A Schedule for Lazy but Smart Ranchers

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Summary

We determine the number of sprinklers to use by analyzing the energy and motion of water in the pipe and examining the engineering parameters of sprinklers available in the market.

We build a model to determine how to lay out the pipe each time the equipment is moved. This model leads to a computer simulation of catch-can tests of the irrigation system and an estimation of both distribution uniformity (DU) and application efficiency of different schemes of where to move the pipe. In this stage, DU is the most important factor. We find a schedule in which one sprinkler is positioned outside of the field in some moves but higher resulting DU (92%) and saving of water.

We determine two schedules to irrigate the field. In one schedule, the field receives water evenly during a cycle of irrigation (in our schedule, 4 days), while the other schedule costs less labor and time. Our suggested solution, which is easy to implement, includes a detailed timetable and the arrangement of the pipes. It costs 12.5 irrigation hours and 6 equipment resets in every cycle of 4 days to irrigate the field with DU as high as 92%.

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