale Irrigation Schemes in the Lake Tana Floodplains, Ethiopia

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Abstract

Improving irrigation management to combat water scarcity is of the key element in agriculture to feed the ever-growing population in the finite water and land resources. This study was conducted to assess the performance of two selected irrigation schemes (Shina and Bebeks) in the Lake Tana floodplains (Ethiopia), using technical performance indicators. The irrigation management of the farmers, including field irrigation application efficiency and irrigation water use efficiency, was investigated. Canal conveyance efficiency was determined in main and secondary canals and other problems that cause scheme under performance were identified. The field irrigation application efficiency at nine experimental fields (three maize and six onion fields) ranged from 20 to 80 % and were mostly between 40 and 60 %. The irrigation water use efficiency for onion varied from 1.9 to 7.2 kg m^{-3} based on bulb yield. Similarly, the irrigation water use efficiency varied from 0.9 to 1.2 kg m^{-3} for maize based on grain yield. The farmers applied over irrigation (by 50 to 80 % higher irrigation than the crop needs) during early growth stages and under irrigation (by 12 to 40 % lower than the crop needs) during mid and late growth stages. The lined and earthen canal conveyance loss in Bebeks were 0.037 and 0.047 l s^{-1} m^{-1}, whereas in Shina they were 0.033 and 0.044 l s^{-1} m^{-1}. Both schemes are performing below the standard based on the technical performance indicators. Canal and reservoir sedimentation from erosion in the upstream catchment areas during the rainy season and poor maintenance of structures were the major problems.

Keywords: Ethiopia, food security, irrigation efficiency, performance indicators

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