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Effect of resource conserving technologies on productivity and profitability of rainfed food - fodder cropping system under semi arid climate of India

A.K. Dixit¹, A.K. Rai² and T. Kiran Kumar³

Division of Crop Production

Indian Grassland and Fodder Research Institute, Jhansi-284003

e-mail: dixitak21@yahoo.com; rai_arvindkumar@rediffmail.com; kiranagro1@gmail.com

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ABSTRACT

A field experiment was conducted during three consecutive years from Rabi 2010-11 to Kharif 2013 at a fixed site to assess the effect of tillage, nutrient and weed control in chickpea and fodder sorghum in a system under rainfed condition at Jhansi. Pooled data of three years study revealed that reduced tillage recorded statistically similar plant stand (24.22 m²), 100-seed weight (14.74 gm), grain yield (985 kg ha⁻¹), HI (51.67 %) and protein yield (247.1 kg ha⁻¹) of chickpea and dry matter content (27.75 %) and dry matter yield (8.2 t ha⁻¹) of fodder sorghum. But in case of fodder sorghum reduced tillage recorded significantly higher green fodder yield (29.6 t ha⁻¹) and protein yield (633.4 kg ha⁻¹) than conventional tillage. In case of nutrient management, application of 50 % of recommended dose of nutrients (RDN) through inorganic fertilizers + 5 t FYM ha⁻¹ in chickpea showed superiority in all the yield attributing parameters viz., plant population (24.81 plants m⁻²), branches per plant and 100-seed weight (14.98 g) of chickpea over application of 100 % dose of nutrient through inorganic fertilizers but results were significant only for number of branches per plant. Application of 50 % of RDN through chemical fertilizers + 5 t FYM ha⁻¹ recorded significantly higher grain yield (1023 kg ha⁻¹) and protein yield (257.1 kg ha⁻¹) from chickpea and green fodder yield (31.24 t ha⁻¹), dry fodder yield (8.5 t ha⁻¹) and protein yield (656.7 kg ha⁻¹) from fodder sorghum than 100 % RDN through chemical fertilizers. Twice manual weeding gave significantly higher plant population (25.14 plants m²), grains per pod (1.67), branches per plant (4.24), grain yield (1068 kg ha⁻¹) and protein yield (268.3 kg ha⁻¹) from chickpea and green fodder yield (30.5 t ha⁻¹), dry fodder yield (8.4 t ha⁻¹) and protein yield (645.6 kg ha⁻¹) of fodder sorghum, but due to higher cost of cultivation under manual weeding, application of recommended herbicide in chickpea and fodder sorghum gave higher net return of Rs. 9153 & 9798 ha⁻¹ and B: C ratio of 0.42 & 0.57, respectively.

Key words : Chickpea, fodder sorghum, rainfed, resource conservation, system productivity.

India accounts 18.5% of world's human population and 18% of the global cattle population on only 2.4% of world's geographical area (Anonymous, 2011). Therefore, there is a tremendous pressure of human and livestock on available food, feed and fodder for their nutritional, food and fodder security (Choudhary and Suri, 2014). Sorghum (*Sorghum bicolor*) - chickpea (*Cicer arietinum* L.) is the predominant cropping system under rainfed situation which

contributes substantially to meet the food, feed and fodder requirement of semi arid tropics of India. However, the productivity of system is low due to suboptimal input management techniques. Among various input management practices, excess tillage operation, imbalanced application of nutrients including secondary and micro nutrients and non-adoption of weed management practices play important role. Under rainfed situation, moisture stress has been identified as