

Plant water relations, crop yield and quality of arabica coffee (*Coffea arabica*) as affected by supplemental deficit irrigation.

Abstract

Low amount and erratic distribution of the seasonal precipitation and recurrent droughts are major threats to coffee production in Ethiopia. This necessitates application of supplemental deficit irrigation for coffee production. This study evaluated the impact of two supplemental irrigations, viz. supplemental full (SFI) and deficit irrigation (SDI) in comparison to rain-fed (RF) control on plant water relations, yield and quality of *Coffea arabica* L. during the dry season using three cultivars (cv. F-59, 74110 and 75227). Supplemental full irrigation consistently improved soil and plant water status and stomatal conductance (g_s) during the dry season and resulted in significantly higher yield. However, the difference between SFI and SDI was not significant for crop yield, but had higher yield than RF control. Overall quality in terms of raw appearance and total quality of coffee beans was substantially improved and the amount of irrigation water applied was considerably reduced by SDI compared to SFI practice. Therefore, SDI appears to be more effective than SFI for coffee production in areas of frequent water scarcity and recurrent drought as for eastern and northern parts of Ethiopia.

Keyword: *Coffea arabica*; Supplemental full irrigation; Supplemental deficit irrigation; Rain-fed culture; Crop yield.