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Analysis of Potential Groundwater Trading Programs for Nebraska

Karina Schoengold
University of Nebraska-Lincoln, kschoengold2@unl.edu

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Market Report	Yr Ago	4 Wks Ago	5/4/12
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	$115.38	$121.99	$121.13
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	159.52	178.64	184.55
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	*	152.14	154.72
Choice Boxed Beef, 600-750 lb. Carcass.	180.27	180.79	190.66
Western Corn Belt Base Hog Price Carcass, Negotiated.	89.06	81.49	76.88
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean.	91.10	78.73	78.32
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct.	193.75	147.50	*
National Carcass Lamb Cutout, FOB.	409.94	376.90	359.26
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	7.50	5.80	5.41
Corn, No. 2, Yellow Nebraska City, bu.	6.79	6.55	6.40
Soybeans, No. 1, Yellow Nebraska City, bu.	13.36	13.95	14.34
Grain Sorghum, No. 2, Yellow Dorchester, cwt.	10.73	11.13	10.36
Oats, No. 2, Heavy Minneapolis, MN , bu.	3.40	3.58	3.44
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	140.00	225.00	225.00
Alfalfa, Large Rounds, Good Platte Valley, ton.	77.50	145.00	145.00
Grass Hay, Large Rounds, Good Nebraska, ton.	*	97.50	97.50
Dried Distillers Grains, 10% Moisture, Nebraska Average.	217.50	216.50	221.00
Wet Distillers Grains, 65-70% Moisture, Nebraska Average.	80.00	77.50	77.75

*No Market

The goals of a recently funded project to measure the potential benefits of developing a groundwater trading market in Nebraska is discussed in this *Cornhusker Economics* article. Groundwater is a major component of agricultural water use. In extensive regions of the Western United States, rural agricultural economies rely entirely on groundwater. At the same time as providing water for human needs, groundwater is also an input to streams, wetlands and riparian areas that provide important ecosystem services. Ongoing groundwater pumping will deplete flows in adjacent streams, leading to potential conflict between human and environmental uses of water. In the last decades, many conflicts over transboundary allocations of water, endangered species and instream and riparian habitat have been driven by surface water-groundwater interaction. For example, claims have been filed with the United States Supreme Court over the impacts of groundwater use on flows of transboundary rivers for the Pecos River (Texas vs. New Mexico), the Arkansas River (Kansas vs. Colorado) and the Republican River (Kansas vs. Nebraska and Colorado). Groundwater has typically been viewed as private property, and its use in agriculture is generally neither regulated nor quantified precisely. However, there is growing interest in moving to systems that regulate groundwater use. The ability to trade groundwater allocations is often a part of such conversations.

The majority of the water trading literature has focused on surface water trading. However, a few studies have examined the potential for beneficial groundwater trading. Thompson, et al., (2009), use a numerical example based on average parameters at the Natural Resources District (NRD) level to illustrate that groundwater trading that satisfies the Republican River Compact (RRC), can be economically beneficial. Other recent research has examined the economic benefits (Palazzo and Brozović, 2010), of groundwater trading in the Republican River Basin (RRB). In fact, groundwater trading has the potential to function better than

surface water trading due to limited problems from conveyance losses and infrastructure requirements (Zilberman and Schoengold, 2005). While the potential benefits of groundwater trading have been examined in the economic literature, we are unaware of any empirical studies that have examined trading decisions in a groundwater permit market, probably due to a lack of data.

Potential concerns with tradable groundwater permits include high transaction costs, location-specific impacts of water use and the difficulty with measuring water use to ensure compliance (Koundouri, 2004). Importantly, several common obstacles to efficient surface water rights markets are expected not to be significant issues in groundwater trading markets in our study area. The certification of irrigated acreage has been completed in the RRB, and hence all groundwater users have very clearly defined and quantified property rights. Because all wells are metered and annual reporting of pumped volume is mandatory, monitoring and verification of groundwater use are already in place. Groundwater trading does not involve the transfer of actual water, but only the right to pump water, and thus requires no diversion or delivery system. Hence, unlike surface water quantity markets, conveyance is not an issue. Moreover, regulations are already in place and many farmers have reduced their pumping from their historical levels. Because all trades are between agricultural groundwater users and do not include environmental or urban users, there is no reason to expect community level opposition to trading.

There are two tasks that we will complete for the project. First, we will c*ompare actual and predicted water trading*. Despite a lack of an official water market or clearinghouse, there have been some *actual* groundwater trades in the Nebraska section of the Republican River Basin. Information is available on the location of the wells that have traded groundwater. We hypothesize that due to high transaction costs we are most likely to observe trades between buyers and sellers that have the largest differential in the net marginal production value of irrigation water. Information on *predicted* trades comes from previous work by Palazzo and Brozović (2010), which is measured based on a variety of characteristics including soil type, depth to groundwater and pumping costs. Predicted results show a sizeable variation among wells in the Republican River Basin in the marginal cost of reducing water use. These results show that in the absence of transaction costs, groundwater trading could provide economic benefits to many producers while still allowing the RRB to meet streamflow requirements.

The second task we will complete for the project is to *determine economic benefits of interseasonal groundwater trading*. To determine the economic benefits of interseasonal groundwater trading we will develop analytical models of the economic benefits of tradable multi-year allocations, using the five-year allocation rule that is currently used in the Republican River Basin. When producers are risk-averse and have more knowledge about their own costs than a regulator, there are economic benefits to multi-year allocations. Other research confirms that producers do respond to short-term weather fluctuations in managing risk (Ding, Schoengold and Tadesse, 2009), and thus, we expect that multi-year water allocations will allow irrigators to better manage weather risk.

The results from this project will provide information that can readily be used by the Nebraska NRDs to develop groundwater trading policies that can be beneficial over the long-run for irrigators. The results of this research can also be used to predict the directional flow of water trades. Thus, measurements of the impacts of predicted trades on streamflow can be measured and used to determine how the stringency of groundwater trading regions varies depending on hydrological characteristics.

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Karina Schoengold, (402) 472-2304
Assistant Professor
Department of Agricultural Economics
University of Nebraska-Lincoln
kschoengold2@unl.edu