Effect of Contour Farming on Soil Loss and Runoff

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Contour tillage is an important practice in the control of runoff and soil erosion. It is simple, inexpensive, and in many cases easily applied. Since contouring is generally used in connection with other conservation practices, such as soil treatment, crop rotations, terracing, and strip cropping, there are few results that show the effectiveness of the practice itself.

This paper reports 9 years results on the effectiveness of contour farming on a productive Corn Belt soil. In addition to surface runoff and soil loss by erosion, the authors present a preliminary report on tile flow and plant nutrient losses in the tile drainage.

PROCEDURE

Four plots were located on a 2% slope on the Agronomy South Farm at the Illinois Agricultural Experiment Station (Fig. 1). Each plot is 53 1/2 feet wide and 180 feet long. Surface soil losses and runoffs were measured in tanks connected by multi-slot divisor units. Metal plot walls extend into the ground around each plot to a depth approximately 4 inches below the depth of tile. The soil is predominantly Flanagan silt loam with over 9 inches of surface soil. It is a highly productive, permeable prairie soil, typical of extensive areas of east central Illinois. It is class II land, requiring simple conservation practices.

The plots have received limestone in amounts as indicated by soil tests. Heavy applications of rock phosphate were applied prior to 1941. Beginning in 1947, phosphate, potash, and nitrogen fertilizers have been applied in quantities in excess of plant needs as indicated by soil tests.

A 2-year rotation of corn and oats with sweet clover seeded in the oats was used for 4 years (1941—44). One plot was planted on the contour and another was planted up and down the slope to each crop, each season. Since 1945 corn and soybeans have been alternated on the plots.

Tile drains were installed in 1905 at 66-foot intervals on the land covered by these plots. The plots were located so that one of the tile lines extends lengthwise through the center of each plot. Drainage from the area above the plot is shunted around the plots. The tile flow from each plot is conveyed into specially constructed measuring equipment located in covered pits near the lower end of the plot (Fig. 2). The water in the tanks is weighed to measure total quantity of flow. Samples of drainage water for chemical analyses are taken from the storage tanks in which one-fiftieth of the total drainage water is collected. The one-fiftieth aliquots are secured by the use of a tipping bucket which dumps one-half of the flow onto a 25-hole divisor unit. The discharge from one hole of the divisor flows into the storage tank.

DISCUSSION OF RESULTS

SURFACE SOIL LOSS AND RUNOFF

Soil losses and surface runoffs were less from plots planted on the contour than from those planted up and down the slope. Soil losses from noncontoured plots of soybeans were approximately four times as much as from contoured plots. Soil losses from corn for a 9-year period averaged 3.7 tons per year, from noncontoured plots and 2.2 tons from contoured plots (Table 1). From the soybean plots the average annual soil loss per acre for a 5-year period was 2.7 tons and 0.6 tons from the noncontoured and the contoured plots, respectively.

FIG. 1.—Contour farming plots. Left, concrete-walled pit containing equipment for measuring surface soil losses. Center, small building covering pit containing equipment for measuring and sampling tile flow.

FIG. 2.—Equipment for measuring tile flow: A. Tile outlet, B. Stilling well and calibrated weir plate, C. Tipping bucket, D. 25-hole divisor, and E. 1/50th of total flow to storage tank.