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CORNHUSKER ECONOMICS

Who Should Own the Property Rights? Revisiting the Downstream Water Pollution Problem

Market Report	Yr Ago	4 Wks Ago	2/1/13
<u>Livestock and Products,</u>			
<u>Weekly Average</u>			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	\$123.95	\$128.50	\$124.86
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	184.46	171.79	172.26
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	156.82	152.37	147.30
Choice Boxed Beef, 600-750 lb. Carcass.	183.34	194.32	185.83
Western Corn Belt Base Hog Price Carcass, Negotiated.	85.93	81.20	88.59
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean.	84.88	82.80	85.90
Slaughter Lambs, Ch. & Pr., Heavy, Woolled, South Dakota, Direct.	148.25	*	96.50
National Carcass Lamb Cutout, FOB.	383.49	299.69	291.50
<u>Crops,</u>			
<u>Daily Spot Prices</u>			
Wheat, No. 1, H.W. Imperial, bu.	6.40	7.39	7.81
Corn, No. 2, Yellow Nebraska City, bu.	*	6.95	7.51
Soybeans, No. 1, Yellow Nebraska City, bu.	*	13.94	14.74
Grain Sorghum, No. 2, Yellow Dorchester, cwt.	10.98	11.54	12.52
Oats, No. 2, Heavy Minneapolis, MN, bu.	3.39	3.46	3.88
<u>Feed</u>			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	250.00	*	247.50
Alfalfa, Large Rounds, Good Platte Valley, ton.	145.00	230.00	230.00
Grass Hay, Large Rounds, Good Nebraska, ton.	100.00	212.50	212.50
Dried Distillers Grains, 10% Moisture, Nebraska Average.	196.00	266.25	301.75
Wet Distillers Grains, 65-70% Moisture, Nebraska Average.	75.00	97.88	108.00
*No Market			

One of the concerns in environmental and ecological economics is the overexploitation of natural resources, often leading to pollution. Proponents of market based solutions to these pollution problems argue that one only needs to move away from common property (the way almost all natural resources, other than land, are owned now), to individual property, i.e., privatize the natural resource ownership, in this case create individual property rights in the capacity of some body of water to process water pollutants. These proponents also do not see (or downplay) the usually significant transaction costs, instead presuming that bargaining and other interactions between individual property owners is essentially costless and efficiency is easily achieved. In such a case, the role of government would be limited to: 1) providing a way to allocate the initial property rights, and 2) supporting the legal system to enforce the property rights.

One of the key realities missed in this story is that transaction costs are far from negligible, largely because individuals have widely different views on the best level of pollution. Such costs are also not easily reduced by government intervention, as it is difficult to force any kind of common ground among the affected parties. The question is: In this situation, can we design policies that lead to efficiency without a heavy handed influence of government, or can we instead rely on individuals finding this common ground through some kind of interaction?

To provide some insight into the effectiveness of various kinds of interaction we conducted an experiment in July of 2012, in which participants played the role of Upstream Farmer (UF) or Downstream Water User (DWU). Each UF was randomly paired with a DWU. Decisions by the participants determined their financial gain in the game. Average cash earnings were \$45, with a range of \$15 to \$71 for a 60-90 minute long session. The experiment included

various treatments, with one dimension being the ownership of the property right, i.e., either the upstream farmer or the downstream water user had the right to determine the pollution level of the water resource. The other dimension was the type of feedback that the affected party was able to give to the party determining the pollution. We focused on the observed difference in behavior of participants based on who owns the property right. (For a discussion on the effect of feedback see the September 5, 2012 *Cornhusker Economics Newsletter* at <http://agecon.unl.edu/cornhuskereconomics>.)

In the experiment, participants made a decision on how much conservation technology the Upstream Farmer was to use, and consequently, how much water pollution to cause. The use of conservation technology to reduce the pollution is more costly to the farmer; the property right owner hence faces a trade-off between their own payoff and the other person's payoff. The figure below illustrates the choices that were made concerning own payoff, based on the respective treatment. Generally, the higher the own payoff, the lower the other person's payoff.

If the Upstream Farmer is a Property Rights Owner (PRO), the choice is much more skewed towards self than if the property rights owner is the Downstream Water User. If the UF possess the property right, they take about 66 percent of the total payoff for themselves, while the DWUs take just a little above 50 percent. This difference is statistically significant for each of the three feedback treatments.

There are two likely explanations for this outcome. The first explanation is that individuals are used to farmers making production decisions that may not always consider costs imposed on downstream water users, i.e., the accepted status quo has historically been to give the rights to the upstream farmer. Hence, Downstream Water Users are willing to allow somewhat larger payoffs to the Upstream Farmer than in the reverse scenario. The other explanation is that DWUs are more attuned to what it means to suffer the consequences of someone else's decisions, and hence are more willing to walk-in-their-shoes and sacrifice a bit more.

The implication of this result is that if society prefers a more easily achieved efficient level of pollution without the need to heavily intervene, accomplished by individuals tempering their choices by each considering the situation of others, property rights should be given to the party affected negatively by increased pollution. Intriguingly, the experiment shows that the degree of pollution of the natural resource is independent of who owns the property right – hence there is no efficiency loss from using this approach.

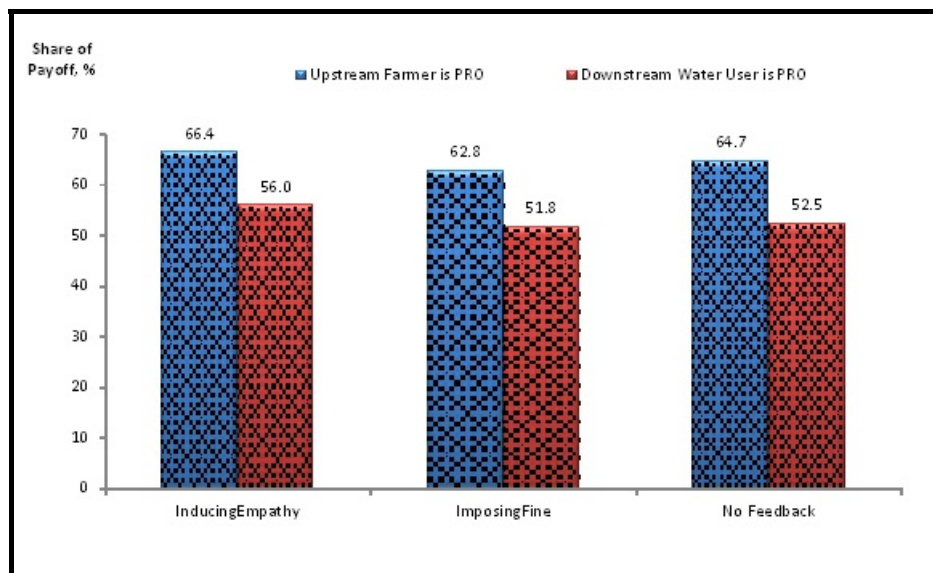
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Allocation of Payoffs to Self by the Property Right Owner