

Abstract

The greatest challenge in the agricultural sector is to produce more food with less water. The problem facing tomato growers in Njoro Sub County is the unfavourable conditions for tomato growth which includes very low rainfall during the dry periods. This requires maximizing yield per unit of water used. However, there is limited information on water management strategies, or deficit irrigation that would maximize tomato crop yield and additionally improve on the quality of fruit when drip irrigation is used. The objective of this study was to evaluate the effect of deficit sub – surface drip irrigation and mulching systems on water productivity of tomato (*Lycopersicon esculentum* mill) crop in Njoro Sub County. The study was carried out on experimental plots measuring 4 m² in a shade at Egerton University's Tatton farm. Factorial experimental design was used in this study where the treatments were three water levels (100 % ET_C, 80% ET_C and 60 % ET_C) and four grass mulch densities (0, 0.5, 1 and 1.5 kg/m²) replicated three times. The sub – surface drip lines were laid at a depth of 5 cm below the ground surface. An estimated crop water requirement was applied to the respective plots based on various irrigation levels guided by the four main tomato crop development stages. The agronomic parameters and yield was monitored on weekly basis over a period of twenty weeks. The tomato water productivity under the interactive effect of deficit sub – surface drip irrigation and grass mulch densities was determined to be highest at 60 % ET_C and 1 kg/m² of grass mulch and lowest at 100 % ET_C and 1.5 kg/m². The study provides information on optimum application rates that can be adopted for production of more tomato yields by farmers with less water thus leading to poverty reduction by improving the agri-business in Njoro Sub County.