

Abstract

Aims: To model tomato water productivity under deficit sub – surface drip irrigation and grass mulch densities using Aquacrop model.

Study Design: The study was factorial experimental with twelve treatments.

Place and Duration of Study: Tatton Agriculture Park, Egerton University, Nakuru, Kenya between January to May 2019.

Methodology: Tomato (*Lycopersicon esculentum* mill) crop (Tylka F1) was used to determine the effect of deficit irrigation and mulching on its productivity. Aquacrop model was calibrated to simulate the tomato yield, biomass and water productivity. Aquacrop model was used to estimate the tomato water requirements, water productivity, yield and biomass under deficit irrigation and mulching. The study was carried out on 36 experimental plots measuring 2 by 2 m with the total area under study being 144 m².

Results: The results showed a good correlation between the actual and simulated water productivity as determined by the Nash and Sutcliffe efficiency (NSE) of 0.00, Root Mean Square Error (RMSE) (%) of 0.04 and Coefficient of determination (R²) of 0.72.

Conclusion: The study calibrated Aquacrop model for simulating tomato crop water productivity in Njoro Sub County and showed that the model is a good estimator of tomato water productivity.