

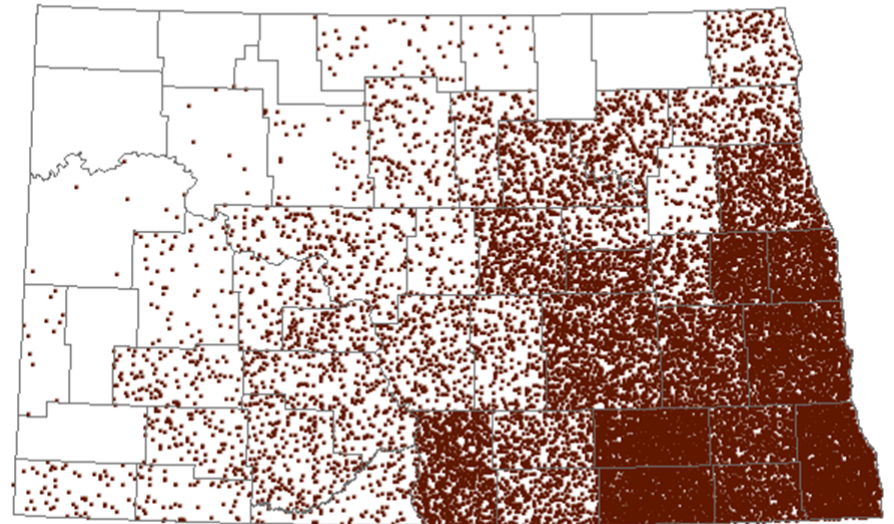
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CORN RESIDUE – FEED, FUEL, FERTILITY

EXPANDING CORN ACREAGE

- ✗ Corn belt is moving north and west
- ✗ Hay lands are diminishing and feed is expensive
- ✗ Cattle production fits with corn production
- ✗ Nationally and ND cattle numbers have been declining

**Corn for Grain Production
North Dakota: 2011**



1 Dot = 10,000 Bushels
Dots randomly placed within county.

AMAZING CROP

- ✖ Growing demand
 - + Food
 - + Ethanol
 - + Feed
 - + Export
- ✖ High yields and biomass
 - + ND avg yield 07-09 118 bu
- ✖ Profitability
 - + \$6.50 Jan/Feb price 2013
 - + 2012 NC ND COP \$4.00



THE RESIDUE

- ✖ Has a soil value

- + Farming issues

- ✖ Residue management

- ✖ Planting

- ✖ Spring drying/warming

- ✖ Nutrients, soil structure, conservation

- ✖ Has a feed value

- + Livestock issues

- ✖ Fence/water for grazing

- ✖ Harvest cost and efficiency

- ✖ Utilization and supplementation

- ✖ compaction

MANAGING RESIDUE



CORN RESIDUE - STOVER

✖ How much is produced?

- + Widely used ratio 1:1 residue to grain
- + Grain yield * 56/2000 = tons/acre
- + Ex. 100 bu = 2.8 ton

✖ How much can be harvested

- | | |
|----------------------|-----|
| + Shredding + raking | 80% |
| + Rake only | 65% |
| + Combine windrow | 50% |
| + Grazing | 25% |

CORN RESIDUE - STOVER

- ✗ What is the nutrient content?
 - + High variability (fertility, growing conditions, hybrid)
 - + Some leaching with precipitation and time
 - + Estimates for well dried stover
 - ✗ lbs/ton
 - ✗ N 15-20
 - ✗ P 5-8
 - ✗ K 5-40
 - ✗ Ca, Mg, S, organic C
 - + <10% nutrient removal with grazing

CORN RESIDUE - STOVER

✕ What is the feed value?

+ Residue components

✕	% DM	% CP	TDN
✕ Stalk	50	3.7	40
✕ Leaf	20	7.0	60
✕ Cob	20	2.8	55
✕ Husk	10	2.8	60
✕ Baled stover		4-6	50%
✕ Cow requirement		7-9	50-60%

CORN RESIDUE - STOVER

✖ Calculating value - input values

Feed value and nutrient costs for corn stover

Hay price for medium quality mixed grass/legume hay, \$ per ton
 Price of dried distillers grains (DDGS), \$ per ton
 Price of anhydrous ammonia, \$ per ton
 Price of MAP (11-52-0), \$ per ton
 Price of potash (0-0-60), \$ per ton
 Estimated moisture percent of stover, %
 Estimated weight of a large round bale of corn stover

\$	83
\$	220
\$	860
\$	660
\$	700
	20%
	1,200

Nutrient removal rates, lb. / T dry matter (optional)

Nitrogen, lb.	20.0
Phosphorus, lb.	5.9
Potassium, lb.	25.0

Estimated weight of a large round bale (optional)

Bale diameter, inches	64
Bale width, inches	60
Est. bale weight, lb.	1,210

Harvesting costs for corn stover

Chopping stalks, \$ per acre
 Raking, \$ per acre
 Baling, \$ per bale
 Cost for plastic wrap (if used), \$ per bale
 Moving or transporting bales, \$ per bale
 Bales harvested per acre

\$	-
\$	-
\$	12.00
\$	-
\$	3.00
	2.3

[See current Iowa Farm Custom Rate Survey](#)

Estimated bales harvested per acre (optional)

Corn yield, bu./acre	100
% of stover harvested	50%
Est. bales harvested per acre	2.3

CORN RESIDUE - STOVER

✖ Calculating value - baling/grazing results

Value for large round bales of corn stover

<u>Value based on costs to seller (minimum price to accept)</u>	<u>Per Bale</u>		<u>Per Wet Ton</u>		<u>Per Acre</u>
Pounds of nitrogen removed	9.6		16.0		22.1
Pounds of phosphate removed	2.8		4.7		6.5
Pounds of potash removed	12.0		20.0		27.6
Value of extra nutrients removed	\$ 13.52	\$	22.53	\$	31.09
Total harvesting costs	\$ 15.00	\$	25.00	\$	34.50
Equals cost of corn stover (at the farm)	\$ 28.52	\$	47.53	\$	65.59
<u>Value based on the cost of alternative feed sources (maximum price to offer)</u>					
Market value of 1.16 tons of hay minus .22 ton of DDGS	\$ 28.73	\$	47.88	\$	66.07

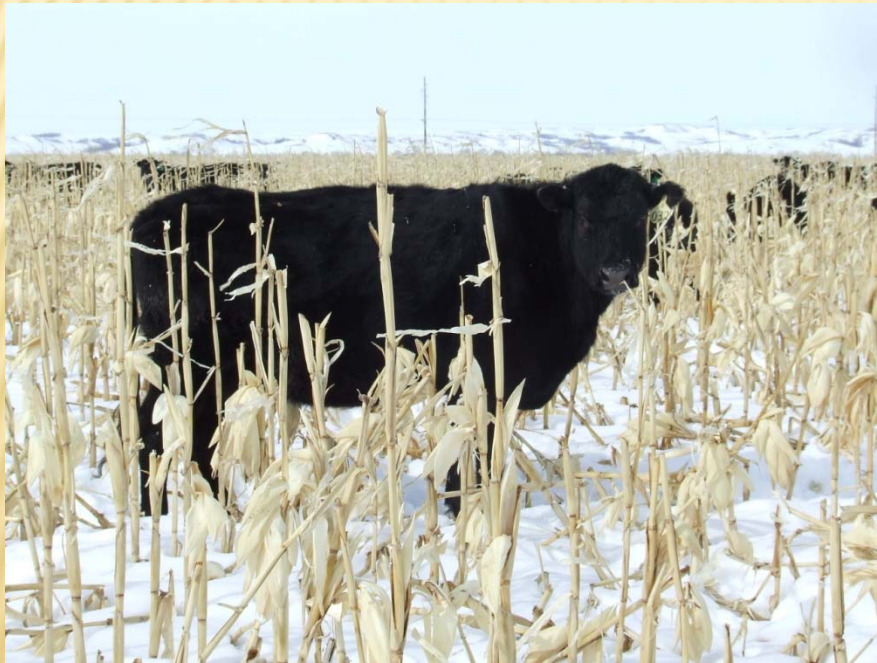
Value for standing corn stover that will be harvested

	<u>\$ / bale</u>		<u>\$ / ton</u>		<u>\$ / acre</u>
Value based on costs to seller (minimum price to accept)	\$ 13.52	\$	22.53	\$	31.09
Value based on the cost of alternative feed sources (maximum price to offer)	\$ 13.73	\$	22.88	\$	31.57

Value for standing corn stover that will be grazed

		<u>\$ / acre</u>
Value based on costs to seller (minimum price to accept)	\$	4.22
Value based on the cost of alternative feed sources (maximum price to offer)	\$	15.56

GRAZING STALKS



- ✗ Typically 150 lbs grain per acre to clean up plus 20-30 % of stover
- ✗ Typical carrying capacity 1 ac = 1-1.5 AUMs
- ✗ Best utilized with minimal supplement by mature dry cows
- ✗ Feed value deteriorates over time
- ✗ Rumen acidosis potential if excess grain

GRAZING STALKS

- ✖ Vitamin/mineral and protein supplementation needed
 - + Free choice triple 12
 - + 30% tubs or liquid
 - + 3-5 lbs high quality hay
- ✖ Today's stalks of lower value due less grain loss, hybrids with less nutritious stalks ?



GRAZING STALKS

- ✖ Access to all season water biggest issue
- ✖ Fencing is also an issue
 - + 1 strand electric about \$.40 per foot
- ✖ Typical rental has been \$10-15/aum varying with demand, quality, fence, water, restrictions
- ✖ Potential for extended grazing and reduced wintering expense



GRAZING STALKS

- ✗ Proper grazing maintains ample residue cover with no-till and reduced tillage for soil protection
- ✗ Shallow soil compaction possible prior to freeze up in traffic areas
- ✗ Don't graze heavy soils when muddy
- ✗ UN and ISU long term studies has shown fall grazing doesn't effect subsequent yields

Following Crop	Location	Grazed	Not Grazed
Soybean	Atlantic Iowa	55.6	56.1
Soybean	Chariton Iowa	35.0	35.4
Soybean	Mead Nebraska	62.4	60.4
Corn	Mead Nebraska	209	205

BALING STOVER



- ✗ Tight harvest window and weather concerns
- ✗ May need drying time to get below 20% moisture
 - + Typically stover is 2x moisture of grain
- ✗ Fall chopper windrower or raking may be needed depending on combine/header

BALING STOVER



- ✗ Suggested 3 wraps of net with big round balers
- ✗ Some added wear on baler pickup, bearings and belts
- ✗ Consider a nitrate stalk test of stressed corn
- ✗ If not processed considerable feeding waste of stalks

BALING STOVER



- ✕ Partial stover removal may be beneficial to subsequent crop yields
 - + 175 bu/acre crop
 - + Corn on corn
 - + Soybean following irrigated corn
 - + High soil OM
 - + Fertility replacement

Increasing corn production might be accompanied with growth or stabilization of beef production if residue can be utilized as a competitive feed resource to extend grazing and winter cows. Non ranching corn producers can find benefit in working with cattlemen through residue management and additional income.

CORN AND COWS

ELECTRIC FENCE COST

Table 4. Construction costs for high-tensile electrified wire fence (Based on a 1,320 ft. fence)

Item	Amount	Cost per unit	Total cost
Wood posts (8-in diameter)	6	\$ 22.00	\$ 132
Wood posts (4-in diameter)	4	9.30	37
Steel posts (6.5 ft)	52	3.69	192
Insulators	285	.15	43
Springs	5	4.50	23
Strainers	5	2.50	13
High-tensile wire	6,600 ft	.0225	149
Energizer (priced over 4 yr)	1/4	200.00	50
Cut-out switch	1	9.00	9
Ground/lightning rods	4	9.00	36
Labor (estimated)	18 hr	13.60	<u>245</u>
TOTAL			\$ 927
TOTAL PER FOOT			0.70