

# Crop Residue: A Complement to Native Rangeland

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Whenever ranchers and range managers gather together, whether young with education or seasoned with knowledge, sooner or later the conversation will come around to the weather. When it does, this question will be asked, "What one factor would most affect the production of rangeland?" The most common answer will be more rain, water and moisture. In this semiarid country, more rain has been a dream since man stopped to live in the sea of grass. Can dreams come true? Yes.

Technology brought mechanical rain to the North Central Nebraska Sandhills in the form of deep wells and center pivot irrigation systems. But the dream which began as rangeland improvement in the form of irrigated pasture ended in the development of commercial grain production. In 1959, the first working system went on display at Orchard, Nebraska—in the northeastern part of the state. Although slow to start rolling, 20 years later in 1979 the invasion was well under way.

These invaders of the native rangeland are overhead irrigation pipeline systems which pivot about a central point, thus the name Center Pivotal Irrigation Systems. Local slang tags the mechanical unit as the "system" and the irrigated lands as the "circle."

The system is a 6 to 8-inch pipeline suspended 6 to 8 feet above ground by 4 to 10 towers at 80 to 180-foot spans. The towers are powered by electric motors or are water driven—with the water coming from irrigation ditches or wells. The pumps putting water into the systems are powered by diesel or natural gas and force 900 to 1,000 gallons per minute through the system. Both the time taken to make one rotation and the amount of water leaving the system are adjusted to deliver the desired amount of water to the circle.

The circle can vary in size and shape. The average is 135 acres set in the center of a quarter section (160 acres). This leaves 25 acres of dry land in the corners. Recent additions to the system make it possible to irrigate most of the corners. Overlapping the circles and full windshield wiper-type circles almost eliminate the corners. These recent innovations are used to irrigate near hills, roads, and buildings.

During the past ten years the system has developed from a steel-wheeled, high tower monster to rubber-tired, tension-

suspended sleek runners. Today they are quite dependable and labor-saving as compared to hand set, tow line, or side roll systems. Consequently, the present-day ones are more expensive and require a high level of management.

In 1972, three counties in northcentral Nebraska near the South Dakota border—Cherry, Rock, and Brown—had 325 center pivots. In 1977 the number had increased to 1,045, and by 1980 the total pivot systems for these three counties numbered 1,225.

The original systems installed around 1970 were placed largely on cropland or abandoned fields. In later years, they were placed on newly broken soil, most of it native rangeland. Whether we like it or not, irrigation systems are sitting in the middle of "God's Own Cow Country." Like all invaders, they are here and we as ranch managers must utilize them to their fullest.

The part of the row crop we can utilize to complement native range is termed crop residue or aftermath. Corn, grain sorghum, small grains, and beans each has a specific type of residue. Basically, all consist of the stubble remaining after harvest, the husks and chaff discarded from threshing, and the grain which falls to the ground before and during harvest.

In order to know how and where to incorporate crop residue into a forage program, we must know the nutritional and managerial characteristics of the type of crop residue involved. Corn stalks make up the most abundant crop residue in the three-county area. This residue consists of the papery large husks and heavy, crushed stalks from the combine and dropped ear corn. The vegetative part of the residue is high in bulk and fiber and low in palatability. Protein is limited to about 4%. Energy, phosphorus, and minerals are low. The grain is just the opposite, being low in bulk and fiber, high in palatability and digestibility. Energy, phosphorus, and minerals are high. On the average, a diet of stalks and grain will support a mature cow up to the last 60 days of gestation. One acre will support this 1,000-pound cow for 60 days.

From a managerial viewpoint, corn residue fits into a planned forage program in three ways: first, for fall grazing; second, for winter feeding grounds; and, third—little publicized but growing—is the use of crop fields for cool-season forage; this latter use involves seeding the fields to rye, winter wheat, or similar plants as soon as the silage or grain harvest is complete. In years of early harvest and warm falls green forage is available in September and October. And every year early spring grazing is available, sometimes as early as mid-April. In an area such as this one which is short of early spring pasture this practice has good economical potential. However, if harvest is late or an early snow covers the fields, an alternate source of feed must always be

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She is a Life Member of SRM and is presently on the Council, Nebraska Section, SRM.

After ten years on the range front associated with academics and USDA-ARS-SEA, when given the choice of caring for a 300 cross-bred cow-calf herd or facing a classroom of 300 students, the cows won!

Her father often says, "Irene was born running—after grass and horses."



A 1981 model system being used on small grains.

available.

When cattle are transferred from the diversified diet of the native rangeland to the singular diet of the crop residue field, over-intake of corn grain is an immediate and real danger. Thus it is important to limit the initial intake. The following tips from local ranchers should be considered:

- be sure the cattle are full when they are turned into a cornfield;
- either feed high quality hay or transfer the cattle to a new pasture just before they are turned in;
- warm weather reduces cattle's appetite, thus limiting intake;
- be sure the cattle have access to water before entering the field and maintain a constant supply at all times; and
- be sure there is adequate salt and mineral in the field.

For best nutrition, graze crop residue as soon as possible after harvest before nutrients are leached and forage begins to deteriorate. This will provide adequate nutrition for early gestation cows with only salt and mineral supplementation.

Residue fields normally have 5 to 7 bushes of "dropped" ear corn. However, some fields may have as high as 30 bushels of ear corn per acre on the ground.

Cattle coming into new residue fields are like children with a sack of assorted wrapped candy. The first time is a learning experience. The first thing to do is to get into the sack and the second is to find out which candy is the best. So it is with cattle; the inexperienced animal (one which has not been in a residue field before) may take a week to learn to walk down the rows and to sort out the ears of corn. Eating an ear of corn is no small task for an animal with only lower teeth. Most cattle pick up the ear by one end and devour it like a child does a peppermint stick. Can you imagine the frustration the inexperienced cow has when she picks up a large ear in the middle? It is too hard to bite into and too large to swallow. Most cows soon learn to put their nose to the ground and go down the rows like a vacuum cleaner. These experienced cattle become efficient gleaners which suffer from the symptoms of overeating.

To reduce bloat, founder, and compaction in the stomach, graze the fields with inexperienced cattle first and clean the

fields with more experienced and efficient grazers after most of the ear corn has been removed.

Unique nutritional problems may develop. Most obvious is the increased consumption of salt and mineral, at least double or triple. Further information is needed regarding which specific mineral cattle require on residue fields.

The protein level in the diet of cattle on corn fields is continually decreasing. Thus, protein supplementation should be constantly increased to maintain a total intake of 12%. Crude protein extracts, legume hay, protein blocks, and grain mixes all can be used to this end, and each has its benefits.

There are still unknowns such as sudden deaths blamed on cornstalk poisoning, and unestimateable production loss due to vitamin and mineral imbalances.

Checking the amount of residue remaining in the field may seem the most obvious way to determine removal time of cattle. Other more advanced signs of feed depletion are cattle walking through the field rather than spot grazing, and a decline in the grain content of the feces. Weight loss is already occurring and hair coat appears rough when the cattle begin to walk the fence. Cattle should be removed before this condition appears.

Instead of moving out of the field at the first signs of feed depletion, gradually introduce the winter feeding program while allowing the cattle to clean the field.

Fields used for winter feeding need special consideration. There must be adequate water and shelter for the increased cattle numbers. Drainage must be good and there must be dry feeding and bedding areas.

Both the range and the rancher can benefit from the incorporation of crop residue fields into the forage program. Since residue fields are available in the fall, pastures are not needed for fall and winter grazing. Thus, native rangeland is released for grazing manipulation during the growing season and lies undisturbed during the fall and winter.

At first glance, this may not seem important, but, in light, sandy soil, erosion is of major concern. Using residue fields as winter feeding areas eliminates the wear and tear of trampling on the native range. This is especially important and beneficial during dry, open winters when the wind whips the

sand from every exposed or disturbed surface. At these times, the more native litter on the ground, the less erosion, and the more protection for spring growth.

In the spring, the green tender grass on native range tempts cattle through fences before turn-out time. The alert range manager will provide a silage field seeded to rye or winter wheat which will be ready to graze 4 to 6 weeks before the native range is ready to graze. These cool-season forages will keep the cattle's appetite satisfied, the fences in one piece, requires less hay to feed, and give the range a good head start on growth before turning out the cattle.

Crop residues can fit into a carefully planned grazing system. They may be rented just as any fall pasture is rented. Circles, varying in size from 40 to 200 acres, will have as much as 25 acres of dry land in the quarter "corners." Many times these corners are in native grass or dryland hay—some people even try to grow dryland crops in the corners. Some circles are fenced as such but most of the fields are fenced around the entire quarter section. Almost every possible

combination of overlapping circles and patches exists. Variable acreages combined with variable amounts and kinds of available feed call for variable methods of paying rent. Thus, crop residue fields are rented by the day, acre, or flat rate. When renting by the day, charges run from 15 to 25 cents a day or \$4.50 to \$7.50 per head per month. When renting by the acre, rent is \$10 to \$17 per acre, or \$5 to \$8.50 per head per month, assuming 60 days per acre. Some circles are sold at a flat rate of \$2,000 or \$3,000 per quarter section. Hay costs about \$30 per month, and summer grass about \$15 to \$18. In comparison, corn stalks are less costly than feeding hay.

In summary, irrigated row cropping with its attendant center pivots and crop residues is now an accepted practice. For the open-mined ranch manager, crop residues can fit nutritionally and economically into a carefully planned forage program. "The system," "the circle," and the residues must be used to their fullest for fall forage, winter feed grounds, and spring grazing to complement native rangelands.

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