

**Supplemental Irrigation Effects on Growth and Yields of Watermelon
(*Citrullus lanatus*) in Semi-Arid Tharaka -Eastern Kenya**

BY

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ABSTRACT

Agricultural water scarcity and frequent drought periods limit crop productivity and farm incomes in many arid and semi-arid regions. The goal of this study was to investigate if watermelon production could be enhanced in the semi-arid Tharaka District using supplemental irrigation to improve rural livelihood and development. The objectives were to determine the effect of the supplemental irrigation on the watermelon growth, yield, quality and economic feasibility. The experiment was conducted in a split plot complete randomized design with supplemental irrigation method as the main plot and watermelon cultivar as the minor plot. The data collected was subjected to analysis of variance (ANOVA) to evaluate the treatment effects. Principal component analysis was done to determine the most significant factors to the treatment responses. The statistical package used to analyze the data was JMP version 8 (SAS Institute, 2008). The vegetative growth under the various supplemental irrigation methods was statistically similar in all the treatments because all plots were initially uniformly irrigated. The highest total economic yield of 4.05 Mg/ha in the short rain season (SRS) and 4.95 Mg/ha in the long rain season (LRS) was obtained in Charleston grey irrigated by drip. These Charleston grey fruits weighed 6.07 kg and 7.42 kg in the SRS and LRS respectively. The highest soluble solids concentration was obtained in Sugar baby. It was 6.77° in the SRS under drip irrigation and 9.63° in the LRS without supplemental irrigation. However it was not economical to apply supplemental irrigation to achieve these soluble solids concentrations. The highest net benefits of KES 63,700/ha in the SRS was obtained in Sugar baby irrigated with drip and KES 369400 in the LRS was obtained in Charleston grey irrigated with sprinkler method and KES 227560 irrigated with drip. It was concluded that with a 2 to 4 week basal irrigation drip supplemental irrigation can be used to boost Charleston grey production in semi-arid conditions.