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2017

Efficient Diffusion of Sustainable Environmental Practices through Green Networks

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AGRICULTURAL ECONOMICS

April 12, 2017

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Cornhusker Economics

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Market Report	Year Ago	4 Wks Ago	4-10-17
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	**132.00**	125.46	120.00
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	196.94	163.14	174.81
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	160.66	133.88	142.76
Choice Boxed Beef, 600-750 lb. Carcass.	216.21	214.12	209.99
Western Corn Belt Base Hog Price Carcass, Negotiated	62.84	67.65	57.94
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	76.69	81.28	74.69
Slaughter Lambs, wooled and shorn, 135-165 lb. National.	130.79	NA	154.36
National Carcass Lamb Cutout FOB.	346.78	334.13	342.41
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	3.75	3.04	2.93
Corn, No. 2, Yellow **Columbus**, bu.	3.36	3.16	3.33
Soybeans, No. 1, Yellow **Columbus,** bu.	8.59	9.04	8.51
Grain Sorghum, No.2, Yellow Dorchester, cwt.	5.31	4.88	5.27
Oats, No. 2, Heavy Minneapolis, Mn, bu.	2.42	5.91	2.85
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	183.00	136.25	*
Alfalfa, Large Rounds, Good Platte Valley, ton.	80.00	65.00	65.00
Grass Hay, Large Rounds, Good Nebraska, ton.	87.50	65.00	67.50
Dried Distillers Grains, 10% Moisture Nebraska Average.	125.00	93.50	103.75
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	48.00	39.75	42.50

*** No Market**

A movement towards sustainable use and management of ecosystem services requires collective action by individuals or groups of individuals (Ostrom, 1990). Additionally, ecosystem services have public goods features whose provision depends upon multiple social and psychological factors (Shang and Croson, 2009) which may align with individuals' intrinsic motivation or "warm glow" (Frey 1994, Benabou and Tirole 2003). Banerjee and Shogren (2012) have also shown that problems of collective action vis-à-vis ecosystem services provision are more likely to be resolved if there is a "social norm" component such as peer pressure, reputation, and altruism which ties back to the findings of Shang and Croson (2009). Given these results, in a land conservation context, Banerjee and Shogren (2012) recommend widespread publicity of land retirement decisions as a means to create a stewardship social norm within agricultural communities that can have an effective impact on species protection in particular and adoption of pro-environmental behaviors in general.

Another matter of interest in the domain of environmental stewardship norm creation is that collective action will often require both small and large homogeneous and heterogeneous groups to act together. This issue is especially relevant when behavior change has to be affected on a larger scale – for example, when dealing with issues such as climate change and adoption of sustainable lifestyle decisions (i.e. a shift to a

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green lifestyle). Adoption of a green lifestyle, in particular, has been encouraged by the Brundtland Commission (1987) and the United Nations Conference on Environment and Development (1992) to meet the UN's Sustainable Development Goals. Moreover, studies by Brown and Kasser (2005) and Welsch and Kühling (2010, 2011) find that a green lifestyle/behavior is significantly related to an increase in well-being through a change in human consumption pathways. These changes may not necessarily imply consuming less but it involves characterizing the consumption to involve environmentally friendly products. This finding conforms to other studies that suggest that non-materialistic lifestyles improve wellbeing (Kasser 2004, O'Brien 2008). For example, sadness drives individuals to spend more whereas happier people consume less (Guven, 2012).

Thus, given the importance of green consumption and sustainable behaviors to human well-being and ecosystem services preservation, it is important to study the drivers of sustainable behavior adoption. We are specifically interested in how adoption of sustainable behaviors is impacted by how knowledge and information diffuses within different sized homogeneous and heterogeneous groups. One way of understanding such information diffusion and behavior change is by adopting a network based approach (Allen and Gale 2000, Cassar 2007) when studying social groups.

We can consider different types of networks such as those considered by Cassar (2007)

- Random networks within which individuals have the same probability of being connected to their networked peers.
- Local networks where a sub-set of networked individuals are connected to and interact with each other such as on a circle or lattice.
- Small world networks which have features intermediate between local and random networks and on which information from other parts of the social network are available. This type of network is representative of the society we live in, within which we interact with close social peers yet come in contact with new individuals and are exposed to new information sets which may impact our behaviors.

This behavior change may occur through the ties between a person – the ego and all others – the alters (Videras et al. 2012). And the information flows and rate of behavior change are predicated on the stock of social capital within the network. Common measures or indices of this stock are trust and reciprocity between networked peers. Additionally, the pattern of information diffusion is impacted by strong moral feelings such as guilt, shame and/or pride (Croson and Treich 2014) and individuals' influence within the network on their neighbors and others (Videras et al. 2012). The flow of information in a network is also affected by external parameters such as the social context i.e. cultural norms and the geographical conditions of the network. And these in turn impact adoption of green behaviors and lifestyles as indicated by Kurz (2007) and Miller and Buys (2008). For example, Kurz indicates that social context can significantly impact recycling rates and attitudes. Miller and Buys (2008) present that neighbors are likely to carry out environment friendly car washing in a drought-prone area in Australia (external social context that facilitates sustainable behavior), while in a neighborhood where the primary community concern is ensuring that the lawns and gardens look aesthetically pleasing, a socially proactive individual may use more weed killers (and in this case external social context is facilitating unsustainable behavior despite a strong social stock or "sense of community").

Videras et al. (2012) study behavior regarding household carbon footprint management in networks where the ego is connected to a heterogeneous group of alters – the coworker, neighbor and family. The networks vary on the basis of the number of ties and the intensity of relationships. The findings of the study identify education, high income and size of household as important factors that drive pro-environmental behaviors in individuals. Moreover, self-image within one's network peers is an important consideration for the study of green lifestyle/behavior adoption. In a non-network context, Binder and Blanckenberg (2016) investigate how strong a motivator self-image is for actual pro-environmental behaviors.

This study shows that even though a "green self-image" increases pro-environmental behaviors even the greenest self-identified individual does not exhibit all pro-environmental behaviors. This difference in maximum possible intent and realized action is defined as a value action gap. Using a sample of UK Household Longitudinal Study panel data, the authors find that while 2% of environmentally-friendly individuals leave the tap water running while brushing their teeth, 65% never take fewer flights and 53% never share their car, to mention a few results. Being retired and having a green preference is the only scenario which has a negative impact on the value action gap.

Given this discrepancy, nudges – small changes in the decision setting without making any changes in the setting's incentives, can be a likely means of reducing the value action gap and promoting diffusion of environmental behaviors within a network. . Thaler and Sunstein (2008) make a strong case for understanding how behavioral characteristics can be used to design such nudges for cost effective policy implementation. The UK government has its very own Nudge Unit – The Behavioral Insights Team that runs experiments to see if nudges can be used to incentivize behavior that conforms to existing social norms. Similar studies have also been conducted by policy makers in the United States. For example, data from field studies conducted by utility companies- Sacramento Municipal Utility District and Puget Sound Energy suggest that providing peer feedback (which introduces a social norm component) has led to a sustained decrease in energy usage from 1.2% to 2.1% (Ayres et al., 2012).

From our analysis of studies conducted on pro-environmental behaviors, we understand that while social norms, social contexts and ties explain how information is diffused in a network, a lot remains to be explored in terms of the gap between intent and actions of individuals in a network and possible ways in which this gap is bridged in different types of networks to fully attain sustainability goals. Networks provide a means to explore the dynamics of trust and how it may serve as an important tool to achieve a more efficient diffusion of sustainable behavioral practices. Another interesting dimension that may be explored in a network is to what extent gender of key network players influences rate and type of knowledge diffusion for behavior change.

Finally, since lifestyle changes involve upfront costs and unilateral adoption may lead to social norm violations, it would also be interesting to evaluate how networked individuals' risk and time preferences interact with information available about others' behaviors to influence one's own adoption decisions. A comprehensive study of these issues using behavioral and experimental economics methods will be instrumental in affecting environmental friendly behaviors as a means to achieve a more sustainable future.

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