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Assessment of the potential for irrigation development in Albert Nile basin: A case study of Nebbi district

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There has been limited research conducted on irrigation potential in Uganda. The existing studies provide a wide number of estimates of irrigation potential for Uganda and thus constrain reliable medium term planning and investment in the subsector. This research was aimed at assessing the potential for irrigation development in Nebbi District, which cover 195,300 km², with a view of guiding planning and strategic investment in irrigation. Irrigation potential was assessed as an aggregation of the land suitability, water requirement and the available water for irrigation for three systems (drip, sprinkler and surface). Land suitability evaluation for the three systems was determined based upon topography and soil characteristics. The FAO CROPWAT model was used to determine the water requirements for the selected crops. Water resources assessment was carried out using rainfall data and the stream flow analysis of the available water resources in the study area. For surface irrigation, no area was classified as highly suitable or moderately suitable. Only 0.03% (48.91 ha) is marginally suitable, 36% (68,445.55 ha) currently not suitable whereas 64% (121,606.33 ha) permanently not suitable. For drip irrigation, 58.7% (111,591 ha) is marginally suitable and 25.8% (49,084 ha) is moderately suitable. Furthermore, 15% (28,492 ha) and 0.5% (989 ha) are currently not suitable and permanently not suitable respectively. There was no area classified as highly suitable under drip irrigation. For sprinkler irrigation, 14.1% (26 815.8 ha) of the area is marginally suitable and 0.03% (48.1 ha) is classified as moderately suitable for sprinkler irrigation. 47.5% (90 291.4 ha) and 38.4 % (72 987.2 ha) of the area is currently not suitable and permanently not suitable respectively. The mean capability index (Ci) for surface irrigation was 36.1 (currently not suitable), 45.4 (marginally suitable) for drip irrigation while sprinkler irrigation Ci was 42.8 (marginally suitable). Crop evapotranspiration (ET_c) for the selected crops (tomatoes, cabbages and onions) varied from 2.46 to 5.76 mm/day; 2.87 to 5.92 mm/day and 2.87 to 4.78 mm/day respectively. The results from water resources assessment revealed that the total catchment yield was 2.69 x 10⁹ m³ which permits irrigation for an area of 141,817.65 ha. The results showed that drip irrigation system was more suitable for the Nebbi district.