Gravity Irrigation

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The most important feature of gravity irrigation is that the ultimate distribution of water over the land surface is controlled by the land surface itself and not by some mechanical device. The manner in which this distribution takes place can be modified by changing the condition of the land surface (e.g., land leveling to smooth the surface or change the slope, making of furrows to direct the flow). However, since our ability to change the face of the earth is limited, design of surface systems essentially involves the proper choice of length and direction of run\(^1\) and of stream size consistent with local conditions of soil and topography.

Classification of Gravity Systems

Elements of the Gravity System

All gravity systems consist basically of a source of water, a distribution and conveyance network, and a land surface arranged so as to direct the flow of water. Distribution systems may consist of pipelines or open ditches, the pipelines usually operating at low pressure. Turnout structures\(^2\) and pressure-regulating devices therefore are essential parts of the distribution system.

Types of Systems and Equipment

Surface irrigation systems are classified according to how the irrigation stream is controlled by the land surface. Wild-flooding, border-check, and furrow irrigation are the three types commonly used.

a) Wild Flooding. Wild flooding is the least efficient and least common system. Temporary ditches are opened either along or perpendicular to contour lines, and are made to overflow at a number of points. Water progresses uncontrolled down the slope, and any excess is intercepted by the next ditch (see Fig. 1). This method is used as a temporary system for irrigating pastures, hay, and small-grain crops. Water and labor efficiency are likely to be low, even under favorable conditions. Its use is warranted only by very special conditions.

b) Border Checks. This method is used for irrigating all crops (with the possible

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1 Length of run is the downslope distance from the point where water is discharged onto the land to the end of the plot dash the furrow or border check.
2 Devices for controlled discharge of water from a pipe or canal onto the land, often also incorporating flow-measuring and energy-dissipation devices.
exception of row crops) where large planar surfaces of land are available and slopes are moderate. Checks are bounded by low borders or levees made of earth, and the cross-slope (perpendicular to the direction of water flow) must be zero. Relatively large flows

Fig. 1. Wild flooding from contour ditches: a on steep slopes with contour ditches; b on almost flat slope, with ditches following the slope

of water are required. The width of a check is a function of the infiltration capacity of the soil, the head of water available (size of stream), and the cross-slope of the land. The permissible length of a check is a function of the infiltration capacity, head of water,