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Modified Design for Drip Irrigation System to Improve the Productivity of Irrigation Water and Fertilizers Distribution

***[1]Abdelraouf, R. E., [1]Okasha E.M. and [2]Tarabye, H.H.H.**

[1]Water Relations & Field Irrigation Dept., National Research Center, Dokki, Giza- Egypt
[2]Agricultural Engineering Department, Faculty of Agriculture and Natural Resources, Aswan University, Egypt

Abstract : Due to limitation water resources in Egypt, the water use efficiency most be maximized to facing the population increase. Two field experiments were done during the two successive seasons 2014 and 2015, at El-Nubaria research station for National Research Centre, Egypt. The execution of modified design for drip irrigation system should be tested and evaluated in comparison with the other two designs to increase water and fertilizers use efficiency in the new reclaimed land. Three designs of drip irrigation systems will be tested in this study. The first establish design was the common design (control). The second one was with PRD technique (partial root drying; one emitter will irrigate half area of the root zone and emitters of other lateral will irrigate other half of root zone) where the two laterals were in the same direction. The last one was the modified design with PRD technique with oboist direction for the two laterals. Take into consideration the following parameters to determine the difference between the three designs (A) water emission uniformity, (B) soil moisture distribution, (C) application efficiency, (D) Water productivity of groundnut "$WP_{groundnut}$" and (E) yield of groundnut. Statistical analysis specified that the maximum values of water productivity and complete net return for farmers were discovered under the modified design (3). The result proved that, emotion uniformity will be increased from 74% : 75% : 99,6% throw out design (1) , design (2) and modified design (3), respectively as show in Fig. (3). Furthermore, the averages of emitter discharge along laterals L/h with modified design (3) were stable from start to end but with design (2) the averages were decrease Fig. (4). It means that, in the design (2) can be used but maximum lateral length of 25 m. The application efficiency (AE) was increased 91: 95: 99 % throw the three design respectively Fig. (8). The water productivity achieved high amount with modified design (3) compared with the others Fig. (9) and Table (6). The yield of groundnut was affected by different designs. It increased from 1.9: 2.1: 2.51 ton/fed. significantly throw the three designs.

Key words : *Modified design of drip irrigation, PRD technique, Water productivity of Groundnut.*

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