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Effect of Supplemental Irrigation on Growth and Yield of Chickpea

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ABSTRACT

An on farm trial was conducted at N.Agraharam and Vajiireddypalem of Prakasam district during Rabi 2007-2008 to 2009-2010 on Bengalgram crop The test treatments for improved production technology were sprinkler irrigation at 30DAS and 50DAS in contrast to farmers practice(rain fed) The supplemental irrigation with sprinkler at 30DAS and 50DAS recorded the higher yield (2575kg/ha) by 14.44 per cent as compared to farmers practice (2150 kg/ha). Improved technology increased yields at both villages compared to farmers practice. The sprinkler irrigation also enabled the farmers to accrue Rs.6115 ha. additional net income. The B: C ratio was 1:2.67 and 1:2.45 at N.Agraharam and Vanjii reddy palem respectively, with improved practice compared to 1:2.58 and 1:2.26 with farmers practice.

Key words : Bengal gram, Supplementary irrigation,Yield.

Chickpea (*Cicer arietinum* L.) is the largest produced food legume in South Asia and the third largest produced food legume globally. Chickpea is grown in more than 50 countries. Asia accounts 89.7 per cent of the area in chickpea production, followed by 4.3per cent in Africa, 2.6per cent in Oceania, 2.9 per cent in America and 0.4% in Europe (Gaur, MP *et.al.,* 2010). In terms of chickpea production and consumption, India ranked first in the world. About 64 per cent of global area with 68 per cent of global production of chickpea is contributed by India (Amarender Reddy and Devraj Mishra, 2010). Chickpea production has grown from 3.65 to 8.8 million tonnes between 1950-51 and 2012-13, registering a growth of 0.58% annually. Seed quality standards of chickpea would vary with requirement by the users, best infirmity of the product bio-chemical constituents of the seeds, absence of seed abnormalities and free from infections. Chickpea crop generally fails due to lack of moisture during flowering and pod development stage. Yield of chickpea can be increased by 25 per cent, with one irrigation at branching stage and one at pod development stage. Hence, the present on farm trials were conducted to know the minimum amount of water to be supplemented during branching and pod development stage for realizing higher yield.

MATERIAL AND METHODS

A survey was conducted on chickpea cultivation in different mandals of Praksam district. Based on the information collected, the major constraints identified were moisture stress during vegetative phase i.e., 30 days after sowing (DAS) and pod development stage i.e., 50 days after sowing. Because of these constraints farmers are getting low yields. Based on these constraints, on farm demonstration was conducted during Rabi, 2007-08 to 2009-10 in two respective villages viz., N.Agraharam of Ongole mandal (V1) and vanjji reddy palem of Kothapatnam mandal (V2) in Prakasam District. The on farm demonstration was conducted in an area of 0.4 ha each. The supplemental irrigation with sprinklers was evaluated with farmer's practices. The soils of on farm demonstration plots were light black soils and deep black soils respectively. The soils are low in nitrogen and high of phosphorous and potassium.

RESULTS AND DISCUSSION

In supplemental irrigation at branching (30DAS) and pod development stage (50DAS) recorded higher seed yield of 2650 and 2500 kg/ha compared to 2280 and 2020 kg/ha with farmers practice at N.Agraharam and Vanjii reddy palem respectively (Table1). The study conducted by

Table 1. Yield of Bengal gram as influenced by supplemental irrigation.

	Supplemental irrigation at 30& 50 DAS			Farmers practice		
	V1	V2	Mean	V1	V2	Mean
Yield	2650	2500	2575	2280	2020	2150
Gross return (Rs.ha)	53000	50000	515000	45600	40400	43000
Cost of cultivation (Rs.ha)	19875	20375	20125	17625	17855	17740
Net return (Rs.ha)	33125	29625	31375	27975	22545	25260
Additional net return (Rs.ha)	5150	7080	6115	-	-	-
B:C Ratio	1:2.67	1:2.45	1:2.55	1:2.58	1:2.26	1:2.42

Muniratanam and Sangita (2006) also reported that significant increase in seed yield of chickpea with one irrigation at 30 DAS than the no irrigation. Net returns of Rs.33125 ha^{-1} and Rs.29625 ha^{-1} were recorded with sprinkler irrigation at 30DAS and 50DAS compared to Rs.27975 ha^{-1} and Rs. 22545 ha^{-1} with farmers practice at N.Agraharam and Vanjii reddy palem respectively. Hasan and Sarkar (1999) also reported that depending upon the rainfall and soil moisture condition, single time irrigation is sufficient to get additional net returns.

Improved technology also enabled the farmers to accrue Rs.5150 ha^{-1} and Rs.7080 ha^{-1} at N.Agraharam and Vajiireddypalem respectively than the farmers practice (No irrigation). The B: C ratio was 1:2.67 and 1:2.45 with sprinkler irrigation compared to 1:2.58 and 1:2.26 with traditional practice at N.Agraharam and Vanjii reddy palem respectively. The introduction of sprinkler irrigation at 30DAS and 50 DAS found to be most profitable practice in chickpea. Mustafa *et al.,* (2008) reported that the highest seed yield (702 kg ha^{-1}), net returns (Rs.7937 ha^{-1}) and B: C ratio (2.65) was recorded when chickpea crop was irrigated at sowing, pod filling, branching, flowering.

Therefore from the study it can be concluded that application of at least one irrigation will enhance the seed yield of chickpea than no irrigation.

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