



Performance of Different Varieties of Groundnut Under Surface and Subsurface Drip Irrigation Using Saline and Good Quality Waters

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Abstract

A study was conducted on the performance of different varieties of groundnut under surface and subsurface drip irrigation using saline and good quality waters at Swami Keshwanand Rajasthan Agricultural University, Bikaner during 2016-2018 on loamy sand soil. The experiment comprised of two levels of irrigation water salinity viz., EC 0.25 (BAW) and 2.8 dS m⁻¹, two drip system (surface and subsurface) and three varieties (HNG-10, HNG-123 and Mallika) of groundnut under Randomized Block Design (RBD) with three replications. Application of best available water gave significantly higher yield (28.03 q ha⁻¹) with the tune of 30.2 per cent over saline water and subsurface irrigation yielded (25.57 q ha⁻¹) significantly higher over surface drip irrigation method. Among the varieties, HNG 123 performed well with significantly higher yield (26.99 q ha⁻¹) over both the varieties. BAW fetched the higher net return (₹ 68220) and B:C ratio (1.95) and in case of drip irrigation systems, subsurface irrigation brought in higher net return and B:C ratio. Variety HNG-123 found superior with maximum net return (₹ 62704) and B:C ratio (1.88) followed by Mallika.

Key words: Irrigation water quality, Saline water, Groundnut varieties, Surface and subsurface drip irrigation, Water use efficiency, B:C ratio

Introduction

Groundnut is one of the most important food crops of the world, grown in 26.4 million ha with a total production of 36.1 million metric tons and an average productivity of 1.4 Mg ha⁻¹ (FAO, 2008-09). India has the largest area under groundnut with the lowest productivity in the world (FAO STAT, 2002). Gujarat, Andhra Pradesh and Rajasthan are the leading states of India in production of groundnut. In Rajasthan it is cultivated in area of 6.40 lakh ha area (Indiastat, 2019). Bikaner is the pioneer district in groundnut production, where it is grown as an irrigated crop. Judicious use of saline ground water in dry areas with scarcity of irrigation water for crop production has been found quite feasible (Dagar *et al.*, 2019). Ground water quality of Bikaner

district is not good and has the problem of salinity. Overhead sprinklers are used for irrigation resulting in low water use efficiency (WUE) with depletion of ground water reservoir in this arid region. Drip irrigation is the right option in this situation which not only enhances WUE but ensures safe use of poor-quality water with minimum hazard on soil and plant. Drip irrigation system for saline water is considered the most suitable technology as leaching of salts takes at low leaching fraction. Thus, drip system not only saves irrigation water but also does not permit salt accumulation in vicinity of root zone. Drip irrigation system has been found to be quite effective under limited water availability not only in achieving higher productivity but also economizing other inputs such as fertilizers, pesticides, labor etc. Drip irrigation system is a