

CONSERVATION & MANAGEMENT

Level Pans Catch Runoff, Produce Increased Yields

Watershed runoff, concentrated and then spread on level pans, makes it possible for farmers to grow annual grain or forage crops without irrigation in semiarid areas receiving only 15 to 18 inches of rainfall annually.

Normally, farmers in this area must summerfallow their cropped land and plant a crop every 2 years. But this system keeps land out of production for 1 year out of 2. Also, research indicates that fallowing is not an efficient method of moisture storage because of high evaporation losses from bare soil. Annual dryland cropping, on the other hand, carries a high risk due to erratic growing season rainfall.

Level pans range in area from 2 up to 10 acres in size. They are con-

structed in broad, natural drainage-ways. For every acre in the pan, about 25 acres of watershed feed water into the pan. Pans include diversion ridges to intercept and spread the runoff that normally flows through the waterway. Pans have no slope and include border dikes and flumes for water control.

This system concentrates runoff water from a large area onto a small cropping field for better distribution, retention, and deep penetration. Pan construction costs average about \$90 per acre.

In tests at Akron, Colo., using pans from 2.5 to 6.6 acres in size, annual crops of grain and forage sorghum were compared with similar yields from annual dryland cropping and summerfallow on unlevelled areas. Annual precipitation during the 3-year test period was 3 inches below normal.

Level pans stored as much moisture in 7 winter months as fallow did in 19 months. Unlevelled annually cropped areas contained only half the moisture stored in pans for the same time.

During the growing season, 11½ to 21½ inches of additional water was received and stored by level pans from rainfall and runoff. All this water was held by the pans, whereas some was lost on the nonlevel areas.

Considering all sources of moisture, grain sorghum on level pans had 2 inches more growing season moisture than crops on fallow nonlevelled areas. The difference is due mainly to high evaporation and runoff losses from unlevelled areas.

Grain sorghum yields on level pans averaged 41 bushels per acre over a 3-year period. This is 17 bushels per acre more than yields on fallow and 36 bushels more than yields from annual cropping.

With forage sorghum, moisture available on level pans was almost 4 inches greater than moisture on fallow

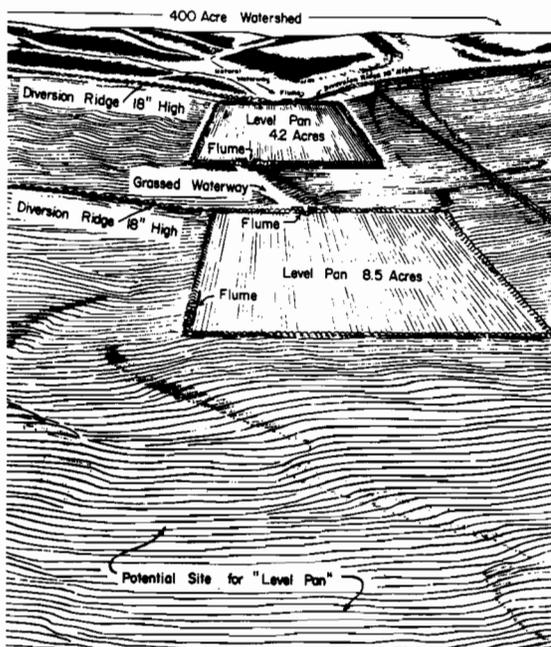
and annually cropped unlevelled areas. An inch of this extra water came during 9 winter months and 3 inches from rainfall and runoff during the growing season.

Forage sorghum yields on the level pans averaged 5.1 tons dry matter per acre, compared with 2 tons on fallow and annually cropped areas.

In general, water use efficiencies on the level pans were double those on nonlevelled dryland areas.

As a result of the higher yields, gross income from crops on pans increased by about \$36 per year. Thus, pan construction costs could be paid for in 3 to 5 years with normal rainfall in the area.

Although only 5 percent of dryland areas are suited for level pan construction, the increased yields from annual cropping will allow greater stability and diversification of farming in areas where extended drouths are common. —R. H. MICKELSON, *Soil & Water Cons. Res. Div., USDA Agricultural Research Service, Central Great Plains Field Station, Akron, Colo.*



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