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Effect of Bunding Methods on Soil Properties and Yield of Soybean in Medium Black Soils of Madhya Pradesh

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Operational research project on dryland agriculture could play a vital role in changing the cropping pattern of the area to one that approaches optimum production. Contour bunding installed in the area on slopy land under the watershed management programme helped to check soil erosion (Anon. 1993) as well as available nutrients.

An experiment was conducted in farmer's field during 1990 in slopy (2.5%) medium black soils. Three bunding methods (control, vetiver and graded) were tested at eight places of Thoona, Pachama, Fanda and Tumbda villages of Sehore and Bhopal districts. Bunds were made on contour line. The data were statistically analysed in randomized block design. After three years of installation of bund, yield of soybean was recorded and soil samples were collected and analysed for pH, EC, organic carbon, calcium carbonate, available N, P and K as per method described by Jackson (1973), bulk density (Singh 1980), water holding capacity (Piper 1986), available S by Turbidimetric method (Steinbergs (1953), available B by curcumin method (Bergarland & Troug 1944), available Zn, Cu, Fe and Mn by DTPA method (Lindsay & Norvell 1978) on atomic absorption spectrophotometer.

Perusal of the data in the table showed that the higher level of organic carbon, available N, K, S, Zn, Cu, Fe and Mn water holding capacity of soil and crop yield were recorded in vetiver bund and these were at par with graded bund over control. While, electrical conductivity (1.13 ds/m), available P (10.67 kg/ha) and soil deposition were highest in graded bund, lower values of electrical conductivity (0.79 ds/m) and available P (8.69 kg/ha) were found in vetiver bund and control, respectively. Calcium carbonate, bulk density and available B decreased by vetiver bund over control at par with graded bund. It indicate that the vetiver bund check the soil loss. Rain water with excess salts were sieved. Anon. (1993) reported that the magnitude of average cumulative soil deposition become constant and equal to 11.3 cm for vetiver barrier in the period of six rainy seasons. The stagination of rain-water in the field of graded bund, salts were collected from other fields and decreased the availability of nutrient and water holding capacity. pH of soil remain unchanged due to any treatments.

TABLE 1

Effect of bunding methods in soil properties and yield of soybean.

Treatment	pH	EC (dS/m)	Org.C (g/kg)	$CaCo_3$ (%)	Water holding capacity (volume basis)	Bulk density (gCm^{-3})	Available nutrients									Soil deposition (cm)	Soybean grain yield (q/ha)
							Major (kg/ha)			Minor (mg/kg)							
							N	P	K	S	B	Zn	Cu	Fe	Mn		
Initial value	7.7	1.00	4.5	10.0	35.00	1.30	200.0	9.24	456.50	9.00	0.40	0.50	0.20	4.0	3.0	—	—
Control	7.8	1.04	4.5	10.5	34.75	1.35	196.0	8.69	431.10	8.50	0.45	0.46	0.25	4.5	2.5	0.0	8.4
Vetiver bunding	7.7	0.79	6.5	8.5	40.75	1.15	241.3	10.45	483.48	11.69	0.25	0.66	0.45	7.5	4.5	8.5	12.7
Graded bunding	7.8	1.13	5.4	9.5	38.75	1.25	214.6	10.67	451.31	9.50	0.34	0.56	0.35	6.5	3.5	9.4	10.1
CD (C = 0.05)	NS	0.11	0.14	0.27	1.21	0.057	6.55	1.31	11.23	1.12	0.041	0.059	0.047	0.60	0.57	NS	1.2

It may be concluded from the foregoing discussion that vetiver bund improve the physical and chemical condition of soil, and also increased the crop yield.

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