

RUNOFF

Increases Annual Forage Sorghum Production

U.S. CENTRAL
GREAT PLAINS STATION
AKRON, COLORADO

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Forage sorghum yields were increased in a level pan which collected and stored runoff for additional moisture. The level pans were constructed in broad natural drainageways to intercept, spread, and store runoff that normally flows through them.

A sketch of part of the water-spreading system at Akron station is shown in figure 1. In addition to the two level pans shown in figure 1, three additional pans have been constructed. Several different crops have been grown in the pans to study their performance under intermittent flooding from runoff.

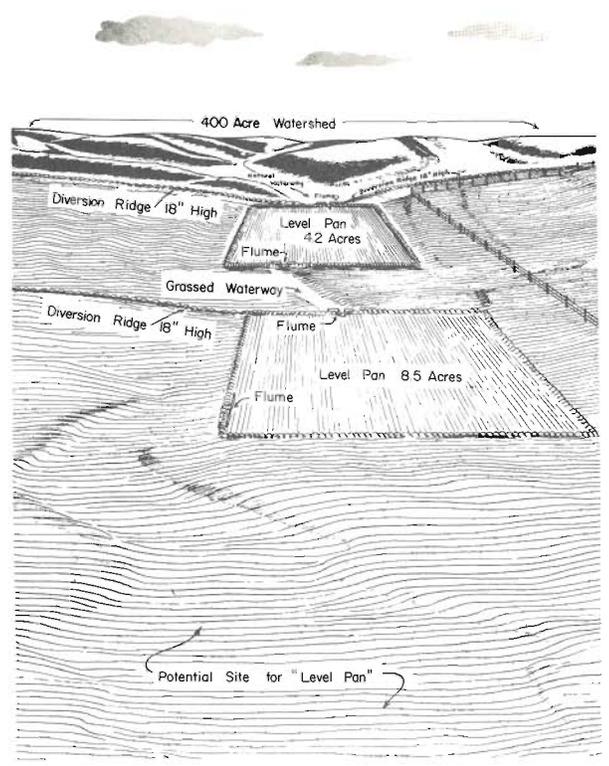


Figure 1.—Sketch of level pan system for intercepting, spreading, and storing watershed runoff.

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As an example, the results for forage sorghum will be given. Forage sorghum has been grown in one of the level pans for several years. The pan is 2.5 acres in size and has a contributing watershed of 61.7 acres for a ratio of about 25 to 1.

Average results are summarized for 1962 and 1963 in table 1. Available growing season moisture and yields from the level pan collecting runoff are compared with data from annually cropped, unleveled areas (unleveled check) where some moisture was lost in runoff, and leveled pans (leveled check) where no additional water from runoff was allowed on the pan.

Total available moisture was increased about 6 inches in the level pan receiving supplemental runoff. About 2 inches of this was due to increased storage at planting time due to runoff from snow-melt and early spring rains.

Almost 4 inches of runoff was received during the growing season. The diked level checks tended to increase moisture by retaining all precipitation. In unleveled areas, part of the precipitation was lost in runoff.

The higher moisture content obtained in the level pan increased forage yields 2 and 3 times over the level and unleveled checks. Efficiency of water-use was nearly doubled. The 6 additional inches of water made available during the growing season increased oven-dry forage yields by about 6,000 pounds.

Level land provided better distribution of rainfall by preventing runoff and retaining all precipitation. Where runoff was allowed to concentrate on leveled areas, moisture supplies were further increased with greater depth of storage.

This additional moisture has permitted annual cropping of forages with increased yields in areas that usually require fallow to store enough extra moisture for profitable yields. Annual gross returns were increased \$45 per acre (based on \$15 per ton). Based on this rather limited data for only 2 years it is estimated that costs of pan construction would be paid in 2 to 3 years.

Table 1.—Total available moisture and forage sorghum yields; average for 1962 and 1963.

Cropping system	Initial soil moist. ¹	Rainfall ²	Runoff ² added	Total avail. moist.	Yield ³	Water-use ⁴ efficiency
	Inches					
Unlevel check	4.68	6.40	-0.72	10.45	3324	337
Level check	4.80	6.49	0.00	11.29	4320	460
Level pan	6.61	6.49	+3.88	16.98	9915	721

¹Available soil moisture in 5 feet at seeding time.

²Measured rainfall and runoff collected on the plots during growing season.

³Oven-dry weights; use factor of 4.0 to convert to green ensilage yield.

⁴Pounds of oven-dry forage produced per inch of water used.

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