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Rainwater conservation techniques and nitrogen fertilization on yield and water use efficiency of sorghum

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ABSTRACT

Soil erosion, low nitrogen availability and soil moisture stress during winter season are among the major limitations to high crop production and sustainable land management in a rainfed Semi-Arid Tropics (SAT) in India. We conducted three years field study (2000-01 to 2002-03) on a Vertisol to study the impact of land configuration and nitrogen management on winter sorghum productivity under different rainfall situations. Greater quantity soil moisture availability in the profile with rainwater conservation techniques (RCT), *viz;* compartmental bunding (CB) and ridges and furrows (RF) from sowing to harvest produced 17 to 22% higher sorghum grain yields over flat bed (FB) sowing. Sorghum grain yields and water use efficiency (WUE) were higher during mild moisture stress year compared to normal rainfall year with rainwater conservation techniques. In the sub plot, application of 20 kg N ha^{-1} produced 19% higher grain yield during a drought year. Further increase in N application to 40 kg ha^{-1} produced 22% higher yield during normal rainfall year. Mean sorghum yield during study period was 19% higher with 40 kg ha^{-1} compared to 0 kg N ha^{-1}. The CB and RF with application of 40 kg N ha^{-1} produced greater winter sorghum yields in Vertisols of south India under rainfed situations.