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Declining Crop Diversity and Increasing Industrialization

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Cornhusker Economics

Cooperative Extension

Institute of Agriculture & Natural Resources
Department of Agricultural Economics
University of Nebraska – Lincoln

Declining Crop Diversity and Increasing Industrialization

Market Report	Yr Ago	4 Wks Ago	7/30/99
<u>Livestock and Products,</u>			
<u>Average Prices for Week Ending</u>			
Slaughter Steers, Ch. 204, 1100-1300 lb Omaha, cwt.	\$59.50	\$63.72	\$64.89
Feeder Steers, Med. Frame, 600-650 lb Dodge City, KS, cwt.	68.50	85.00	80.17
Feeder Steers, Med. Frame 600-650 lb, Nebraska Auction Wght. Avg.	*	94.25	78.00
Carcass Price, Ch. 1-3, 550-700 lb Cent. US, Equiv. Index Value, cwt.	95.01	101.84	99.61
Hogs, US 1-2, 220-230 lb Sioux Falls, SD, cwt.	37.38	*	34.50
Feeder Pigs, US 1-2, 40-45 lb Sioux Falls, SD, hd.	*	*	*
Vacuum Packed Pork Loins, Wholesale, 13-19 lb, 1/4" Trim, Cent. US, cwt.	105.35	96.75	110.75
Slaughter Lambs, Ch. & Pr., 115-125 lb Sioux Falls, SD, cwt.	77.03	76.63	81.35
Carcass Lambs, Ch. & Pr., 1-4, 55-65 lb FOB Midwest, cwt.	160.00	172.00	177.00
<u>Crops,</u>			
<u>Cash Truck Prices for Date Shown</u>			
Wheat, No. 1, H.W. Omaha, bu.	2.75	2.81	2.97
Corn, No. 2, Yellow Omaha, bu.	1.89	1.74	1.75
Soybeans, No. 1, Yellow Omaha, bu.	5.82	4.07	4.26
Grain Sorghum, No. 2, Yellow Kansas City, cwt.	3.51	3.01	3.27
Oats, No. 2, Heavy Sioux City, IA, bu.	*	1.18	1.18
<u>Hay,</u>			
<u>First Day of Week Pile Prices</u>			
Alfalfa, Sm. Square, RFV 150 or better Platte Valley, ton.	90.00	85.00	82.50
Alfalfa, Lg. Round, Good Northeast Nebraska, ton.	60.00	*	*
Prairie, Sm. Square, Good Northeast Nebraska, ton.	70.00	*	*
* No market.			

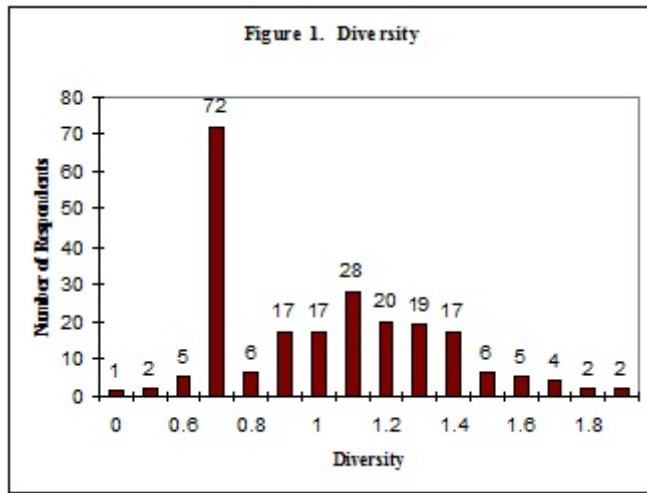
For centuries, farmers have used crop rotations to diversify crop production. During the last 30 years, most crop rotations have been eliminated as part of the shift toward enterprise specialization. Chemical inputs, improved hybrids and varieties and large field machinery have increased productivity and pushed the production of the major commodity crops with ever fewer farmers. The continued shift toward less diverse and industrialized farming is considered by many experts to be inevitable, as well as essential to support a growing world population on a diminishing agricultural land base (Urban, 1991).

Importantly, more diversity provides the benefits of breaking pest cycles through greater temporal and spatial variety; distributing labor demands more evenly throughout the year; improving soil quality; spreading financial risks; and using complementary farm resources such as crops and livestock to reduce off-farm expenses. Diversity may reduce net returns, however, due to lower production efficiency. Still, more diversity may be exactly what is needed to counter the effects of industrialization, which has a different set of benefits. We face tradeoffs.

The question of crop diversity in Eastern Nebraska was recently examined in a case study of Saunder's County. A survey was sent to 700, out of a county population of 1,176 farm households. A response was received from approximately 50% of the sample, with 201 usable responses. The results were representative of the Saunders County farm population and, based on physical characteristics of the area, broadly applicable to other areas of Eastern Nebraska. How diverse is this part of the state? Figure 1 shows about one third ($72/201 = 0.36$, or 36%) are using a corn-soybean rotation, with a diversity index of 0.70. Only about 1-in-100 of the farms have as many as 8-crops, which is illustrated by the diversity index of 1.84. About two thirds are described by a diversity index



of less than or equal to 1.0, suggesting an industrialization path. In fact, about 92% of the harvested acreage is in corn and soybeans.



The formula for the Shannon index is $H' = -\sum p_i \log p_i$ where p_i = the proportion of the farm area in acres belonging to the i th crop series.

What might we expect for the future? An intentions scale was developed with a minimum value of “2” meaning no intention to become more diverse: More than one third plan no changes in the next 5-years (Figure 2). A value of “6” or smaller generally indicates a small probability of adding diversity: adding all the responses with a “6” or smaller, more than three-fourths will not likely add diversity. Somewhat less than 10-in-100 indicate a high probability that said farm would be diversified further in the next 5-years. Although the Freedom to Farm Act loosened cropping regulations, few farmers in Saunders County are considering diversifying.

As we know, agricultural systems are ultimately shaped by the decisions of individual farmers. What drives these decisions? It is commonly believed that farmers will use crop rotations and diversify if it pays to do so. Yet, although profit is likely the primary motive, numerous studies have provided evidence that farmers pursue

multiple goals in addition to profit maximization and in accordance with norms in family living, leisure time activities and land stewardship (Patrick et al., 1983).

The results of this study support the notion that a positive normative environment for using rotations significantly relates to higher intentions to expand the use of crop rotations. In this Saunders County sample, farmers with the highest intentions had over double the average norm measure of farmers in the lowest intentions category. Family members, commodity groups, other farmers, seed suppliers and crop consultants were judged to have slightly negative opinions about planting more types of crops in rotation with overall means ranging 2.6 to 2.9 on a 1 to 5 unlikely to likely scale. Government agencies, such as the Natural Resources Conservation Service, the Farm Service Agency, county extension and non-family landlords, were considered to have slightly positive opinions about using more types of crops in rotation. As could be expected, family members were more important to cropping decisions than other people or organizations. Overall, farmers pay attention to both family and outside groups, as well as to profits, in the decision to diversify.

Allison (1992, p. 297) notes that, “It is incontrovertible that people are much more willing to sacrifice their own interests for those who are similar to them, who live near them, who share the same position, etc.” As a result, the perceived norms held by others may be a significant barrier to expanding the use of crop rotations. It also follows that if norms held by said groups favored diversification, farms would be likely to become more diversified rather than less so. Diversification, and the related phenomenon of industrialization, is driven by profits but also by norms held by others, in a complex interplay.

Allison, P.D. “The Cultural Evolution of Beneficent Norms.” *Social Forces*, 7,2 (1992): 279-301.
 Patrick, G., B. Blake and S. Whitaker. “Farmers Goals: Uni- or Multi-Dimensional?” *American Journal of Agricultural Economics*, 50, 3 (1983): 491-497.
 Urban, T.N. “Agricultural Industrialization: It’s Inevitable.” *Choices*, 6,4 (1991): 4-6.

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