Nile Valley University Publications
Nile Journal for Agricultural Sciences (NJAS)
(ISSN: 1585 – 5507)
Volume 10, NO. 02, 2025
nilevalley.edu.sd

Impact of Drip irrigation Regimes and Surface Irrigation on the Yield and Water Productivity of Garlic (*Allium sativum* L.) in Khartoum State, Sudan

Shaker BabikerAhmed[*1], Ahmed B. A. Khalifa[2], Amir B. Saeed[3], Sara Hassan Elnasikh[4] and Mohammed A. A. Elmowla[5]

1Department of Agricultural Engineering, Faculty of Agriculture, Omdurman Islamic University, Sudan.
2Kassala and Gash Research Station, Kassala, Sudan
3Department of Agricultural Engineering, Faculty of Agriculture, University of Khartoum, Sudan.
4Department of Agricultural Economics and Rural Development, Faculty of Agriculture, Omdurman Islamic University, Sudan
5 Dept. of Agricultural Engineering, Faculty of Agriculture, Nile Valley University, Atbara, Sudan
Corresponding author: shaker@oiu.edu.sd ; https://orcid.org/0000-0001-6112-5796

Received : 29. Jun. 2025 **Accepted :29. Sep. 2025** **Published : 23. Nov. 2025**

Abstract

Irrigation water management practices are the main strategies for improving water productivity. The objective of this study was to investigate the effect of drip irrigation systems with three irrigation levels of total water requirement (100%, 75%, and 50%) on the water productivity of two varieties of garlic (V1 Baladi and V2 Egyptian) compared with furrow irrigation (control). The treatments are two irrigation type furrow irrigation (C) and 3 level of drip irrigation system (D1 100, D2 75and D350). The field experiment was arranged in a split plot design with three replicates. The results showed that taller plant and the highest number of leaves were recorded with drip irrigation of 100% ETc for both seasons compared to other treatments. Higher yields were produced with 100% ETc under drip irrigation, while the lowest yields were recorded with 50%ETc and surface irrigation in both seasons. Moreover, the highest values of water productivity and economic water productivity were obtained under 50% ETc. Drip irrigation with 100% ETc was the most economic and had a higher net benefit.

Keywords: *drip irrigation, water requirement, Crop evapotranspiration, water productivity and economic water productivity*.