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## Optimal Use of Land Preparation for Increasing Soil Moisture to Raise the Crop Productivity on Marginal Lands in Sudan

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### Abstract

Land preparation is one of the most important and costly agricultural operations. Success or failure of crop production depends for a large part on the good preparation of the land. In addition, tillage changes the physical properties of the soil. This study is an attempt to select the most appropriate methods for land preparation under arid and semi-arid conditions, in order to raise soil moisture and increase production and to reduce costs of using traditional methods of land preparation. This experiment was conducted in the West of Khartoum city, where the chemical and physical properties of the soil are sandy and sandy clay. To achieve the objectives of the study, two tractors with different drag force were used. The first tractor for tester and the second one for help, as well as used of two primary plows such as; (disc plow) and chisel plow and two secondary Plows such as; (Disc harrow and plow cruiser) in addition to an animal drawn plow. Five land preparation have been conducted: In a first test land has been prepared by using the initial chisel plow to a depth of 25 cm, then opening furrows using plow cruiser. The second test by using the initial disc plow to a depth of 15 cm, then furrows were opened using a plow cruiser. The third test used the initial harrow plow to a depth of 20 cm, then furrows were opened using plow cruiser. The fourth test opened the furrows using a plow cruiser to a depth of 25 cm. Only the fifth test opened the furrows using the animal drawn plow to a depth of 13 cm. The results showed that the field efficiency of (chisel, disc, cruiser, harrow and the animal drawn) plows were 88.2, 81.5, 68.2, 49.1 and 12.8 respectively. Fuel consumption in liter ha<sup>-1</sup> were 7.60, 4.60, 3.30 and 2.50, respectively. The study recommended that the most suitable practice is the cruiser plow which was recorded the higher field efficiency and less fuel consumption for increasing soil moisture and raising the crop production.

**Keywords:** Land preparations, land use, marginal, Sudan