

Runoff and soil loss from contour bays as affected by surface conditions

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Soil erosion is considered as a serious problem on the sloping cracking clay soils of Queensland. Contour cropping and contour banks have not been entirely effective in reducing soil loss to an acceptable level (Cummins et al. 1973; Vandersee and Mullins 1977). The effectiveness of agronomic measures in reducing soil erosion is being investigated on 1 ha contour bays on an even 6% slope in the Eastern Darling Downs.

Four surface conditions were created over the 1978/79 summer fallow period; stubble mulched (sweep tillage), stubble incorporated (disc tillage), stubble burnt (disc tillage) and a summer crop (sorghum).

Runoff depth through 0.61 m H flumes was recorded by water level recorders while runoff samples were collected by rising stage water samplers. Soil loss was calculated using a volumetric analysis of silt fans together with suspended sediment determinations on runoff samples.

Soil surface conditions were described in terms of surface cover and antecedent moisture content. The results of one storm event of 69 mm on a wet soil profile are presented in Table 1.

TABLE I. Runoff and soil loss from contour bays under four surface cover conditions.

	Stubble burnt	Stubble incorporated	Stubble mulched	Sorghum
Surface cover (%)	5	35	50	80
Surface runoff (% of rainfall)	28.7	17.3	9.7	3.2
Soil loss (t. ha ⁻¹)	20-40	5	Negl.	Negl.

Runoff and soil loss were markedly affected by the different surface conditions, with a linear relationship between runoff and surface cover % runoff = 29.45 - 0.35 (% cover) (r = 0.98, P (0.02)

Surface cover reduced soil loss proportionally more than runoff. For this particular rainfall event, 2-4 mm of soil were lost on the burnt bay while negligible soil loss occurred on the stubble mulched and sorghum bays.

The soil loss that occurred in this storm accounted for more than 95% of the total soil loss measured during 1978/79. The data show that differences in surface conditions resulted in major differences in runoff and soil loss.

Cummins. V.G., Robinson. I.B., Pink, H.S. and Roberts, M.H. (1973). Tech. Bull. Div. Ld. Util. Qd. Dep. Prim. Inds. No. 10.

Vandersee, B.E., and Mullins, J.A. (1977). Tech. Bull. Div. Ld. Util. Qd. Dep. Prim. Inds. No. 21.