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CORNHUSKER ECONOMICS

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Department of Agricultural Economics
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Offsetting the Oil Addiction: Farmers Motivated to Sequester Carbon

Market Report	Yr Ago	4 Wks Ago	8/17/07
<u>Livestock and Products,</u>			
<u>Weekly Average</u>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight	\$86.40	\$89.00	\$90.17
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb	129.09	129.50	136.14
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb	119.34	119.08	119.10
Choice Boxed Beef, 600-750 lb. Carcass	150.87	142.83	144.39
Western Corn Belt Base Hog Price Carcass, Negotiated	75.58	67.82	67.12
Feeder Pigs, National Direct 50 lbs, FOB	50.12	48.54	58.20
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean	75.89	75.31	72.37
Slaughter Lambs, Ch. & Pr., Heavy, Woolled, South Dakota, Direct	92.00	105.00	104.00
National Carcass Lamb Cutout, FOB	224.49	253.59	255.27
<u>Crops,</u>			
<u>Daily Spot Prices</u>			
Wheat, No. 1, H.W. Imperial, bu	4.01	5.33	5.70
Corn, No. 2, Yellow Omaha, bu	1.95	3.03	3.16
Soybeans, No. 1, Yellow Omaha, bu	5.01	7.54	7.40
Grain Sorghum, No. 2, Yellow Columbus, cwt	2.86	4.96	5.05
Oats, No. 2, Heavy Minneapolis, MN, bu	2.02	2.54	2.52
<u>Hay</u>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton	135.00	135.00	135.00
Alfalfa, Large Rounds, Good Platte Valley, ton	92.50	92.50	85.00
Grass Hay, Large Rounds, Good Northeast Nebraska, ton	82.50	*	*
* No market.			

President Bush has noted that the U.S. is “addicted” to oil and other fossil fuels. This observation is well-founded: In 2006, the traditional fossil fuels of coal, natural gas and petroleum accounted for nearly 86 percent of all energy usage in the country, with petroleum alone accounting for nearly half of the fossil fuel use (see: <http://www.eia.doe.gov>). Unfortunately, it doesn’t appear that this country’s thirst for fossil fuels will be quenched anytime soon, as projected total energy consumption in the U.S. is expected to increase 1.3 percent annually through the year 2030. This expected rise in consumption will lead to ever higher fossil fuel prices.

Although high energy prices are the most publicized by-product of our reliance on fossil fuels, a somewhat overlooked consequence of our addiction may have a greater impact worldwide. Namely, most climate scientists are now in agreement that the burning of fossil fuels releases enough carbon dioxide (CO₂) into the atmosphere to be the major reason for global warming. We have exceeded the capacity of the atmosphere to hold more greenhouse gases, generally, including too much CO₂. So, although the exact effects of global warming are uncertain, we could see more intense storms, prolonged periods of drought and flood, and impacts on agricultural growing seasons throughout the world. At a minimum, no matter what perspective one takes on this problem, we are gambling with the stability of earth’s climate and ecosystem.

With global warming potentially a serious threat to the well-being of the planet, many citizens are asking how it can be stopped, or at least slowed. It appears that there are only two ways. The first would be to drastically reduce the amount of fossil fuels being used, which is not a viable option, at least not for the next few decades. The other main method is through sequestering carbon ... capturing



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and storing carbon ... in such places as old mines, the world's oceans, forests, and most importantly for Nebraska, agricultural lands.

Carbon storage in agricultural cropland can be achieved if farmers choose to use some form of conservation tillage. With this in mind, it becomes essential to understand farmer motivations with regard to conservation tillage. A recently completed three-year study focused on understanding these motivations in the Nebraska farming population. Surveys containing questions regarding awareness of global warming, types of tillage systems used, and beliefs about carbon sequestration policies were sent to 4,200 farmers in eight counties. The statistical results from the 770 returned surveys provided several insights into what motivates farmers to use sequester carbon through conservation tillage.

Conventional economics would suggest that the only way to motivate farmers to use conservation tillage methods would be to pay them to use the practices. This could be achieved through government payments or the selling of carbon offsets to entities such as the Chicago Climate Exchange. It does not appear, however, that financial incentives provide the only, or even the main motivation to using conservation tillage practices. Our models suggest that increasing a farmer's gross income by \$1,000 will increase the probability that conservation tillage methods will be used by only 0.3 percent, i.e. less than one percent. This implies that it would take substantial financial payments in order to increase the amount of cropland under conservation tillage. Importantly, paying farmers for the environmental service of storing carbon also suggests that farmers in the area are not currently using conservation tillage methods. Our results show this assumption to be largely untrue, as nearly 80 percent of farmers in the counties surveyed are currently using some form of conservation tillage system on at least part of their farms. These operators have gone largely unpaid for these services, yet they continue to use this tillage practice.

If financial incentives are not the primary motivating factor for using tillage methods that store carbon, then what does motivate farmers to provide this environmental service? In addition to concerns over financial payoff, the answer to this question appears to be a complex mix of personality traits and the influence from others, including family members, friends, and those in the business community, both of which are internalized to the farmer.

Results suggest that those who place a greater value on environmental stewardship and on enhancing the sustainability of agriculture are much more likely to engage in conservation tillage practices. For instance, a farmer with even a slight interest in environmental issues is nearly seven percent more likely to engage in

conservation tillage practices than a farmer with no concern for environmental issues. As concern for the environment grows within the farmer, so does the likelihood that the farmer will use conservation tillage.

Influence from others also plays a role. Somewhat surprisingly, though, the opinions of friends and family do not motivate farmers very much to use alternative tillage strategies. Results show, instead, that opinions coming from entities closely related to agriculture (i.e. equipment dealers, chemical and seed suppliers, agricultural lenders, etc.) have a greater influence on a person's decision to use conservation tillage than close friends and family.

With respect to control, residue left in the field impacts soil temperature and moisture content at planting time, making it more difficult to plant in a timely manner in the spring. So, farmers using these methods are more at the mercy of nature than those that use intensive tillage systems. It would be reasonably expected that those with a greater preference for control over nature and their land would be less likely to use conservation tillage systems. Analytical results from our sample confirm this suspicion. Only a slight increase for preference in environmental control results in nearly an eight percent decrease in the likelihood of a farmer using conservation tillage practices.

Finally, the greatest factor in predicting the adoption of conservation tillage methods is something the research team has called "habit." A farmer that has been practicing conservation tillage is much more likely to keep using the practice in the future. This was also found to describe a farmer that is using intensive tillage practices, suggesting it is difficult to move away from a familiar tillage system.

It is obvious that there is no easy solution to the global warming problem our country and our planet faces. However, carbon sequestration could be one piece of the puzzle needed to help combat the problem. Armed with this new knowledge about what motivates farmers to use conservation tillage methods, we now have a more scientific basis for designing policies, programs and markets which facilitate storing more carbon in agricultural land.

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