

Poultry Litter Use and Transport Survey in Hardy and Pendleton Counties: A Summary Report*

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INTRODUCTION

Poultry litter contains a mixture of chicken manure, feathers, spilled food, and bedding material. Upon clean-out, farmers can apply poultry litter to pasture, hay and crop lands in order to recycle essential plant nutrients like nitrogen, phosphorous and potassium. Given increasing costs for fuel and commercial fertilizer, poultry litter can potentially lower fertilizer costs. However, nutrient excesses can result in areas where poultry production has expanded faster than the willingness and/or ability of agricultural land owners to utilize litter nutrients.

Litter transport is a commonly utilized strategy to address nutrient excesses. State governments in Maryland, Virginia, and West Virginia have utilized transport subsidy programs. However, little hard information is currently available on the transport and fate of litter other than the tonnages involved in subsidy programs. In addition, uncertainty exists as to the willingness of landowners to accept manures, including litter (Gollehon *et al.*, 2001). Pelletier *et al* (2001) interviewed potential poultry litter users and identified several obstacles for poultry litter acceptance, but did not estimate willingness to pay.

The purposes of this survey were: (1) to document the use and movement of litter within the two largest poultry production counties (Hardy and Pendleton) in West Virginia; and (2) to examine the interest in and willingness-to-pay for litter from farmers who have never used litter previously. This research was coordinated with similar surveys in Maryland and Virginia in order to develop a regional information base on litter use and transport.

METHODS

A mail survey was developed during late 2004 and early 2005. This survey was reviewed by researchers at University of Maryland and Virginia Tech University. Previous surveys (Norwood, 2005; Basden, Ritz, and Collins, 2000) also were used to assist survey development. Survey questions were targeted towards three groups of farmers: those who had never used poultry litter, those who have used litter in the past, and poultry growers.

Surveys were sent to all farmers in Hardy and Pendleton Counties. To improve response rates, cover letters were signed by extension agents in each county. The survey was sent out initially in February 2005 with a remainder postcard follow-up in March. A final copy of the survey was sent to non-respondents in April.

The population of farmers¹ was 999 (426 in Hardy and 573 in Pendleton). Excluding 44 surveys returned for incorrect mailing addresses or because the individual was no longer farming, a very good response rate of 58% was achieved – 61% in Hardy County and 58% in Pendleton County. The number of respondents by county and Farmer Group are shown in Table 1.

All computations of survey responses were made using Excel spreadsheets. Responses were analyzed and summarized according to the three farmer groups: (1) Farmer Group #1: Non-poultry growers who have never used poultry litter, (2) Farmer Group #2: Non-poultry growers who have used poultry litter, and (3) Farmer Group #3: Poultry growers.

Table 1. Farmer respondents by County and Group

County	Non-Poultry Growers		Poultry Growers	Totals
	No Litter Use	Litter Users		
	Farmer Group #1	Farmer Group #2	Farmer Group #3	
Hardy	46	115	85	246
Pendleton	94	156	55	305
Total	140	271	140	551

¹ The definition who qualifies to be a farmer came from the USDA National Agricultural Statistics Service.

RESULTS

Farmer Group #1: Non-poultry growers who have never used poultry litter

Most non-poultry grower farmers were not in group #1, only about 1/3 of all non-poultry grower respondents (34%) had never used litter. Group #1 farmers owned and/or rented fewer acres than those farmers who have used litter previously. Average farm size was about 100 acres smaller in both counties.

Group #1 respondents were asked about what would increase their interest in using poultry litter. The results show no single dominant reason that would increase interest (Figure 1). The most common response (about 40%) was an expression of no interest at all (“none of the reasons given”). When a reason was given, the highest percentages were: “assurance of litter free of weeds” (34%), “lower prices for litter” (32%), “easy access to a litter supply” (32%) and “availability of custom applications for litter” (23%).

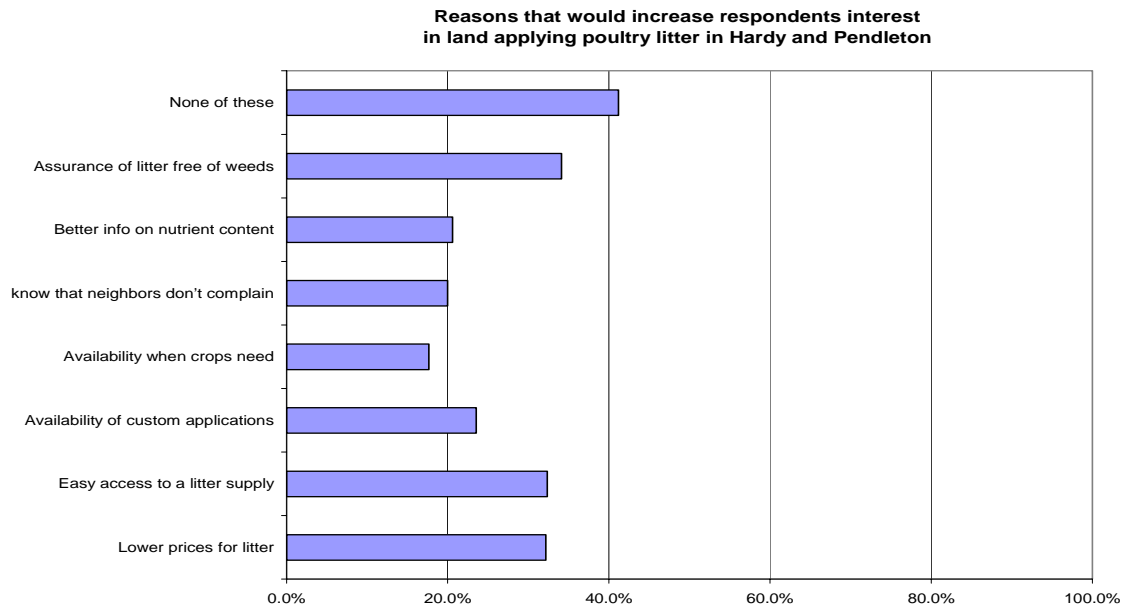


Figure 1. Reasons why group #1 farmers would be interested in land applying litter.

We attempted to understand farmer perceptions about using poultry litter as a substitute for commercial fertilizers. Group #1 farmers were asked about their maximum willingness-to-pay (WTP) for litter² and their certainty about this response on a scale of one to ten. Most respondents (50%) were very uncertain (3 and below) with only 28% being very certain (8 and above). Average WTP over all group #1 responses was very high in Pendleton County (\$15.5 per ton), but about at average market prices in Hardy

² In the survey, litter was described as having nutrient content per ton of: 55 pounds of nitrogen (TKN), 50 pounds of phosphorus (P₂O₅), and 60 pounds of potassium (K₂O).

County (\$6.5 per ton). For only those farmers who were very certain about their response, average WTP was much lower in both counties (\$6.7 per ton in Pendleton County and \$2.4 per ton in Hardy County). For those that had positive WTP, the average portion of land that they would consider applying litter also was greater in Pendleton (60%) than in Hardy (33%) County.

Farmers who responded that they would pay nothing for poultry litter were asked why. Environmental rather than financial concerns about litter use dominated their reasoning. The main reason given was “odor” (46%). The “other” response was selected by 32% of respondents. These reasons consisted mainly of concerns over weeds or spreading litter on steep slopes. Lesser reasons include “applying litter takes too much time” (12%) and “need to be paid to have litter applied” (6%).

Farmer Group #2: Non-poultry growers who have used poultry litter

Most group #2 farmers have used litter recently. The median year of last use in both counties was 2004. The average amount of litter obtained during the most recent acquisition was higher in Pendleton (91 tons) than in Hardy (66 tons) County. Reported quantities acquired ranged from 0.5 to 3000 tons.

When group #2 respondents were asked how they obtained litter, the vast majority (90%) said that they acquired litter from another farmer in the same county. About 3.5% of respondents had obtained litter from other farmer outside the county, while only 1.5% of respondents obtained litter through a broker. In Hardy County, small amounts of litter came from Pendleton County (3.6%), Rockingham County, VA (2.8%), Grant County, WV (1.8%) and Henry County, VA (1%). In Pendleton County, minor amounts came from Hardy and Grant counties (1.4% each).

On average, group #2 farmers applied litter to about 50 acres. Computed application rates were slightly higher in Pendleton County (1.7 tons per acre) than Hardy County (1.4 tons per acre). Most litter was applied either on hay (79%) or pasture (58%) land. Only 16% of group #2 farmers indicated litter application on crop land.

The survey revealed that compensation paid for litter was mostly by cash followed by services (Figure 2). It was interesting to note that nearly 1/3 of respondents reported paying no compensation for the litter. Cash prices for litter on a per ton basis ranged from under \$1 to \$30³. Average price per ton for litter paid (weighted by tons purchased) among group #2 farmers was higher in Hardy (\$6.7) than Pendleton (\$4.3).

Farmer Group #3: Poultry growers

Among survey respondents, poultry growers were more common in Hardy County (34%) than in Pendleton County (18%). Most poultry growers in Hardy County raised chickens (93%). While in Pendleton County, chicken (53%) and turkey (47%)

³ Prices were reported both on a per ton and a per truckload basis. Truck load prices were assessed as either 15 or 20 tons depending upon price and amount purchased.

production was more evenly distributed among respondents. In the chicken category, broilers were most commonly grown (42%) followed by broiler breeders (11%), layers (10%) and pullets (8%).

Poultry growers in Hardy County had a much larger average farm size than non-poultry growers (291 vs. 183 acres). However, in Pendleton County, there was little farm size difference between growers and non-growers (183 vs. 181 acres). There was not much difference in average farm size between chicken and turkey growers in either county.

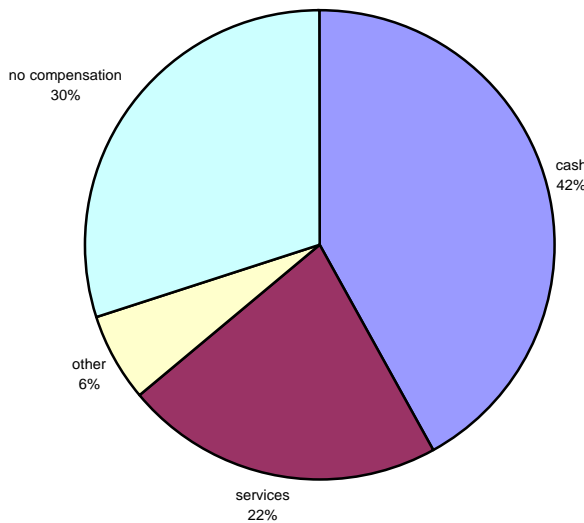


Figure 2. Compensation paid by group #2 respondents.

Respondents were asked questions related to their recent production level in terms of number of houses, their size, and how many flocks were produced annually. Survey respondents owned a total of 272 chicken and 90 turkey houses. Averages from survey responses are presented in Table 2.

Table 2. Average 2004 production by Group #3 respondents.

	Hardy	Pendleton
Chicken Growers		
Number of chicken houses	4	3
Number of birds per house	23,124	22,707
Number of flocks per house in 2004	4	5
Turkey Growers		
Number of houses	3	3
Square footage per house	58,967	30,066
Number of flocks in 2004	4	5

When asked whether they perform crust out after each flock, 75% of the Pendleton County respondents indicated “yes” to this question. However, in Hardy County, less than half (41%) of respondents performed crust out after each flock. For chicken growers, the most common clean out timing was either once per year or after every cycle. Each was performed by about 40% of chicken growers. Over 40% of turkey growers cleaned out once per year followed by 25% once every two years and 15% less often than every two years.

In Hardy County, litter use by group #3 farmers was evenly split among each of the following three categories: all land applied on their farm, all transferred off-farm, or a combination of land application and transfer. In Pendleton, 52% of group #3 used a combination approach while only 12% land applied all litter on their own farm, and the remaining 36% transferred all their litter off-farm.

For broiler chickens, about 75 acres of agricultural land was estimated to be needed to adequately receive all litter generated from one house annually⁴. Over half of broiler chicken growers (57%) did not own or rent sufficient acreage to land apply litter on their own farms. Most of growers with insufficient acreage transferred most of their litter off-farm. However, a minority (15%) applied all their litter on-farm even though the farmer owned or rented insufficient acreage for litter application.

Group #3 respondents were asked about the soil and litter management activities that they carried out prior to and during the last poultry litter application. The most common soil and litter management activity reported by about 80% of group #3 respondents was: “followed recommended application rates in the nutrient management plan” (Figure 3). Differences between counties were found for covered storage of litter prior to land application and calibration of litter spreader. These activities were over 20% higher in Pendleton County than in Hardy County (Figure 3). Custom application of litter was the least utilized activity in both the counties.

⁴ The 75 acres is derived from an estimate of 150 tons of litter generated annually per broiler house divided by a two ton per acre application rate to meet plant nitrogen needs.

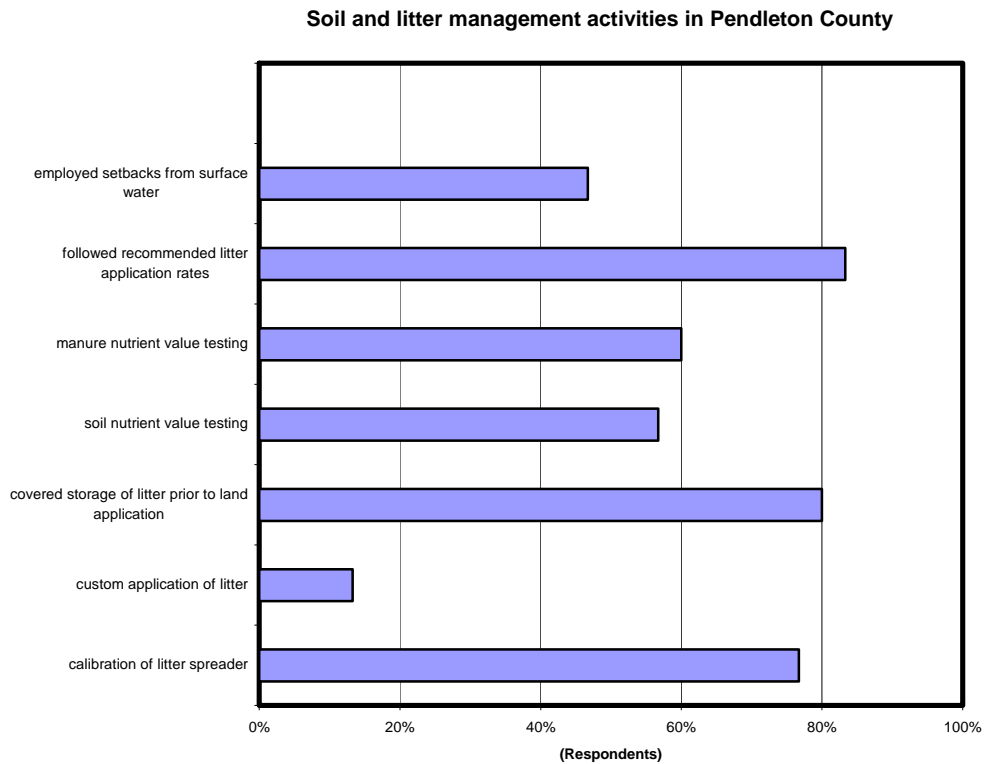
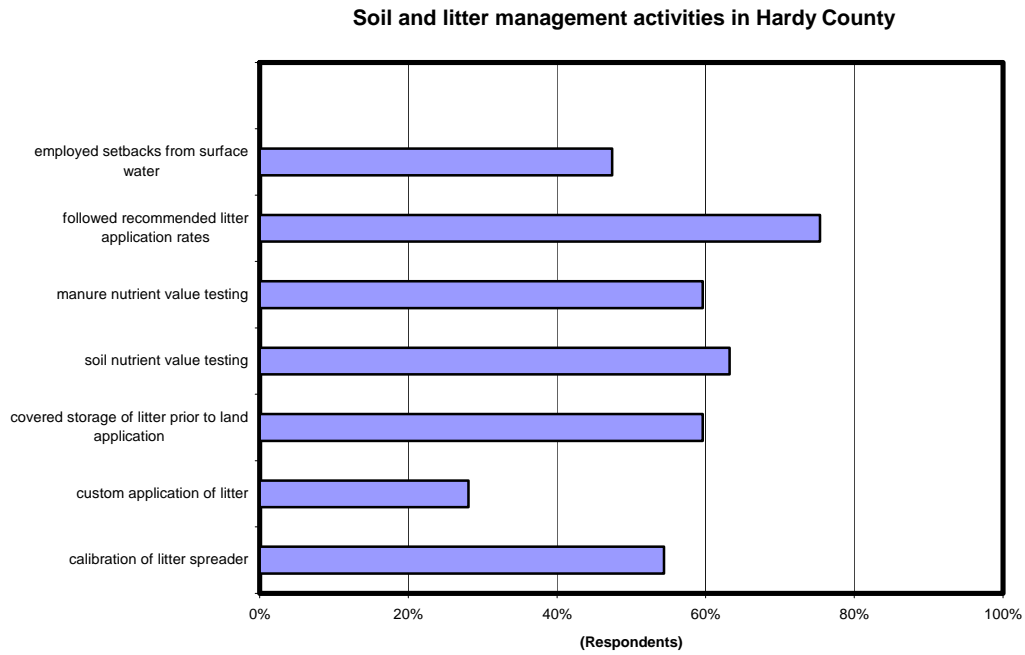


Figure 3. Soil and litter management activities for litter application by group #3 farmers in Hardy and Pendleton Counties.

For litter transfers, respondents were asked to describe their most recent transfer. The top three methods of litter transfer were: transfer to another farmer in the same county (39%); transfer to a neighbor, family or friend within the same county (34%); and transfer to another farmer outside the same county (22%). Litter transfers rarely occurred through a broker (only 4%).

Most growers reported receiving no compensation for litter (Figure 4). Neighbors, family or friends were often given litter. Cash compensation was received much more often in Pendleton County (30%) than in Hardy County (13%). Compensation received through services was greater in Hardy (17%) than in Pendleton (11%). When cash was received, median prices per ton were slightly higher in Hardy County (\$4) than in Pendleton County (\$3 per ton)⁵.

Finally, respondents were asked to indicate the county and state where the litter was transferred. Most respondents (87%) knew the location of their litter transfer. Eighty percent of the litter transfers by Hardy County growers remained in the county. Other counties receiving litter from Hardy County included Hampshire (10%) and Grant (4%) along with Mineral, Frederick (VA) and Boone Counties (2% each). In Pendleton, 64% of the transfers remained in the county. At 18%, Highland County, VA was the main out-of-county transfer point. Grant (8%), Hardy (5%), and Randolph (5%) also received litter from Pendleton County.

CONCLUSIONS

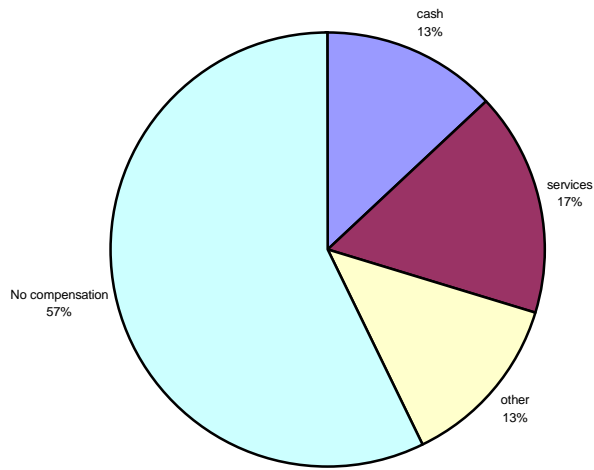
The majority of farmers in Hardy and Pendleton Counties have used litter recently as many poultry growers transfer litter off-farm. Over both counties, 63% of poultry growers reported transferring some or all their litter off-farm. Insufficient agricultural land resources are one reason why many growers transfer litter. Among broiler chicken growers, over half of the respondents did not have a land base sufficient to land apply all their litter. Not surprisingly, most litter stays within the county where it was generated and rarely was transferred outside of the Potomac Headwaters region⁶.

Litter is commonly either given away or traded for services rather than exchanged for cash. Among both counties, Pendleton was found to have a more active, cash compensation litter market. In addition, willingness to pay (WTP) for broiler litter among non-users in Pendleton County who were very certain about their WTP was found to be higher than current market prices for litter. The greater WTP in Pendleton County reflects both lower litter prices in this county due to an abundance of turkey litter as well as an opportunity for future growth in broiler litter use. Conversely, WTP in Hardy County was lower current market price, reflecting a low potential for growth in litter use.

⁵ Median prices are reported to avoid the excess influence of high or low reported prices given the few observations in each county (only seven in Hardy and 12 in Pendleton).

⁶ This region includes Grant, Hardy, Hampshire, Mineral, and Pendleton Counties in West Virginia.

Hardy County



Pendleton County

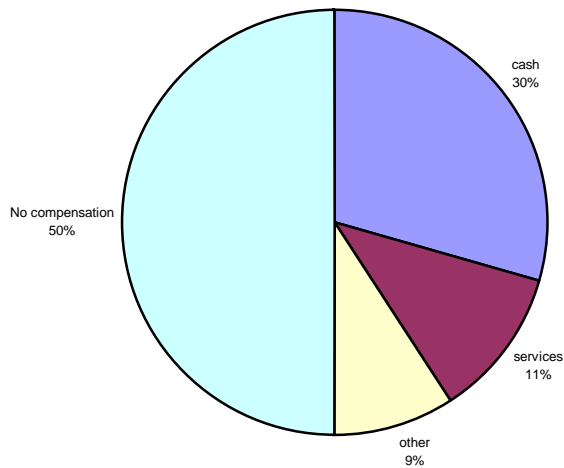


Figure 4. Litter transfer compensation received by group #3 respondents.

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