

Drip Irrigation System for Maize to Reduce Food, Water and Energy Scarcity in Egypt

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Abstract

Maize is an important crop for the Egyptian national economy. However, the crop consumed large amount of water as a result of being a summer crop and grown under surface irrigation. This paper discusses the effect of changing maize cultivation methods to raised beds and changing its irrigation system to drip on potential maize production, and its impact on water and energy savings. Maize cultivated area and production were obtained from Ministry of Agriculture and Land Reclamation. Weather data for 10 years from 2004 to 2013 was used to calculate applied water under surface irrigation, raised beds and drip system. The analysis was carried out using BISm model to compare maize yield under both surface and drip irrigation methods considering other alternative cultivation alternatives. Adoption of the nexus approach, energy consumption was also calculated for various options for water lifting.

The results shows increased maize production under drip irrigation system compared to surface irrigation and raised beds cultivation system. The results also showed that maize production under drip system reduced production-consumption gap from 45% to 12%. It is also worth mentioning that energy consumption was also reduced under these conditions.

Key words: Water productivity, energy productivity, raised beds cultivation, maize production-consumption gap.