Water Spreading Pays—A Case History from South Dakota

FLOYD A. MOONEY, Viewfield, South Dakota
Assisted by **J. ARTHUR MARTIN, SCS, Sturgis, South Dakota**

Flood irrigation or water spreading is a primitive system of irrigation using storm runoff, and is apparently about as old as agriculture itself. It was encouraged years ago in this country through the Desert Claim provision of the homestead laws.

Anyone who has seen the spectacular results of a good spread of floodwater on a flat of western wheatgrass or alfalfa needs no more convincing to make him a firm believer in the practice.

Ranch Location

In 1947 a displaced Texan, one Floyd A. Mooney, loaded up his family and moved to South Dakota where he had bought a ranch lying astraddle of the Belle Fourche River 40 miles east of Sturgis. Most of the 16,000 acres are thin-soiled river breaks — steep, knife-edged ridges and narrow deep draws draining into the river. Over the ages the river has lashed back and forth between the bluffs and shale banks on either side, in places building up floodplains which now lie 8 to 15 feet above the river bed.

Floyd A. Mooney went into cattle ranching in 1947 in western South Dakota after a venture in farming in the Panhandle of Texas from 1930 to 1947. Mooney and his family now operate some 20,000 acres of deeded plus 8,000 acres of leased land, in a yearling operation with about 700 Hereford cows. Mooney is a director and vice-president of the Rapid City Production Credit Association and a member of The American Society of Range Management.

Some of the larger draws have made deltas where they disgorge their loads of silt at their junction with the river. Others follow a cut-back channel to river level.

On Mooney's place are perhaps a thousand acres of river bottom, land which is nearly level but bone dry. Before cattle came into the country the river bottoms must have been meadows of stirrup-high wheatgrass, rippling like grain in the wind. With the river as the only source of water, cattle stayed on the bottoms all summer long grazing them out until the grass was killed and replaced by annual saltbush. Here and there along the river a choice bit of bottom had been homesteaded and fenced for hay, protecting it from the concentration of cattle.

A family named Burton had built the original ranch. They had homesteaded on the river at the mouth of Haydraw, a 40,000-acre drainage which spread its floodwater naturally over a flat, nearly a section in area. As the years passed, more of the watershed was plowed, the draw bottoms were grazed out and started to cut and

the silt load got bigger. At the mouth of the draw a delta built up, changing in size and shape with every flood. Burton built a ditch and floodgate in an attempt to get the water where he wanted it, but silt filled the gate and ditch and the draw started to cut a new channel to the river, leaving half the flat high and dry. A few years' mowing of that area discouraged the wheatgrass and it gave way to blue grama which was short enough to escape the mower.

The Water Spreading System

When Mooney took the place over he decided halfway measures would not do. "We'll let the water flow out of the draw, but on the bottom we will build a series of terraces or dikes on the level," he reasoned. "When the top one fills, water will have to spill around the ends and fill the next one below. We'll cover the whole flat with water and let it soak in; or if it stands too long we can open the dikes and drain the excess into the river."

His local soil conservation district helped him plan and lay out the dikes. After hiring a contractor to build the first ones, Mooney decided to invest in his own equipment. He bought a medium-sized crawler tractor with a bulldozer for dirt work and a tool bar for farming After four seasons the wisdom of this move is evident. In addition to building 17 miles of dikes three to four feet high, the tractor has been used to build 15 stockwater dams averaging 5,000 yards; two miles of road from ranch headquarters to the county road; a mile of heavy canal to divert flood flows to the desired locations; many hours of plowing, chiseling and subsoiling on cropland; moving hay a stack at a time; and snow removal after winter storms.

Haydraw drains enough country so it has run some water every year since Mooneys took over the ranch. Following a year of average snowfall the draw runs for nearly a month. This flow is relatively small, being ordinarily less than 25 second feet. Mooney steers this water around "by hand," opening a dike here, closing one there, holding it on the ground for as much as three weeks. The 8-foot depth of heavy clay and shale beneath the surface absorbs water slowly. Western wheatgrass and alfalfa are not killed by being under water for so long a time in the cool weather of early spring.

Water is impounded and spread by means of dikes from Haydraw, a 40,000 acre drainage. Excess water leaves the flat through a natural channel to the right, prevented from flowing into the river (*lower right*) by a dike along the bank.

During late spring and summer the system must be handled differently. The expected flows then will come from heavy rains or violent thunderstorms. Haydraw will change within minutes from a dry watercourse to a surging, turbid flood. In June of 1955 such a runoff occurred just after the first cutting of hay had been put up. According to Mooney so much water poured over the flat that the dikes were completely submerged, the only evidence of them being swells on the surface of the flood. The peak flow lasted less than a day, and had practically ceased after four days. Mooney expected the wild, unbridled fury of the flood to leave scarcely a trace of the dikes, and was overjoyed when he saw that the damage was so minor that it could be repaired in a matter of hours. Perhaps half of the dikes had a single hole cut through them—a gap of from 3 to 15 feet. The others had to be cut with the bulldozer to drain them, for the flooding occurred during hot weather when alfalfa can be killed by standing under water for 24 hours.

Forage Benefits

On the Haydraw bottom Mooney has moved 25,000 yards of earth to build 7 miles of dikes. The cost at 12 cents per yard would be $3,000, or $6.70 per acre for the 450 acres covered. Maintenance and operating costs to date have been less than 20 cents per acre per year. He is convinced that the system annually rewards him with 400 tons more hay than he could harvest without it, plus the alfalfa seed crops which are entirely dependent on the extra water.

After building the dikes Mooney drilled Cossack alfalfa into the existing grass with no seedbed preparation, planting four pounds per acre in the early spring. Within two years the alfalfa had made such a heavy stand that grass was

not evident in it at a casual glance.

First-cutting alfalfa has yielded as much as two tons per acre. The second cutting is delayed until the prospects for a seed crop can be assayed. In the fall of 1954 Mooney marketed 50,000 pounds of No. 1 certified seed, and 40,000 pounds in 1955.

In discussing the system on Haydraw, Mooney made some interesting observations. Since the dikes were completed in 1952, floodwater has reached the river only once. All the other flows have been absorbed by the meadow. It is conceivable that well over 450 acre-feet of water can be stored in the soil of this particular bottom. A storage dam of equal capacity would be an expensive structure, and short-lived because of silt.

The silt, rich in plant nutrients, may be deposited against some of the dikes as much as six inches in depth from a single runoff. The alfalfa is killed, but western wheatgrass will thrust itself through the silt and flourish. Mooney has reestablished alfalfa on such areas by broadcasting seed on them as soon as the water is off, at any time during the growing season.

Mooney has started developing spreader systems on four more separate bottoms, and has plans to do the same on two others. He says, "Some folks may think I'm crazy, but wherever it's possible to get the water and the soil together, I aim to make the effort. There are so many opportunities here that in my lifetime there is no chance to develop them all. I do want to leave the place a little better than I found it, and I hope the boys will continue on with the same idea."