

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Beef Cattle Reports

Animal Science Department

January 2000

Exporting Feedlot Manure to Off-Farm Users

Richard K. Koelsch

University of Nebraska-Lincoln, rkoelsch1@unl.edu

Keith Glewen

University of Nebraska-Lincoln, kglewen1@unl.edu

Tom Trehitt

Nebraska Department of Environmental Quality

Daniel T. Walters

University of Nebraska-Lincoln, dwalters1@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/animalscinbcr>



Part of the [Animal Sciences Commons](#)

Koelsch, Richard K.; Glewen, Keith; Trehitt, Tom; and Walters, Daniel T., "Exporting Feedlot Manure to Off-Farm Users" (2000). *Nebraska Beef Cattle Reports*. 376.

<https://digitalcommons.unl.edu/animalscinbcr/376>

This Article is brought to you for free and open access by the Animal Science Department at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Beef Cattle Reports by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Exporting Feedlot Manure to Off-Farm Users

Rick Koelsch
Keith Glewen
Tom Trehwitt
Dan Walters¹

A small group of Nebraska feedlots are successfully marketing manure to off-farm users by packaging agronomic and nuisance avoidance services with the manure. Users indicate that such services are important to their use of feedlot manure.

Summary

A survey of Nebraska feedlots suggests the majority of feedlots do not export manure to off-farm customers despite a common lack of land base (owned or managed by the feedlot) for using the nitrogen and phosphorus in manure. Only a small portion of the feedlots in Nebraska are actively marketing manure as a product with value by packaging agronomic and nuisance avoidance services with the manure in an effort to enhance its value. A separate survey of manure users suggests that the reason users purchase manure was for its crop nutrient value. However, many users were uncomfortable relying on the nutrients in manure and so supplemented the manure with commercial fertilizer. End users need to be better able to determine manure's nutrient value.

Introduction

The concentration of nutrients is a common environmental concern of beef confinement systems. It is common for Nebraska feedlots to import 2 to 5 times more nitrogen and phosphorus (primarily as purchased feed) than leave the farm as managed products. The imbalance represents an environmental risk.

Export of manure nutrients to off-farm users represents one potential practice for reducing the concentration of

nutrients. A survey was implemented to identify the practices of Nebraska feedlot managers to deliver manure to off-farm manure users. In addition, a survey instrument was completed by users of Mead Cattle Company manure. The objectives of this study were as follows:

1. Summarize current practices on Nebraska cattle feedlots relative to exporting of manure.
2. Review of the perceived benefits and costs by neighboring crop producers who accept manure.
3. Identify innovative strategies that encourage export of manure to off-farm users of manure.

Procedures

Two surveys were conducted. A mail survey was conducted of 210 feedlot owners using a mailing list from the Nebraska Cattlemen followed by a postcard reminder (one week later) and a copy of the survey and cover letter (two weeks later). A response rate of 117 of the original 210 (55%) surveys resulted. A second mail survey was prepared for users of manure from a single large Nebraska feedlot. The survey instrument was mailed to 100 individuals with similar follow-up reminders. Sixty completed surveys were returned.

Results

Feedlot Survey

The feedlots represented by the responses to this survey were commonly medium and larger feedlots (Table 1). On average, these operations maintained a one-time population of 5,650 animal units (AU...1,000 pounds of live weight) which were primarily finishing cattle. The average land base under the management of the operator was 1,323 acres. Feedlots less than 10,000 AU distributed manure over one-quarter or less of the available land under the farm's management. Those over 10,000 AU used most of their available land for manure application on an annual basis. Although feedlots over 10,000 AU had a smaller total land base for manure application, they tended to use an equal or larger land base for manure application per animal unit as the medium-sized farms (1,000 to 10,000 AU). In addition, the larger lots were more likely to export manure to off-farm uses. These two indicators would suggest that the manure from the largest feedlots is typically spread at lower nutrient application rates than manure from the medium-sized lots.

Typically, those lots under 1,000 AU were likely to have access to sufficient land for meeting both nitrogen and phosphorus needs. Those farms between 1,000 and 10,000 animal units had access

Table 1. Characteristics of feedlots involved in survey.

Size of Livestock Operation	<1,000 AU (11 farms)	1,000 - 4,999 AU (52 farms)	5,000 - 10,000 AU (27 farms)	>10,000 AU (15 farms)
Average Size				
- Animal Units	581	2,635	6,944	17,517
- Cropland (acres)	679	1,031	1,414	1,565
- AU/acre	0.9	2.6	4.9	11.2
Manure Distribution				
- % of Land Manured	24%	19%	26%	88%
- AU/acre Manured	3.6	13.4	19.2	12.7
Exporting Manure				
- % of total farms	9%	29%	41%	80%
- Do not export due to sufficient owned land. ^a	82%	60%	52%	20%

^aBased upon livestock producer's judgment.

to adequate land for using the nitrogen although they may not be using sufficient land for adequate nitrogen management. These farms also lack sufficient land for managing phosphorus. The largest feedlots were short on land for both nitrogen and phosphorus management and most of this group (80%) exported manure. As a rough rule of thumb, sufficient land for managing nitrogen and phosphorus will limit animal concentration to 2 to 4 AU per acre and 0.5 to 1 AU/acre, respectively.

Regarding the export of manure nutrients to off-farm customers, 72 (64%) of the respondents said they did not export manure nutrients off-farm. The most common reason for not exporting (89%) was the producer's perception that sufficient owned or managed land base for use of the manure was available. Those farms that exported manure have, on average, 30 AU per available acre. Those who chose not to export manure averaged 7 AU per acre.

Fifty producers provided information about their efforts to export feedlot manure to off-farm users. Crop producers (96%) were the primary users of exported manure. Approximately one-third of those surveyed were also exporting manure to other users including local homeowners, landscaping services and businesses marketing gardening products.

The most common financial arrangements were to give manure away at no charge (54%) to at least some users (Table 2). For those who charged for manure, a wide range of approaches for pricing manure were reported. The most common charge was per unit volume, weight, or load (30%). Many producers combined a charge per unit volume or weight with a charge for application area or distance traveled. Very few producers

Table 2. Most common financial arrangement for transfer of manure to primary user.

I pay users of manure to accept manure.	2%
I give manure away at no charge.	54%
I charge per unit volume, weight, or load.	30%
I charge per unit distance manure is hauled.	20%

Table 3. Most common services provided by feedlots exporting manure.

Agronomic Services		Nuisance Prevention Services	
No Services	40%	No services	51%
Manure sampling	38%	Day application to avoid nuisance	33%
Measure of application rate	38%	Maintain setback distances	19%
Rate adjustment for individual fields/crops	31%	Manure Processing	
		No Processing Services	70%
		Composting of manure	23%

charged for manure based upon the nutrient content of the product.

The survey attempted to identify those services that were packaged with the export of manure to off-farm customers (Table 3). However, there were a number of feedlots that offered services designed to enhance the value of manure. Many producers offered one or more agronomic services with manure sampling, measurement of manure application rate and adjustment in application rate for individual crop and field conditions being the most common. To minimize nuisance issues, daytime application to avoid noise nuisance and setback distance were the most commonly reported efforts. Composting of manure was reported by almost one-quarter of the feedlots exporting manure.

Most feedlots exporting manure (60%) have encountered some form of environmental or nuisance-related concern. The three most common issues encountered were odors (28%), road traffic (26%) and road maintenance (24%). Forty-one percent of feedlots indicated that no one has raised concerns with them. Experiences of most producers currently exporting manure to off-farm users has been sufficiently positive to warrant continuation of this practice. Eighty-three percent of feedlots currently exporting manure indicated they intend to continue or increase the marketing of manure. Of those feedlots not previously exporting manure, only 11% planned to begin this practice.

Many individuals shared their insights as to efforts that enhanced manure export including:

- It has become a valuable product for farmers. I can usually get a lot hauled at another's expense." Similar comment shared by nine feedlots.

- "Go the extra mile to establish good relationships with neighbors." The importance of community relations was shared by five feedlots.
- "Work very closely with the customer." Four feedlots stressed the importance of customer relations.
- "Provide as many services as possible to enhance the value of the manure being spread." Eight feedlots emphasized the importance of enhancing the value of manure with additional services.

A small number of the responding feedlots took an entrepreneurial approach in marketing manure as a product with value. The marketing package assembled by three of these feedlots is summarized in Table 4. Each of these three feedlots has assembled a package of agronomic services, nuisance-avoidance services, and financial charges for the manure. One feedlot relied on composting to limit nuisance concerns and reported road traffic as the only nuisance issue that had been encountered to date. Another feedlot encountered the whole range of nuisance and environmental concerns raised by neighbors and local government. In response to these community concerns, this lot has assembled a package of nuisance avoidance services including advance notification of neighbors and county government of spreading plans and same-day incorporation of manure to minimize exposure to odor and flies.

Those surveyed identified three critical information needs related to establishing or maintaining a manure marketing program. The three highest priority information needs included 1) avoidance of environmental/nuisance

(Continued on next page)

Table 4. Summary of three feedlots effort to actively market manure as a valued product to off-farm users.

	Feedlot #1	Feedlot #2	Feedlot #3
Animal Capacity	4,500 head finishing capacity	20,000 head finishing capacity	3,000 head finishing capacity
Crop Acres	340 acres	2000 acres	100 acres
Users of Feedlot Manure			
Customers	Crop producers	Crop producers and landscape services	Crop producers and landscaping services.
Financial Arrangement	Charge per unit volume or load	\$2/acre loading cost + \$1.2/ton hauling cost + \$5/acre application cost.	\$4.5/ton of compost + hauling and spreading cost
Who Transport Manure	Feedlot	Independent contractors	Feedlot
Services Provided			
Agronomic	Manure sampling, measured application rate, rate adjustment for individual field/crop, and customer report of nutrient application rate	Manure sampling, measured application rate, rate adjustment for individual field/crop, incorporation within 24 hours, and deep tillage for compaction.	Manure sampling, measured application rate, rate adjustment for individual field/crop, and soil sampling.
Nuisance Prevention and Manure Processing	Maintain setbacks	Advance notification of neighbors and local government, and same day incorporation.	Composting
Environmental/Nuisance Issues			
Concerns raised	None	Odors, flies, noise, surface and groundwater quality, and road traffic and maintenance.	Road traffic
Source of concerns	No one	Homeowners, other farms, & government	Homeowners
Lessons Learned and Advice for Others			
	-Manure applied to clay hills noticeably increases yields and helps control runoff. -Important to get manure tilled into soil soon as possible in spring when hauled in winter -Someone that has problems getting rid of manure should haul to neighbors for free 1 year to determine benefit. Following year you may have good demand.	-Provide as many services as possible to enhance the value of manure being spread. -Make sure transporting equipment is in tip-top shape. -Manure spills are very detrimental to public opinion. -If you claim fertilizers nutrients in the manure - make sure they are in the manure.	-This is a composting operation that sells to local crop producers. After composting, we have had no negative reaction as to smell, flies, and pollution possibilities.

problems; 2) estimating agronomically based manure application rates; and 3) pricing of manure for competitive and profitable marketing of the manure resource.

Feedlot Manure User Survey

A more in-depth review of the issues encountered by Mead Cattle Company relative to manure marketing (Feedlot #2, Table 4) was also conducted. For this livestock operation, less than 15% of the nitrogen and 10% of the phosphorus in the manure could be used within the cropping program on land owned by this business. The feedlot has implemented a rather ambitious program to market slurry manure from confinement barns that is

trucked by tanker trailers to fields to be surface applied and deep chiseled into the soil. The majority of the fields receiving manure application (70%) were an average distance of 10 miles or less and (7%) were a distance of 15 miles or greater. The feedlot had encountered several obstacles with this effort.

In a given year, respondents indicated that they applied Mead Cattle manure on an average of 103 acres. Growers noted that the preferred crop to be grown following application was corn. The survey results showed that 37% of the users purchased manure because they believed that it improved yield performance. Other common reasons for purchasing Mead Cattle manure included 1) organic matter source, 2) deep tillage

when incorporated, and 3) lower cost nutrient source.

Manure was applied by Mead Cattle at a constant rate that is typically sufficient to supply the nitrogen needs of irrigated corn production. Forty-five percent of the users of Mead Cattle manure indicated that nitrogen was the primary nutrient of interest while 35% indicated that phosphorus was the primary nutrient. An alarming 45% of the growers preferred annually to apply additional nitrogen as an insurance against late-season deficiencies while an additional 22% said they did occasionally. However, only 10% preferred to apply additional phosphorus. The unwillingness of crop producers to rely completely on manure nutrient was

partially explained by some of their reservations with manure. Lack of uniform manure coverage (58%) and variation in nutrient analysis from load to load (63%) were commonly expressed perceptions of these users. When asked "What additional information or services are needed?", these customers suggested a need for manure analysis (65%), an estimate of manure nutrient availability (63%) and soil sampling (38%).

Nuisance issues were also of concern to many users. Concerning potential complaints from neighbors, 35% expressed a high level of concern. However, the recent level of neighbor complaints has been relatively low. Users of Mead Cattle manure (65%) indicated they did not receive any complaints from neighbors relative to spreading manure. Twenty-three percent indicated receiving one complaint and 7% indicated multiple complaints. These complaints was related to odors (38%), noise and traffic (17%) and flies (10%).

When asked what services might be provided by Mead Cattle Company to minimize neighbor nuisance concerns, 60% of the respondents indicated same-day incorporation of manure to limit odor and fly nuisances would be very effective. Twenty percent indicated they felt that notification of neighbors in advance of application would also be effective.

Conclusions

1. The majority of feedlots in the statewide survey do not export manure to off-farm customers. However, most feedlots over 1,000 AU lacked the land base to use the nitrogen and phosphorus in manure.
2. Approximately half of the feedlots in the statewide survey that export manure are charging for the manure or the services associated with its application. A wide

range of pricing structures has been used to date.

3. Only a few feedlots in Nebraska are actively marketing manure as a product with value. These individuals are packaging agronomic and nuisance avoidance services with the manure in an effort to enhance its value.
4. The majority of feedlot manure users indicated that the reason for purchasing manure was for its crop nutrient value. However, many users (up to 2/3 of users) felt uncomfortable relying on manure and so supplemented the manure with commercial fertilizer.

¹Rick Koelsch, assistant professor, Biological Systems Engineering, Lincoln; Keith Glewen, Cooperative Extension educator, Saunders County, Mead; Tom Trewhitt, Nebraska Department of Environmental Quality, Lincoln; Dan Walters, associate professor, Agronomy, Lincoln.