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Soil fertility effect on water productivity of maize in the upper blue Nile basin, Ethiopia

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ABSTRACT

Maize (*Zea mays*) is among the major cereals grown in the high rainfall areas of the subSaharan Africa' s (SSA) such as the Ethiopian part of the Blue Nile basin. However, its productivity is severely constrained by poor soil, water and crop management practices. This study simulated the water productivity of the crop under varying soil fertility scenarios (poor, near optimal and none limiting) using hybrid seeds under rainfed conditions using the FAO AquaCrop model. The result indicated that grain yield of maize increased from 2.5 tons.ha⁻¹ under poor to 6.4 and 9.2 tons.ha⁻¹ with near optimal and non-limiting soil fertility conditions. Correspondingly, soil evaporation decreased from 446 mm to 285 and 204 mm, while transpiration increased from 146 to 268 and 355 mm. Consequently, grain water productivity was increased by 48% and 54%, respectively, with the near optimal and non-limiting soil fertility conditions. The water productivity gain mainly comes from reduced evaporation and increased transpiration without significantly affecting water left for downstream ecosystem services. This has a huge implication for a basin scale water management planning for various purposes.

KEYWORDS

AquaCrop; Simulation; Water Productivity; Soil Fertility; Nitisols

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