

Economics of Wheat/Corn Stover Collection, Dakota Spirit AgEnergy

AAEA Extension Section Webinar

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Dakota Spirit Ag Energy

- Wheat straw biorefinery
- Complement 99mw CHP
- Is wheat straw collection feasible?
- www.dakotaspiritagenergy.com



Inbicon Biomass Refinery: Straw Storage



Inbicon Biomass Refinery: Kalundborg – Design



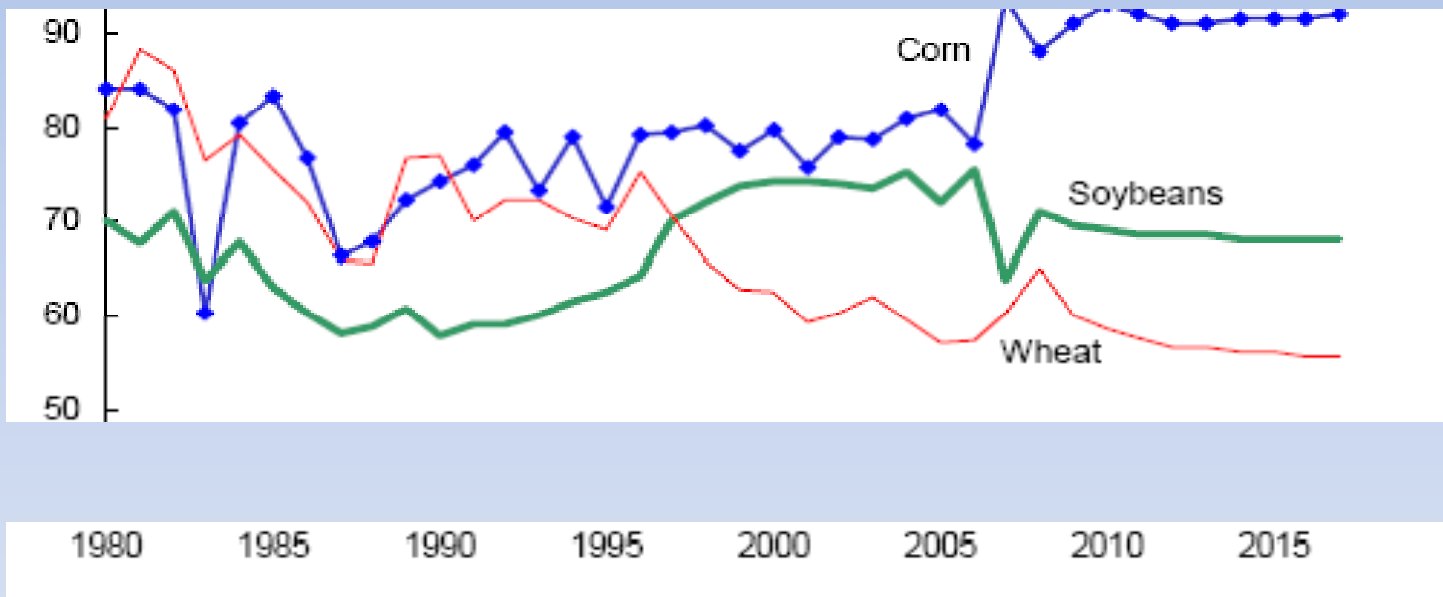
Demonstration Plant, 4t/hr of straw		Tonnes/ year	Tonnes DM/year	GJ/year
Input	Straw	30,000	25,000	432,000
Output	Ethanol	4,300	4,200	114,800
	Bio pellets	13,000	12,300	181,100
	Animal feed	11,100	7,210	112,500

Core Questions

- How much wheat stover is available
- Are farmers willing to provide
- What are logistics?

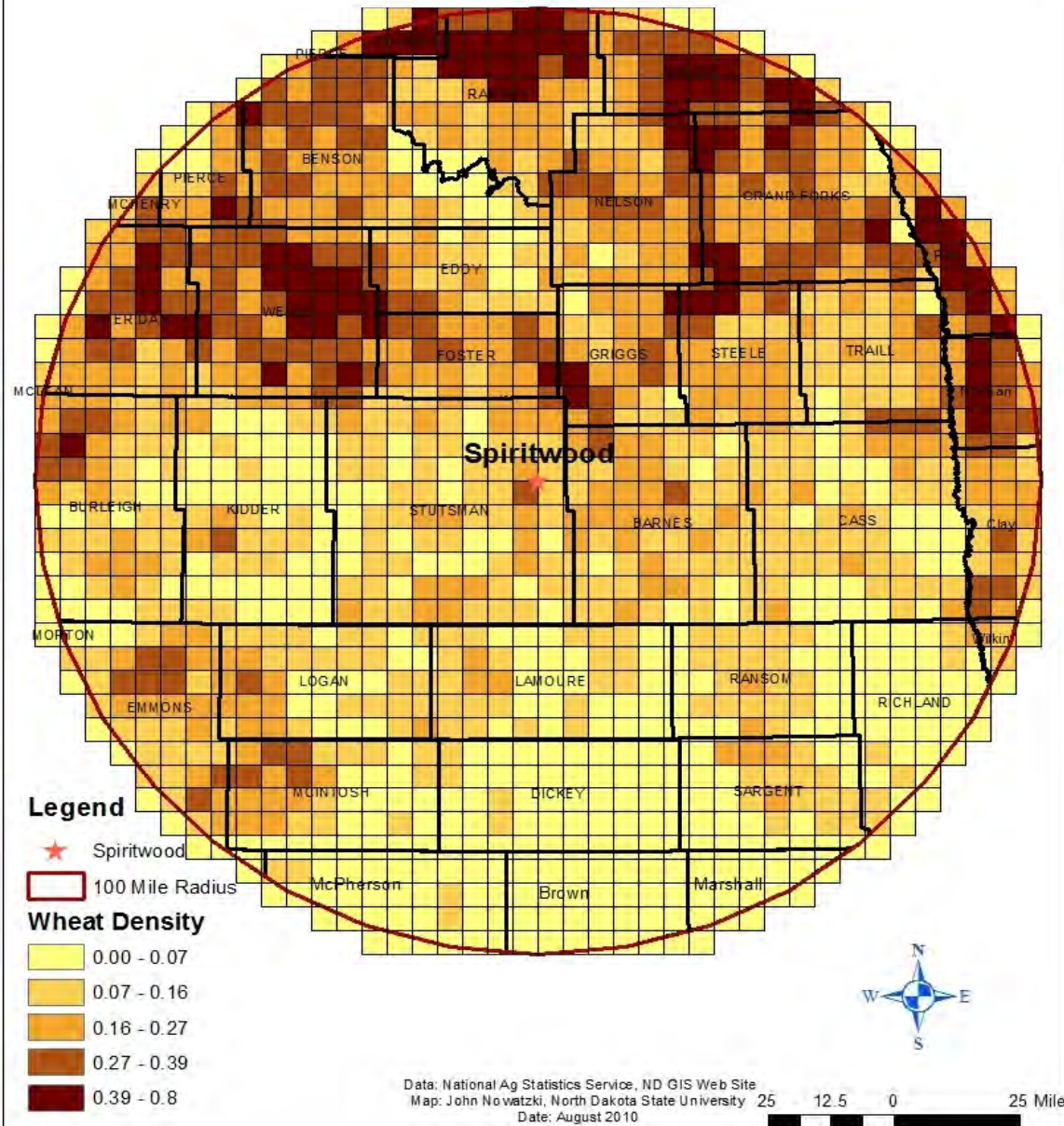




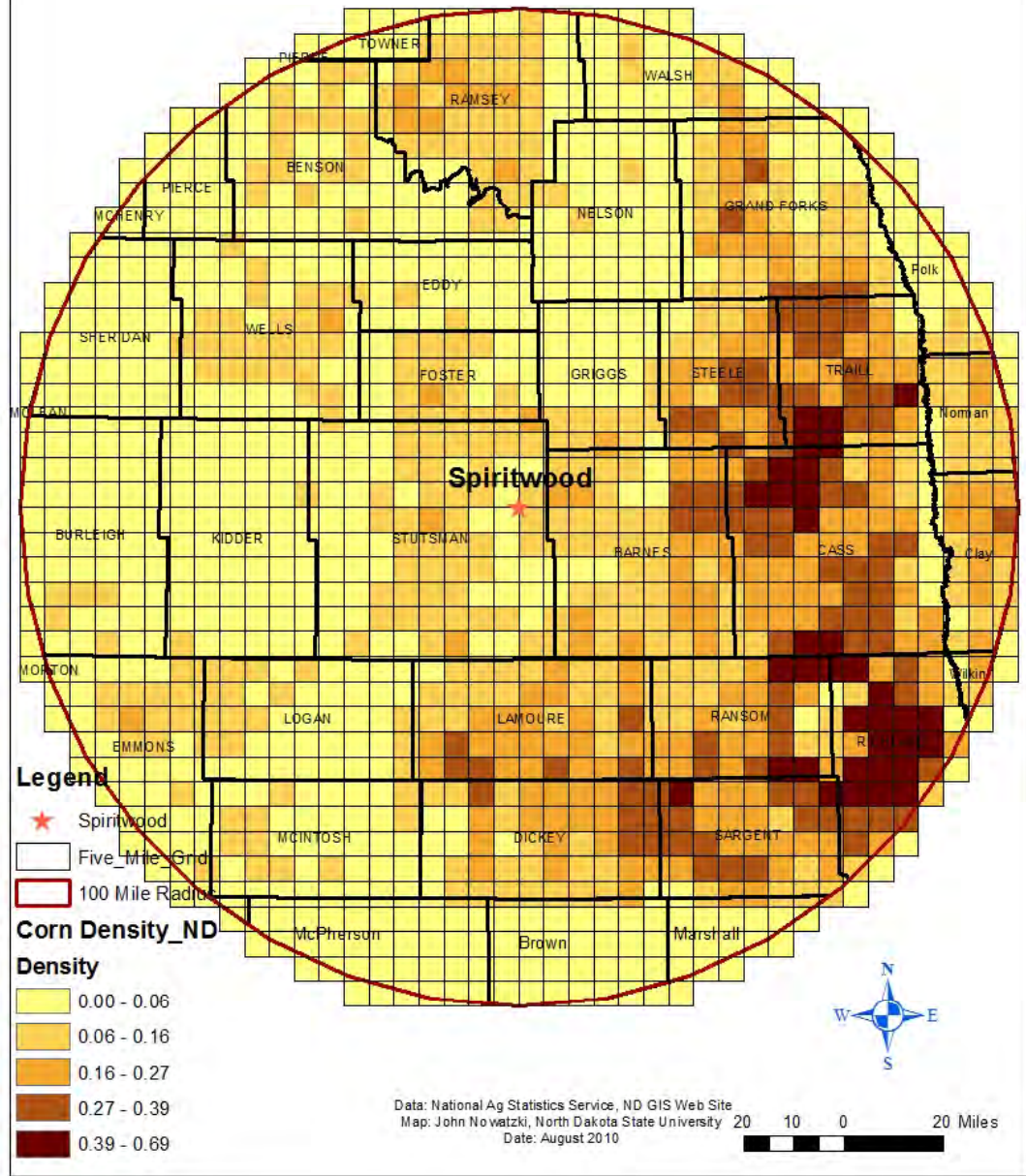


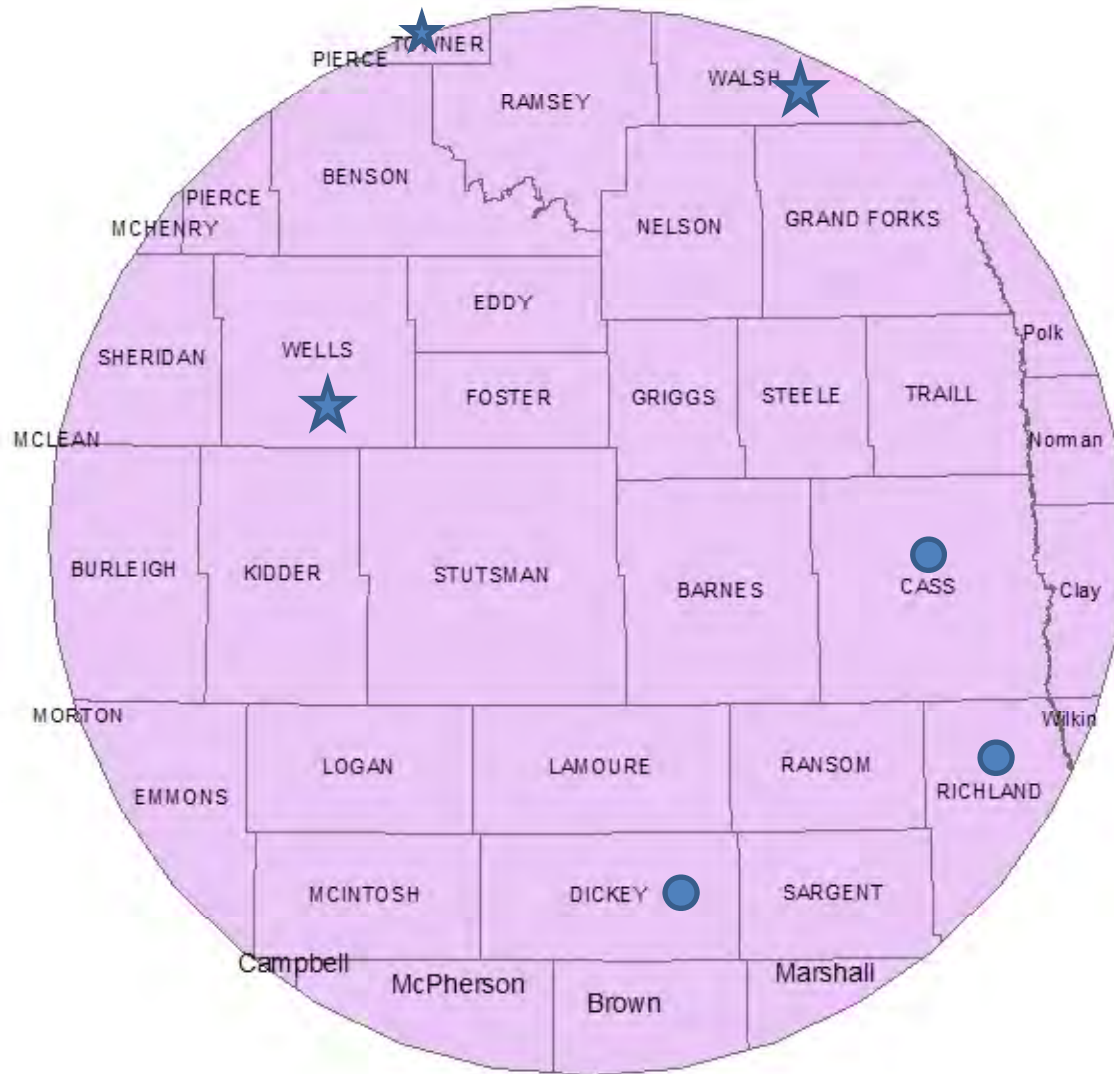
USDA Baseline Forecast, 2010

Wheat Density



Corn Density





★ Top three counties with highest production of wheat

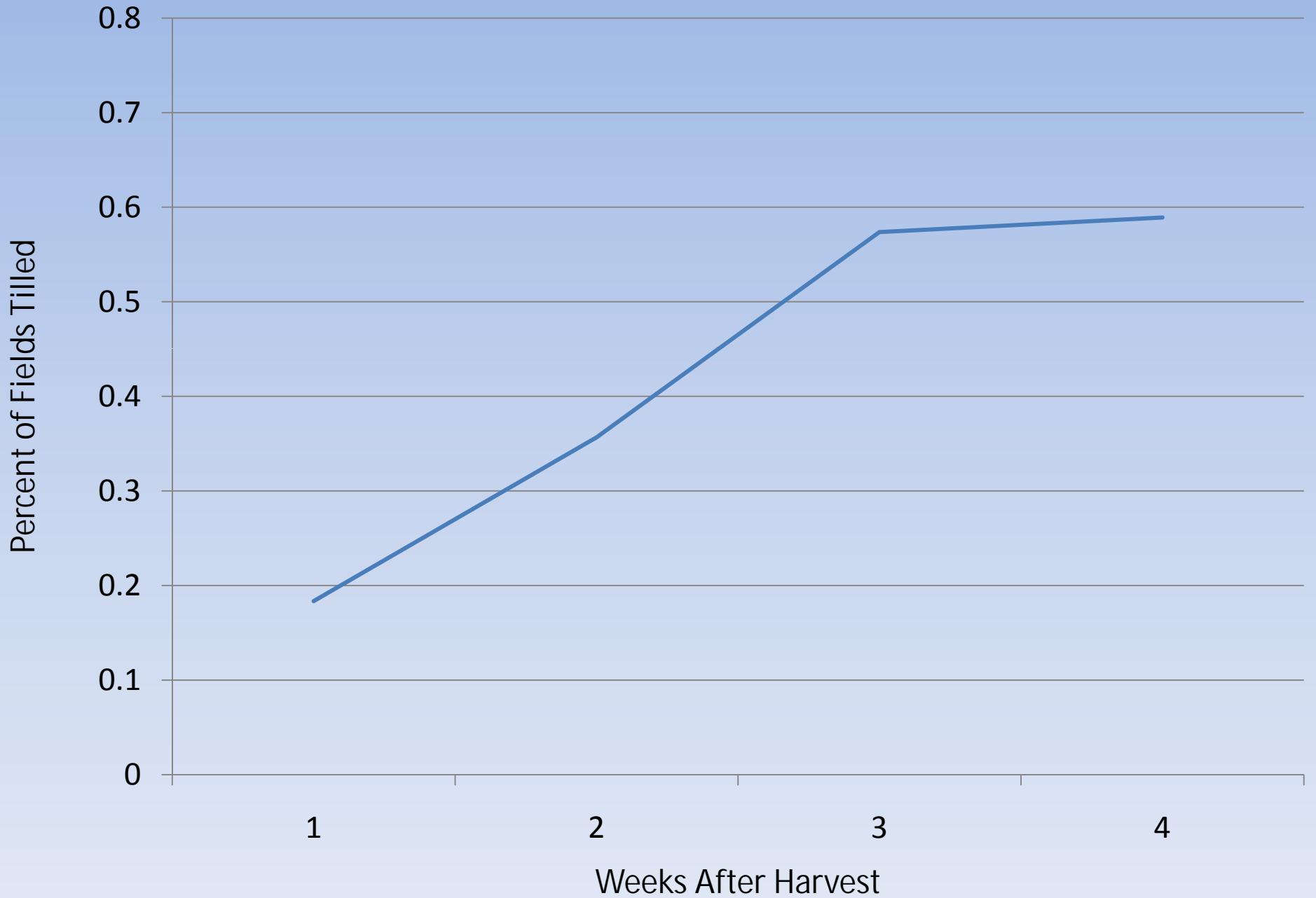
● Top three counties with highest production of corn

Potential Wheat Straw Supply

- 1.16 million tons (bone dry)
- 10% moisture
- Plant height 34.6"
- Combine height 7.6"
- Producers are willing to supply
- Adequate time to harvest

Wheat @ 25%	25 Mile Radius		50 Mile Radius		75 Mile Radius		100 Mile Radius	
State/ County	Total (ton)	Ton per Acre	Total (ton)	Ton per Acre	Total (ton)	Ton per Acre	Total (ton)	Ton per Acre
ND								
Barnes	22,278	0.42	62,277	0.42	62,619	0.42	62,619	0.42
Benson					22,235	0.36	53,106	0.36
Burleigh					2,215	0.36	26,373	0.36
Cass			9,754	0.43	56,933	0.43	76,923	0.43
Dickey					13,430	0.38	16,916	0.38
Eddy			12,250	0.40	19,884	0.40	19,884	0.40
Emmons					885	0.31	27,693	0.31
Foster	6,240	0.43	32,309	0.43	32,309	0.43	32,309	0.43
Grand Forks					28,800	0.45	90,227	0.45
Griggs	6,401	0.42	30,636	0.42	30,636	0.42	30,636	0.42
Kidder			4,175	0.34	20,203	0.34	20,283	0.34
La Moure			20,655	0.41	28,667	0.41	28,667	0.41
Logan			3,390	0.29	20,383	0.29	22,061	0.29
McHenry							1,611	0.31
McIntosh					10,013	0.34	29,672	0.34
Nelson			6,558	0.38	40,886	0.38	46,909	0.38
Pierce							14,463	0.34
Ramsey					11,790	0.38	47,129	0.38
Ransom			2,727	0.47	24,699	0.47	26,652	0.47
Richland					1,055	0.40	38,686	0.67
Sargent					5,384	0.44	22,609	0.44
Sheridan					1,263	0.32	27,646	0.32
Steele			19,528	0.45	37,035	0.45	37,035	0.45
Stutsman	29,067	0.38	57,961	0.38	57,988	0.38	57,988	0.38
Towner							9,475	0.38
Traill					25,967	0.46	44,029	0.46
Walsh							48,751	0.42
Wells			11,716	0.40	70,831	0.40	80,858	0.40
ND Total	63,987	0.40	273,934	0.41	626,111	0.40	1,041,210	0.40

Progression of Wheat Straw Tillage



Farm Focus Group

Table 2.7. Reasons Why Participants Do Not Collect More Straw

Reason	Percent Response	Number of Participants
Too distant to haul	0.00%	0
No market	38.89%	7
Environmental concern	11.11%	2
Fertility loss	50.00%	9
Loss of wildlife habitat	0.00%	0
No time	0.00%	0
Total	100.00%	18

Farm Focus Group

Table 2.11. Most Important Factor in Decision to Sell Straw

Contract Factor	Percent Response	Number of Participants
Price	93.33%	14
Quality discounts	0.00%	0
Delivery time	0.00%	0
Distance to haul	0.00%	0
Storage payment	0.00%	0
Other factor	6.67%	1
Total	100.00%	15

Farm Focus Group

Table 2.12. Price of Wheat Straw Participants Willing to Accept

Participant Number	Wheat Straw (\$/ton)
1	-
2	35.00
3	40.00
4	30.00
5	25.00
6	20.00
7	25.00
8	50.00
9	40.00
10	50.00
11	20.00
12	30.00
13	15.00
14	15.00
15	15.00
16	50.00
Average	30.67

Farm Focus Group

Table 2.13. Preference for Handling Straw

Preference	Percent Response	Number of Participants
Just bale and leave in field	0.00%	0
Bale and stack at road	0.00%	0
Bale, stack, and store	0.00%	0
Bale, haul part way to Spiritwood	12.50%	2
Bale, haul to Spiritwood	0.00%	0
Just sell straw	81.25%	13
Not interested at all	6.25%	1
Total	100.00%	16

Potential Constraints

- 1) Rotary Combines
- 2) Tenant vs. Land Owner
- 3) USDA/NRCS

		Stover Harvest to Maintain Carbon			
		Continuous Corn		Corn Soybean Rotation	
Grain Yield	Stover	Plow	Chisel/ No Till	Plow	Chisel/ No Till
Bu/ac	t/ac	t/ac	t/ac	t/ac	t/ac
103	2.2	0.0	0.0	0.0	0.0
156	3.3	0.0	1.0	0.0	0.0
200	4.5	1.1	2.1	0.0	0.9
259	5.6	2.2	3.2	0.0	2.1
312	6.7	3.3	4.3	0.9	3.2
363	7.8	4.4	5.4	2.1	4.3
415	8.9	5.5	6.6	3.2	5.4

Source: PRX 2010, Johnson 2006



Questions?



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