

Research Paper :

Comparative evaluation of land management practices and cropping systems in relation to runoff soil loss and yield of cotton

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ABSTRACT

A field experiment on medium soil with land slope of 1 per cent was conducted with the treatments of land management practices and intercropping systems during *kharif* season of year 2000 at Instructional cum-Research farm of Department of Soil and Water Conservation Engineering with a view to find the effect of these practices on runoff soil loss and yield of cotton. The land management practices *viz.*, broad bed and furrow (BBF) and ridges and furrow across the slope with cotton (90 x 50 cm spacing) recorded total runoff of 8.115 cm and 6.669 cm, respectively and soil loss of 1.158 tonnes ha⁻¹ and 1.004 tonnes ha⁻¹, respectively. Between these two treatments ridges and furrow recorded 55.51 per cent reduction in runoff and 59.77 per cent reduction in soil loss over the control. The intercropping system *viz.*, cotton + soybean, cotton + green gram and cotton black+gram in 1:1 ratio recorded total runoff of 17.332 cm, 8.033 cm, 12.668 cm, respectively. Among these treatments cotton + green gram intercropping system has most pronounced effect on reduction of runoff and soil loss as 46.41 per cent and 49.31 per cent, respectively. The average yield of these three intercropping system *viz.* 462.82 kg ha⁻¹, 478.81 kg ha⁻¹ and 424.51 kg ha⁻¹ are found to be more as compared to rest of the treatments. The cotton + green gram intercropping system is found beneficial in reducing total runoff (8.033 cm) and total soil loss (1.265 tonnes ha⁻¹) with better improvement in the yield (478.10 kg ha⁻¹). It also resulted in good monetary return of Rs 2793.33 ha⁻¹.

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Soil and water, are two major natural resources essential for crop growth and production. They are meagre and limited. The erratic rainfall and soil erosion are major handicaps faced by the farmers. The farming system aims at best use of natural resources and minimization of soil and water losses. The range of cropping system depends upon climate, soils crop characteristics and precipitation (Bonde *et al.*, 1998; Karad *et al.*, 1991). Presently rainfed agriculture in India contributes 40 per cent of food grain production and supports 40 per cent of total population.

Marathwada region of Maharashtra grows cotton over an area of approximately 6.45 lakh ha of which about 97 per cent crop is rainfed resulting in low yield. Cotton crop is major component of cropping pattern both under dry land and irrigated conditions of Maharashtra state. Presently large numbers of high yielding varieties/hybrids of cotton are being grown. It is important to note that any single practice is insufficient to increase the productivity of the crops and strategy needs modification with integrated approach of *in situ* soil and moisture conservation, adoption of crop management practices and land management practices for stabilizing productivity.

The attitude of farmers is changing towards the combination of cultural practices like land management practices and cropping systems. It is reported that formation of ridges and furrow at sowing reduces runoff, soil loss and increase yield as compared to conventional practice (Mittal, 1998).

METHODOLOGY

Experimental site :

A field experiment on medium soil with land slope of 1 per cent was conducted during *kharif* season of year 2000 at Instructional cum-Research farm of the Department of Soil and Water Conservation Engineering, College of Agricultural Engineering, Marathwada Agricultural University, Parbhani.

Climate and weather conditions :

Geographically Parbhani is situated at 19° 16' North latitude and 76° 47' East longitude with an elevation of 409 m above mean sea level. Parbhani has sub tropical climate with an average annual rainfall of 830 mm and is distributed over the monsoon period. The rainfall is mainly contributed due to South West monsoon extending from