

Surface Irrigation

changing conditions and requirements
affect water-application practices

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Methods of applying irrigation water to crops—by broad classification—are surface, subsurface and overhead or sprinkler systems.

Surface irrigation allows water as a stream to pond or flow over the ground surface. In subsurface irrigation the soil is wetted from beneath by raising the water table; and in overhead irrigation sprinkling is employed. Each procedure is being continually adapted to the endless number of conditions and requirements encountered in growing different crops, managing various types of soils, and meeting changing economic conditions.

A recent adaptation of the corrugation method of surface irrigation—running exceedingly small streams of water directly down slope in shallow furrows pressed into the soil by the runners of a weighted sled—involves land slopes of 0.1% or less, poor soil drainage, and irrigated pasture utilization.

The problem consists of preventing or quickly removing stagnant water following irrigation. Otherwise pasture utilization periods are too short. Also the life of the crop is shortened. Carefully controlled sprinkling might be used but for the necessity to economize. Also the land could be graded to a slope that would provide the needed surface drainage, but the cost of earth moving in this case is

excessive. The use of corrugated-contour checks—a combination of certain features of both the corrugation and the contour check methods of irrigation—solves the problem.

Corrugations in the soil are made by a tractor drawn steel sled with four runners spaced 30" apart and loaded with eleven 52-gallon drums of water. The corrugating is done perpendicular to the contours. The part of the contour check procedure which is used concerns only construction of the checks. The checks—irregular strips of land forming elongated basins—are made after the corrugations are in by throwing up levees on the contour at every 0.2' or so change in elevation and by connecting them at 660' intervals with cross levees. The strips are level throughout their length; have the 0.2' cross slopes; are surrounded by the ditch which is formed during the process of levee building; and are corrugated approximately at right angles to the contour levees.

The irrigation water is admitted first to the upper check and progressively to those next down the slope by head ditches located perpendicular to the contour levees and midway between adjacent cross levees. The earth moved in excavating the ditches is used to reinforce the levees, thus leaving the edges of the ditches at land-surface level.

Gate structures are placed at each contour-levee crossing to progressively hold the water back and release it as each check is filled and drained.

The corrugations, the ditch surrounding each check, the bankless head ditch, and the limited length of check—330' each way from the head ditch—together with the use of a large irrigation stream, combine to make it possible to quickly submerge and drain each check. In the lower right illustration the construction is complete except for the cross levees and some of the ditch-bank leveling. After six years of use this layout is still operating and the pasture is in good condition.

Another simple, inexpensive method of conveying water down slopes—as steep as 25%—is to fill one series of contour furrows after another.

A safeguard in this method consists of pressure relief structures for controlling the velocity of the water as it is brought down the slope and delivered to the contour furrows. Ordinarily this need is taken care of at considerable expense with permanent structures of concrete.

Another simple, inexpensive arrangement consists of a portable, quick-coupling, aluminum pipe with hose connections and cut-off valves spaced so that a short piece of hose can be made to convey water to each contour furrow for one half the distance. Regardless of the pressure, the velocity of the issuing water can be controlled by the valve opening and size of hose.

Portable siphon outlets for surface irrigation systems are widely used and overshadow all else as a labor-saving improvement in the practice of surface irrigation.

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Left—Corrugations made by weighted sled corrugator. Right—A nearly completed corrugated-contour check system.

