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**Report for the 2020 Poultry
Litter Nutrient Distribution
Producer Survey**

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APEC Research Reports

**APPLIED
ECONOMICS
& STATISTICS**

Report for the 2020 Poultry Litter Nutrient Distribution Producer Survey

The 2020 Poultry Litter Nutrient Distribution Producer Survey was distributed by the U.S. Department of Agriculture National Agricultural Statistics Service (USDA NASS) in Spring 2020.

This survey is part of a USDA-funded Critical Agricultural Research and Extension study titled, "Innovative Manure Management Strategies to Promote Phosphorus Balance and Sustain Agriculture on the Delmarva Peninsula."

The goals of this study are to:

- 1) Better utilize poultry litter nutrients as a fertilizer for crop production; and
- 2) Improve the distribution of poultry litter across the Delmarva and throughout grain producing regions of Delaware, Maryland, Pennsylvania, and Virginia.

Results from this study will benefit farmers and protect natural resources.

To learn more about poultry litter or poultry litter co-products, please visit the following link to read Virginia Cooperative Extension publication SPES-187NP:

https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/spes/spes-187/SPES-187.pdf

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2020 Poultry Litter Nutrient Distribution Producer Survey

Preliminary Report

Note: Additional data analysis is underway and will be published in a forthcoming paper.

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Summary and Key Points

- This report summarizes the preliminary findings from the 2020 Poultry Litter Nutrient Distribution Producer Survey. The purpose of this survey is to identify factors that influence the use of poultry litter and litter coproducts on cropland on the Delmarva Peninsula and surrounding areas.
- 19% of respondents currently use poultry litter or have used it in the past, and about 50% of respondents have considered using poultry litter although they do not use it currently.
- 30% of respondents stated interest in using poultry litter as a nutrient source for cropland if they had the opportunity to use it.
- Key factors that likely influence interest in using poultry litter and current use of poultry litter include 1) litter availability at times when fertilizer is needed, 2) concerns about environmental regulations and neighbor/community complaints, 3) capacity to store poultry litter, 4) access to necessary equipment to apply poultry litter, and 5) compatibility with current farming practices.

Introduction

Poultry litter is abundant on the Delmarva Peninsula (encompassing parts of Delaware, Maryland, and Virginia) due to the long history of intensive broiler production in this region. The historic application of poultry litter on Delmarva cropland has led to phosphorus (P) surpluses in some counties on the peninsula, particularly in southern Delaware and Maryland's lower Eastern Shore. Application of additional P to soils with high soil P levels creates negative environmental outcomes, including nutrient runoff in local watersheds, contributing to poor water quality in lakes, rivers, streams, and estuaries like the Chesapeake Bay. While soil P is high in some areas, cropland in other areas may have low soil P levels, necessitating supplemental P application to support crop production. Counties with P deficits are mainly located in northern Delaware, the upper Eastern Shore of Maryland, and Virginia. Increasing application of poultry litter on soils with low soil P levels would provide dual benefits to the region by supporting agricultural productivity and improving water quality. However, Delmarva farmers face numerous regulatory, supply, and logistical obstacles when it comes to using poultry litter. The purpose of this study is to identify factors that influence the use of poultry litter and litter co-products (e.g., poultry litter ash). We partnered with the National Agricultural Statistics Services (NASS) to implement a regional survey of crop farmers to determine their current use of poultry litter and to identify factors that influence use of and interest in using poultry litter as a fertilizer for cropland. By examining the consumer side of the poultry litter market, we can better understand the barriers limiting more efficient distribution and use of poultry litter in the Delmarva region.

Data and Results

We partnered with the National Agricultural Statistics Services (NASS) to survey crop producers on Delmarva and in parts of Pennsylvania. A mixed-mode survey methodology was used that included collecting data via paper surveys distributed through the mail and via phone calls by survey enumerators. A total of 1,000 surveys were distributed between April and June of 2020. In total, 462 respondents completed at least a portion of the survey; however, many respondents skipped key questions. 438 respondents completed at least 75% of the survey.

Demographic characteristics of respondents

Most respondents were male (93%), and the average age and years of experience were 63 and 38 years, respectively. Table 1 indicates that almost 50% of respondents said they earned over 75% of their income through farming.

Table 1: Income from farming (n=438)

Income	Freq.	Percent
Less than 25%	73	16.67
25%-50%	62	14.15
51%-75%	85	19.41
76%-100%	218	49.77

Table 2 reports the highest level of education earned. About 38% of our respondents reported earning a degree or certification after high school.

Table 2: Highest level of education (n=441)

Education	Freq	Percent
Less than 12 years	23	5.22
High school or GED	193	43.76
Some College	58	13.15
Assoc. Degree and/or Technical Training	33	7.48
B.S. Degree	103	23.36
Graduate Degree	31	7.03

Operation Locations and Characteristics

Respondents operated cropland in seven states, and 99% of responses were from Delaware (n=28; 6%), Maryland (n=150; 33%), Pennsylvania (n=92; 20%), and Virginia (n=183; 40%). The counties in which the operations are located are presented in appendix A.

Respondents owned approximately 309 cropped acres (figure 1) and leased 577 cropped acres (figure 2), on average. In comparison to state averages for Delaware, Maryland, and Virginia, the operations sampled are larger with average acreages for farm sizes being 228 (DE), 160 (MD), and 180 (VA) acres (USDA NASS 2017). Farmers were also asked about their crop rotations: 32% of participants had a crop rotation of full season soybeans and corn, and 25% followed a rotation of corn, wheat and double crop soybeans. Nearly half of operations had their soils sampled yearly. Soil sampling every two or three years was practiced by 21% and 24% of respondents, respectively. Of those who did have their soils tested, about 70% reported that at least half of their cropped farm acreage is in the low, medium, or optimal soil test phosphorus ranges for which poultry litter application would be permissible (see figure 3).

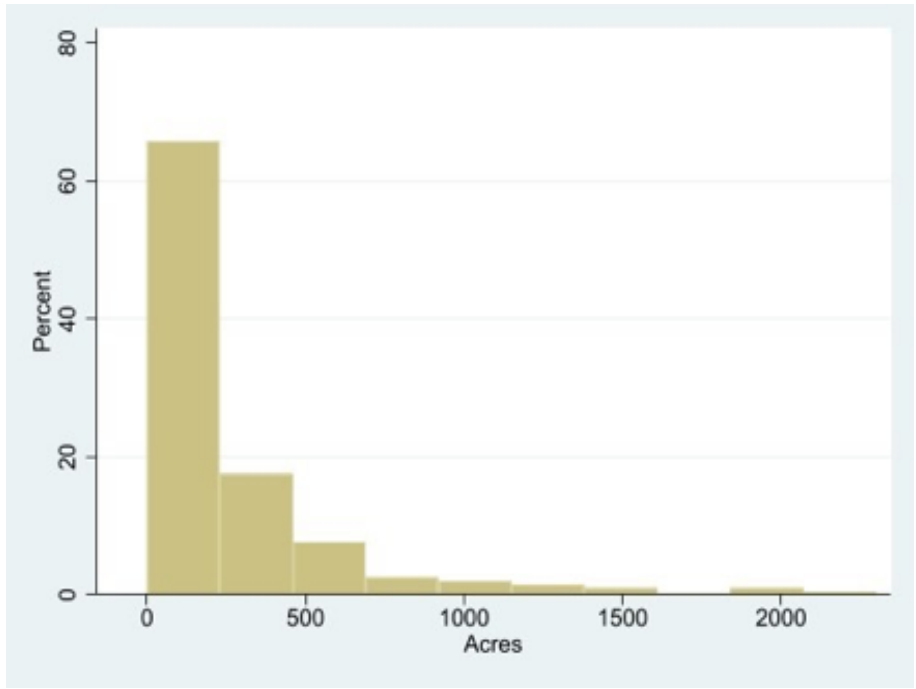


Figure 1. Owned Cropped Acres

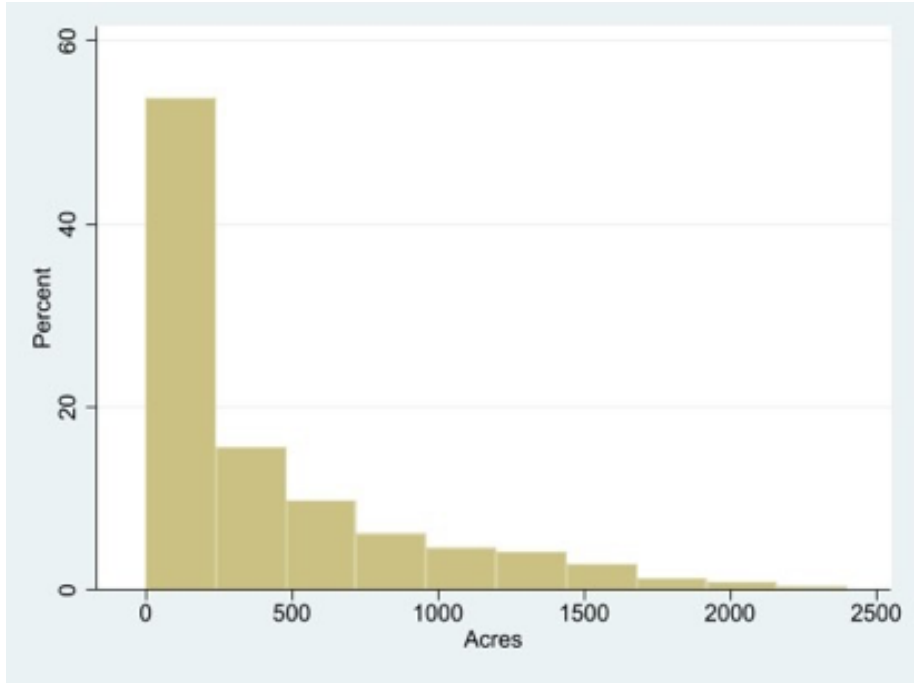


Figure 2. Leased Cropped Acres

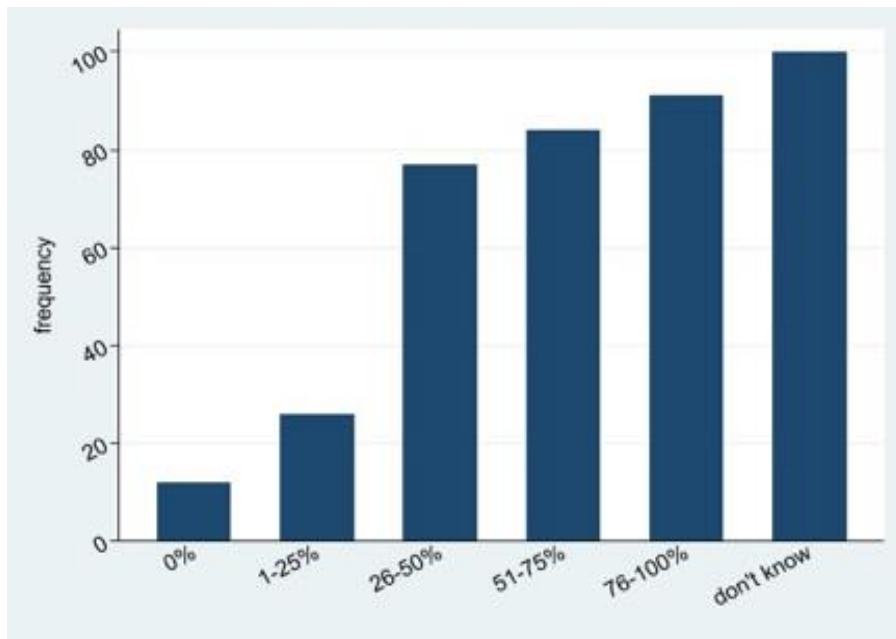


Figure 3. Percent of Cropped Acres in the Optimum Soil Phosphorus Range

Nutrient Management

Crop operations are required to have nutrient management plans if they apply poultry litter. We asked if operators received nutrient management recommendations from five different groups including i) county conservation district, ii) fertilizer dealer, iii) university Cooperative Extension, iv) private consulting company, and v) friends and family. The most frequently reported sources of nutrient management recommendations were private consulting companies (35%) and fertilizer dealers (29%).

Sources of primary nutrients are presented in figure 4. Over 60% of operations reported using inorganic nitrogen as their primary source of nutrients. About 45% of respondents reported using custom applicators for at least some of their nutrient applications.

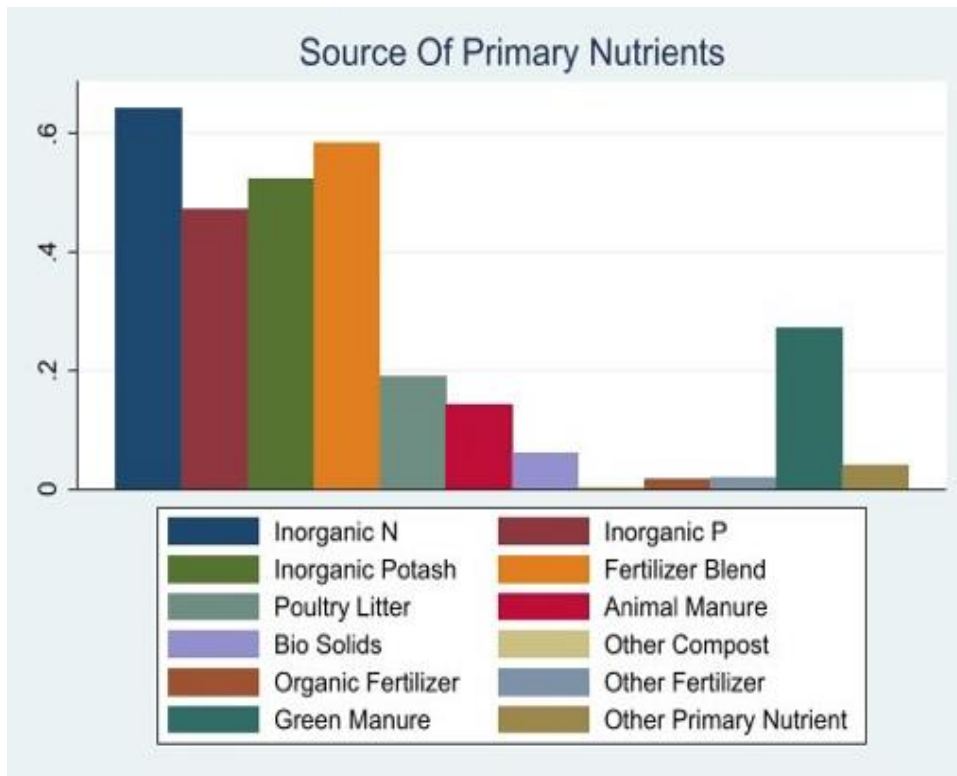


Figure 4. Source of primary nutrients

Interest in Poultry Litter and Litter Co-products

We asked a series of questions about poultry litter and poultry litter co-products to investigate use and management. Around 19% of participants reported using poultry litter and, of those individuals, they apply an average of 2,525 tons of litter to their cropland each year. This would be approximately 2.6 tons of litter per acre for the average operation. Maryland has 32 participants who would be interested in using poultry litter and Virginia has 61 interested operations. No number is provided for Delaware.

We then asked the respondents to answer 14 statements about poultry litter in which they could answer, ‘Agree’, ‘Disagree’, or ‘I don’t know.’ We asked the same 14 statements regarding poultry litter co-products.

- 42.7% of participants said that poultry litter was available in their area in general while only 37.2% of participants agreed that poultry litter was available in their area when they needed it. Consequently, even if an operation wanted to utilize litter, they would not be able to because 1) they couldn’t find it close to them and/or 2) when they typically apply their nutrients poultry litter isn’t available to them.
- Just over 50% of respondents have considered using poultry litter as a nutrient source, and about the same number of participants also expressed concerns about environmental

regulations and complaints from surrounding communities and neighbors regarding poultry litter.

- 42.6% of respondents were not interested in learning more about poultry litter as a nutrient source. This could be, in part, because of concerns about environmental regulations and neighbors. Additionally, 51% of respondents said that they did not have proper equipment to apply litter creating another barrier utilizing litter. Additionally, nearly 60% of respondents indicated that they did not know how to properly store poultry litter, or they were unsure about storage. See Table 3 for more information regarding poultry litter statements.
- Respondents indicated even greater levels of uncertainty about the use and management of poultry litter co-products relative to poultry litter (see Table 4).

Farmers were also asked to indicate how much they were willing to pay for nitrogen (N) and phosphorus (P) from poultry litter. They were told to assume that N and P from a commercial fertilizer would cost \$0.50 per pound. Respondents were then asked if they would be willing to pay \$0.35, \$0.50, and \$0.65 per pound of N or P if it came from applying poultry litter.

- Sixty (14% of sample) participants were willing to pay a maximum of \$0.50 per pound for nitrogen from litter while only 17 participants were willing to pay \$0.65 per pound of N from litter. Eighty-five were willing to pay only \$0.35 per pound of N from poultry litter.
- Results for phosphorus were similar. 85 farmers were willing to pay \$0.35 per pound of P from poultry litter, 56 participants would pay \$0.50 per P for litter and 19 would be willing to pay \$0.65 per pound of P from applying poultry litter. See figure 5 for comparisons of all options.

There were a high percentage of participants that answered “I don’t know” to these questions which could stem from the unknown that surrounds poultry litter application. As mentioned above, over 50% of respondents did not have proper equipment to apply litter which could prevent them from buying poultry litter even when it’s the cheaper option. According to [Fastline](#), an online platform to buy and sell farm equipment, litter spreaders can range in price from as low as \$29,000 to over \$70,000. Litter application also requires soil P levels to meet specific PSI and FIV requirements. External factors such as these could explain the high rate of participants answering “No” or “I don’t know” to purchasing poultry litter even when the price of N and P from litter are below commercial fertilizer prices.

Table 3: Poultry litter statements

Statement	Agree (%)	Disagree (%)	Don't Know (%)
I am familiar with using poultry litter as a nutrient source	69.36	13.54	17.10
Poultry litter is available in my area in general	42.72	35.08	22.20
Poultry litter is available in my area during times when I need fertilizer	37.20	36.47	26.33
Soil phosphorus levels are on my operation allow the use of poultry litter	55.10	7.04	37.86
The cost of poultry litter is affordable compared to other nutrient sources	30.77	18.99	50.24
I am concerned about environment regulations related to poultry litter	50.12	23.86	26.02
I am concerned about neighbor and community complaints about using poultry litter	48.43	28.43	23.13
Applying poultry litter is compatible with my current tillage practices	53.03	12.59	34.38
I have the necessary equipment to apply poultry litter	30.00	50.98	19.02
I know how to properly store poultry litter	40.93	28.19	30.88
I have considered using poultry litter as a nutrient source	52.18	32.77	15.05
I have used poultry litter as a nutrient source in the past	37.53	16.88	45.59
I am interested in learning more about the use of poultry litter as a nutrient source	40.89	42.61	16.50
Are there other factors that impact the use of poultry litter on this operation?	35.66	64.34	n/a

Table 4: Poultry litter co-products statements

Statement	Agree (%)	Disagree (%)	Don't Know (%)
I am familiar with using poultry litter co-products as a nutrient source	14.50	45.00	40.50
Poultry litter co-products are available in my area in general	7.02	30.83	62.16
Poultry litter co-products are available in my area during times when I need fertilizer	5.79	30.23	63.98
Soil phosphorus levels are on my operation allow the use of poultry litter co-products	33.67	6.78	59.55
The cost of poultry litter co-products is affordable compared to other nutrient sources	7.54	10.55	81.91
I am concerned about environment regulations related to poultry litter co-products	36.59	18.80	44.61
I am concerned about neighbor and community complaints about using poultry litter co-products	35.50	25.50	39.00
Applying poultry litter co-products is compatible with my current tillage practices	28.50	11.25	60.25
I have the necessary equipment to apply poultry litter co-products	15.91	35.35	48.74
I know how to properly store poultry litter co-products	14.61	26.20	59.19
I have considered using poultry litter co-products as a nutrient source	14.11	44.84	41.06
I have used poultry litter co-products as a nutrient source in the past	5.51	63.16	31.33
I am interested in learning more about the use of poultry litter co-products as a nutrient source	39.55	29.97	30.48

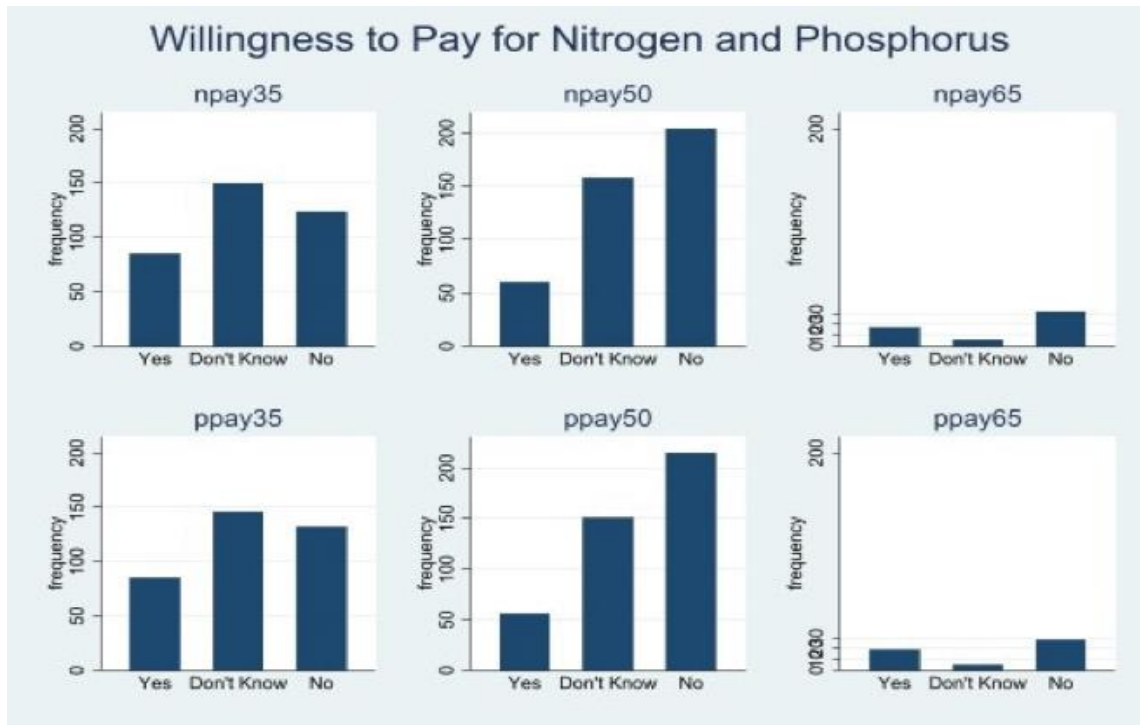


Figure 5. Willingness to pay per pound for poultry litter.

Conclusion

The preliminary results from the 2020 Poultry Litter Nutrient Distribution Producer Survey illustrate the barriers and uncertainties crop farmers face with regards to poultry litter. Less than 20% of participants have previously used poultry litter and over 40% of respondents were not interested in learning more about using poultry litter. A major point of contention of poultry litter surrounds the environmental regulations, community concern, litter availability, storage requirements, and not having the proper equipment for application. Data analysis is ongoing, and we are currently investigating the relative significance of barriers depending on the location of the respondent. These results will inform program and policy suggestions to help improve distribution and use of poultry litter on Delmarva.

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