

Management strategy to improve input use efficiency and enhance sorghum productivity per stored rain drop in vertisols during rabi season.

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ABSTRACT

Crop developmental process and in turn its growth phases (vegetative and reproductive) is influenced by environmental factors i.e., temperature and photoperiod in field crops like sorghum. Crop growth and biomass production is a function of genotype by environment interaction, which is optimized through management strategies. Crop grain yield is determined as a product of their yield components like the grain numbers per plant times the average kernel weight at maturity. The grain numbers set at the panicle initiation phase can be enhanced by best matching the supply of nitrogen with its demand in the crop. Grain growth dynamics, a function of environment by genotype by management interaction is an important feature that helps enhance sorghum productivity.

Rabi sorghum growing environment presents a challenge through a receding soil moisture front which decreases the response to applied external inputs like nitrogen fertilizer. Deep placement of top dressed nitrogen fertilizer treatments brought about an increase in rabi sorghum grain yield by about a range of 630 to 930 kg ha⁻¹ over farmers practice of no fertilizer application. A management strategy helped enhance the agronomic nitrogen use efficiency to 16 kg grain per kg applied N, while the rain water use efficiency to 15 kg ha⁻¹ mm. Thus the hypothesis of increased rabi sorghum productivity per rain drop through improved management intervention in vertisols was validated.

Key words: Rabi Sorghum, productivity, management, nitrogen use efficiency.