



Maximizing blue water use efficiency of wheat (*Triticum aestivum*) through irrigation and mulching

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ABSTRACT

A field study was conducted in sub-humid Eastern Ghats region of India to investigate the effect of different soil moisture conservation practices, viz. no-mulch (NM) as a control, ridge and furrow (RF), *Gliricidia* mulch (GM) and *Lantana* mulch (LM) on water productivity, and yield of wheat (*Triticum aestivum* L.) under three levels of irrigation ($CPE_{100} = 100\%$, $CPE_{80} = 80\%$ and $CPE_{60} = 60\%$). Total water use by wheat was 270.1–365.6 mm during 2016–17 and 210.4–302.5 mm during 2015–16. Averaging both years, wheat used was 88.35 mm (26.8%) and 44.9 mm (13.6%) more water at CPE_{100} over CPE_{60} and CPE_{80} , respectively. Among the irrigation levels, higher water productivity (WP) was observed in CPE_{60} (13.6, 9.8 kg/m³) compared to CPE_{80} (12.8, 9.3 kg/m³) and CPE_{100} (11.3, 8.9 kg/m³) for both years, respectively. CPE_{60} resulted in 5.9 and 15.8% greater WP over CPE_{80} and CPE_{100} , respectively. Mulching increased WP by 27.8% in GM and 23.3% in LM treatments compared to NM. Irrigation with mulching treatments, $CPE_{60} + GM$ exhibited WP of 15.9 and 14.7 kg/m³, and $CPE_{60} + LM$ WP of 11.0 and 10.6 kg/m³ during 2015–16 and 2016–17, respectively. On an average, mulching treatment produced additional total WP of 2.2–2.6 kg/m³, green WP of 0.5–0.7 kg/m³ and blue WP of 1.7–2.0 kg/m³ over NM. Thus $CPE_{80} + GM$ could be successfully applied during post-monsoon (*Rabi*) season in wheat production allowing a water savings of 20% without any yield loss.

Key words: Eastern Ghats, Mulch, Rainwater harvesting, Water productivity, Wheat