

RUNOFF UNDER SPRINKLER IRRIGATION. AFFECTING FACTORS AND CONTROL PRACTICES.

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ABSTRACT

The need to reduce energy costs associated with the use of sprinkler irrigation systems has led farmers towards the use of low pressure operating systems. The characteristics of water applied by these systems, with high water application rates usually exceeding soil infiltration capacity, has increased surface runoff problems under sprinkler irrigation.

Surface runoff can cause different problems: (i) reduction of irrigation efficiency and uniformity, increasing energy and water consumption; (ii) soil erosion; (iii) crop yield spatial variability; and (iv) environmental problems, by transporting sediments and applied fertilizers or other agrochemicals washed-out from the field causing the contamination of surface waters. To minimize surface runoff it is required a good knowledge of all factors that directly or indirectly can affect it. The irrigation process, from water application by the irrigation system to its infiltration or runoff, is very complex. This complexity is essentially due to the great number of factors that can influence infiltration and surface runoff and the interactions between them.

In this chapter, major surface runoff affecting factors under sprinkler irrigation are identified and their effects on surface runoff analyzed. In order to minimize surface runoff, aspects that can require a better attention during the irrigation system design are pointed out, as well as some management practices that can be implemented. The use of conservation tillage, basin and reservoir tillage or soil conditioners have proved to be good options to reduce surface runoff under certain conditions. Recent and future developments in precision irrigation can also overcome many surface runoff problems.