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Tillage and integrated nitrogen management: Does sustain sorghum productivity in Vertisols of Semi-Arid Tropics under varying rainfall situations?

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ABSTRACT

A field study was conducted for four years (2003-2007) to investigate the effect of tillage and integrated nutrient management practices on soil moisture conservation and sorghum yield under different rainfall situations in a rainfed SAT in India. Tillage treatments include conventional tillage, CT (1 ploughing + 2 harrowing + 2 hoeing + 1 hand weeding), reduced tillage, RT (2 harrowing + 1 hoeing + 1 hand weeding) and low tillage, LT (1 Harrowing + 1 hoeing + herbicide application). Nutrient management treatments were 50% recommended rate of nitrogen (RRN), 100% RRN and 150% RRN. Fifty percent N was applied through farmyard manure and 50% N through urea. The differences of rainfall during a year as well as cropping season had a marked effect on sorghum yield. Under varying rainfall situations, CT conserved greater rainfall and improved soil physical properties performed relatively better over RT or LT. We found that sorghum response to INM varied differently under different rainfall situations in all the 4 years of study. In drought year, 50% reduced N application served better whereas in nearly drought year RRN suits. In a good rainfall year, even 50% higher RRN application produced greater sorghum yield significantly over lower rates.