

Abstract

An evaluation of on-farm performance of drip irrigation system within a greenhouse in arid and semi-arid lands (ASALs) environment was conducted. Field experiment was conducted at South Eastern Kenya University, Kenya. Sample emitter discharge was monitored using a measuring can inserted in sub-soil at each emitter, and timer. Above-ground biomass was estimated by weighing sampled tomato plants. Data on drip-deficit irrigation parameters was assessed using standard equations. Results show cumulative average water use efficiency of 2.2 kg/m³, maximum total biomass of 600 g/plant, emitter variation 7, application depth of 12 cm, and Gross irrigation requirement of 17.2 mm and drip system capacity of 4117 litres. Emitter discharge declined linearly with distance from the elevated tank with an average discharge of 679 ml/hr. Although the theoretical irrigation interval is four days, it is recommended that the a practical value of three days be adopted for tomato growing due to erratic evapo-traspiration rates is which is accelerated by wind, and extreme sun's radiation in the dry land conditions. Research on on-farm performance of evaporative cooling on crop production within a greenhouse is recommended. Application of integrated rainwater harvesting and drip system-optimization water requirement of different crops should be investigated.