

Sprinkler Irrigation

Portable Systems Are Now Available

By W. W. Hinz

Irrigation by sprinkling has become an important method of applying water in many states. The first sprinkler irrigation systems were used in nurseries or on small tracts growing specialized truck crops. These early systems were permanent installations and quite costly. When quick-couplings and lightweight steel pipe were introduced in 1930, portable systems came into use. Since the war, aluminum tubing has become available and is replacing the steel pipe because of its lighter weight.

A portable sprinkler system is so classified because all or a major part of the sprinkling equipment can be moved from one location to another. Oftentimes a stationary pumping unit and stationary mainlines are employed. A field having suitable ditches along one side or through the center may require only a portable pumping unit and one or more sprinkler laterals. The entire unit is moved along the ditch at prescribed intervals (usually 60 feet). Pumps mounted on tractors have been used for this type of operation in some places.

Laterals consist of lightweight tubing from 2" to 6" in diameter connected with flexible quick couplings. The tubing is ordinarily in 20-foot lengths and rotating sprinklers are usually spaced at 20- or 40-foot intervals along the lateral line. Perforated pipelines are sometimes employed as laterals but can only be used successfully on extremely pervious soils since their minimum rate of water application is one inch per hour. Many soils will not take more than one-third of an inch in an hour without puddling.

An interest in sprinkling is being exhibited in Arizona at present. Several systems are in use on a number of different crops including alfalfa, pasture grasses, cotton, dwarf milo, sugar beets and flax. The Bureau of Reclamation is conducting sprinkler experiments on the Yuma Mesa project to determine if sprinkling is feasible there. The extremely sandy soil on the Mesa makes irrigation by surface methods difficult and wasteful.

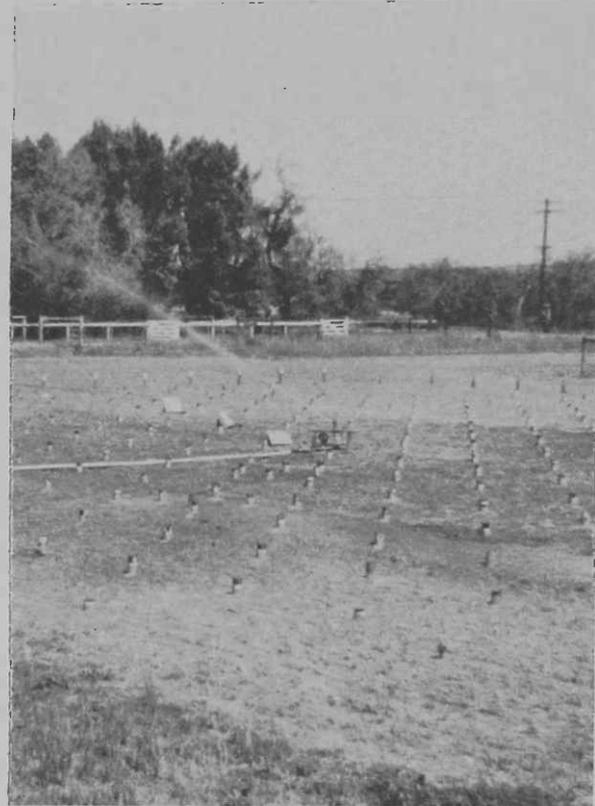
Sprinkler irrigation has found its widest application on lands that are not well adapted to surface irrigation methods, on rough lands that require much leveling, or in areas where only a supplemental water supply is required. Steep lands that are easily eroded cannot be satisfactorily irrigated by furrows or flooding. Thousands of tons of rich topsoil have been carried away with the waste water from irrigated fields.

Wind has a decided effect on the distribution pattern of a sprinkler. High wind velocities carry away much of the fine spray and the advisability of any sprinkling in very windy areas must be questioned. The Agricultural Engineering Department of the University of Arizona is now making a study of evaporation losses and wind effect.

A disadvantage of sprinkling that will be of concern here is the relatively small head of water that must be used for economical operation. In order to keep equipment costs at a minimum it is necessary to use small quantities of water almost continuously. A pumping plant operating on a half-time basis must be twice as large as that required on a continuous-use basis if the same quantity of water is to be delivered.

Equipment costs will vary with field arrangements and the pipe layout to be used, but the cost per acre will be lower on the larger acreages. The av-

On the cover is shown a portable sprinkling system on the University farm near Tucson.



Evaporation losses and wind effects are being studied by the Agricultural Engineering Department.

erage cost will be about \$75.00 per acre. A system for 10 acres may cost as much as \$150 per acre and a system for 160 acres may not exceed \$50 per acre.

Cost of operation is dependent upon a number of things, including pressure to be used, elevation of land above the water source, acre-feet of water to be pumped, and the cost of fuel. With operating pressures of 30 to 40 pounds per square inch, power costs will be somewhere around \$1.50 per acre-foot pumped, assuming an overall pumping efficiency of 50% and shallow well lifts.

Labor cost is variable depending upon the way the system is to be operated. It is thought that labor cost in moving pipe can be kept down by applying water slowly and moving the laterals only two or three times per day. In this way the pipe moving can be handled as a chore. If water is applied rapidly and moves made every few hours it will probably be necessary to plan the pipe-moving operation as a full-time job. One man can change a quarter-mile of lateral pipe in about one hour.

Before purchasing a sprinkler system, carefully weigh all advantages and disadvantages, contact others who have had some experience with this method of irrigation if possible, and make an estimate of the costs involved or get some qualified person to do so.

—W. W. Hinz is Assistant Professor of Agricultural Engineering.