

Water production function for chickpea under sprinkler method of irrigation

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ABSTRACT

A field experiment entitled, "Water production function for chickpea under sprinkler method of irrigation" was conducted at Research cum-Demonstration Farm of Irrigation Water Management, Mahatma Phule Krishi Vidyapeeth, Rahuri, Distt. Ahmednagar (Maharashtra) India during *rabi* season of 2006-07. The treatments were 1.2 cm depth of irrigation at 37.5 mm CPE through sprinkler irrigation method (T_1), 1.68 mm depth of irrigation at 37.5 mm CPE through sprinkler irrigation method (T_2), 2.24 cm depth of irrigation at 37.5 mm CPE through sprinkler irrigation method (T_3), 3.12 cm depth of irrigation at 37.5 mm CPE through sprinkler irrigation method (T_4), 3.44 cm depth of irrigation at 37.5 mm CPE through sprinkler irrigation method (T_5), 4.56 cm depth of irrigation at 37.5 mm CPE through sprinkler irrigation method (T_6) and 6 cm depth of irrigation at 75 mm CPE through surface irrigation method (T_7). A buffer plot was left between the sprinkler irrigation treatments (T_1 to T_6) and surface irrigation treatment (T_7). Treatment T_4 (3.12 cm depth of irrigation at 37.5 mm CPE through sprinkler method) produced 25.90 q ha⁻¹ grain yield and showed its superiority over other irrigation treatments. Treatment T_4 (sprinkler with 3.12 cm depth) was economically for better than surface method of irrigation in terms of net seasonal income, B: C ratio, water productivity and water use efficiency. Thus, the study revealed that growing of chickpea under sprinkler, irrigation method resulted in the more seed yield (25.90 q ha⁻¹) and maximum benefit: cost ratio (2.57) as compared to the surface irrigation method.

Key words : Production function, Sprinkler irrigation, Chickpea.

INTRODUCTION

Pulses play significant role in sustainable agriculture and nutritional security to predominantly vegetarian population of the country. The importance of pulses in human diet and animal nutrition is well recognized. The roots of pulses crop penetrate deep into soil, fix the atmospheric nitrogen with the help of nodules. The shoot adds huge quality of dry foliage into soil and enriches the soil fertility.

Chickpea grain is the good source of proteins, carbohydrates, energy and minerals matters. Chickpea contains 17.7 per cent protein and 56.5 per cent carbohydrates. Chickpea is cultivated on 7.11 million ha area with 5.65 million tonnes production with 795 kg ha⁻¹ productivity in the country. In Maharashtra chickpea is the second most important crop cultivated in *rabi* season with 7.13 lakh tonnes production and productivity as 655 kg ha⁻¹.

In chickpea, irrigation is one of the most important factors for assured production. The proper irrigation and layout for chickpea are proved to be key factors to solve the problems of productivity. Chickpea is generally considerable as sturdy crop requiring small quantity of water, but responds immediately to over irrigation and non-availability of water during critical growth stages of crop resulting into sizable reduction in yield. It has already been reported that the productivity of chickpea increased considerably by adoption of improved technology under irrigated conditions (Masood *et al.*, 1998). Sprinkler

method of irrigation is most widely used in the world and thus most important advanced irrigation method. In India, presently 6.60 lakh ha area is covered under sprinkler and Maharashtra is the leading state with 1.35 lakh hectare area. However, sprinkler is commonly used for high value crops and vegetables. It is useful in increasing productivity by 10-35 per cent with 30-35 per cent water saving and especially suited for those dose growing crops and thus, can be conventionally used to all cereals, pulses, oilseed and vegetables. In closed spaced crops like chickpea sprinkler method could play effective role in obtaining potential yields with judicious management of irrigation water (Suryawanshi and Pampatiwar, 1985).

MATERIALS AND METHODS

An experiment "Water production function for chickpea under sprinkler method of irrigation" was conducted at Inter Faculty Department of Water Management, Mahtama Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar during the *rabi* season, 2006-07. The soil was well drained and 30-45 cm deep with sandy clay loam in textural class. As regards chemical composition available nitrogen is medium (245.42 kg ha⁻¹), available phosphorus (15.51 kg ha⁻¹) and available potassium is more (245.49 kg ha⁻¹) with 0.65 % organic carbon. The field capacity and PWP of the experimental site was 28.36 and 14.17 per cent, respectively. The experiment was laid out in Randomized Block Design with three replications and seven irrigation treatments. Digvijay

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