# POULTRY LITTER PURCHASES AND USE BY RICE GROWERS

By

Carmen Tharp
Wayne P. Miller

SP1493 September 1993

Tharp is an Extension Associate. Miller is an Extension Economist in Economic and Community Development. This study was funded in part through a subcontract with Winrock International by a grant from the Southern Region Sustainable Agriculture Research and Education Program.

# Poultry Litter Purchases and Use by Rice Growers

As part of a project to describe the market structure for poultry litter in Arkansas, we obtained information from rice growers on the use of poultry litter on row crops. This report summarizes the findings of a survey of 145 rice growers.

One potential market for poultry litter is the farmers of eastern Arkansas who have "cut" or problem soils. Poultry litter, used as a soil amendment on "cut" soils, has greatly increased productivity of these soils (Miller & Wells, 1991). The objective of the survey was to identify uses of poultry litter by rice growers, determine the application rates and the total quantity used, identify suppliers of poultry litter, and obtain the price of raw and processed poultry litter paid by farmers.

To determine the extent of poultry litter use on row crops, primarily rice, the Cooperative Extension Service, University of Arkansas contacted 356 rice growers in Arkansas and one bordering county of Missouri. The list of rice growers was given to us by Winrock International and the Arkansas Delta Development Council. It is our understanding that the Arkansas Delta Council collected the list of rice growers from county Extension agents who were asked to identify rice growers who they thought might use poultry litter on their row crops. Information about the project, along with a postage paid card with questions (appendix 1), was mailed to each rice grower. After receiving a response from only 32 farmers, a second letter was sent to those not responding. One hundred-thirteen farmers responded to the second letter. In all we received completed postcards from 145 farmers which is a 41% response.

Follow-up telephone calls were made to 64 (91%) of the 70 rice growers who purchased poultry litter. Additional information (appendix 2) about the source of their litter, the year purchased, the amount purchased, acres on which poultry litter was applied, and their method of spreading was collected.

## POULTRY LITTER USE

Two forms of poultry litter are on the market -- raw litter and composted pellets. Raw litter has been removed from poultry houses, but not processed. Composted pellet litter has been composted to destroy pathogens and processed into pellets. About one in four (24%) respondents have used raw litter and nearly one in three (29%) have used composted pellets. Six individuals have used both raw and composted pellets (Table 1).

**Table 1: Form of Poultry Litter Used**

| | Raw | Compost/ Pellets |
|---|---|---|
| Farmers Using Litter | 34 | 42 |
| Percent | 24% | 29% |

The amount of litter purchased varied greatly among farmers. Only 26 farmers knew how many tons of raw litter they purchased, and 28 remembered how many tons of composted pellets they purchased. The 26 farmers purchased an average of 211 tons of raw litter for a total purchase of 5,496 tons. Farmers purchased between 8 and 2,000 tons for their use. Twenty-eight farmers reported purchasing a total of 277 tons of composted pellets or nearly 10 tons per farmer. They purchased between one and 38 tons each.

**Table 2: Quantity of Poultry Litter Purchased**

| | Raw (26 farmers) | Compost/Pellets (28 farmers) |
|---|---|---|
| Total Litter Purchased (tons) | 5,496 | 277 |
| Range of Purchases (tons) | 8 - 2,000 | 1 - 38 |
| Average Quantity Purchased (tons) | 211 | 10 |

## Litter Used on Row Crops

Of the 145 respondents, nearly half (65) have used poultry litter on their row crops (Table 3). This does not suggest that one-half of the rice growers in Arkansas use poultry litter. It only suggests that from our sample, about one-half have used poultry litter on their row crops.

**Table 3: Use of Litter on Row Crops**

| | Used Litter on Row Crops | Used Litter on Pasture/Greenhouse | Did Not Use Litter | Did Not Indicate |
|---|---|---|---|---|
| Frequency | 65 | 5 | 63 | 12 |
| Percent | 44.8% | 3.5% | 43.4% | 8.3% |

Although more farmers purchased composted pellets than raw litter, substantially more raw litter was purchased and spread on their row crops. Of the 26 people who knew the quantity of litter they purchased, 24 used raw litter on row crops and purchased a total of 5,286 tons of raw litter. Of the 28 compost litter users who remembered the quantity they purchased, all 28 used the litter on row crops with a total of 277 tons purchased. Those 24 who used raw litter on row crops purchased an average of 220 tons of raw litter compared to 10 tons of composted pellets purchased by the 28 compost users. Five farmers surveyed used poultry litter on pasture rather than on row crops. One of these five also used poultry litter in his greenhouses.

**Table 4: Quantity of Poultry Litter Applied to Row Crops**

| | Raw (24 farmers) | Compost/Pellets (28 farmers) |
|---|---|---|
| Litter Purchased (tons) | 5,286 | 277 |
| Average Quantity Applied (tons) | 220 | 10 |

Figure 1 shows the counties where raw and composted pelleted litter were applied on row crops by our sample of rice growers. Both raw and composted litter are being used in a long band of counties, from Clay County in the northeast to Desha County in the southeast. Some farmers in central and southwest Arkansas also use poultry litter on row crops.

**Row Crop Application Rates**

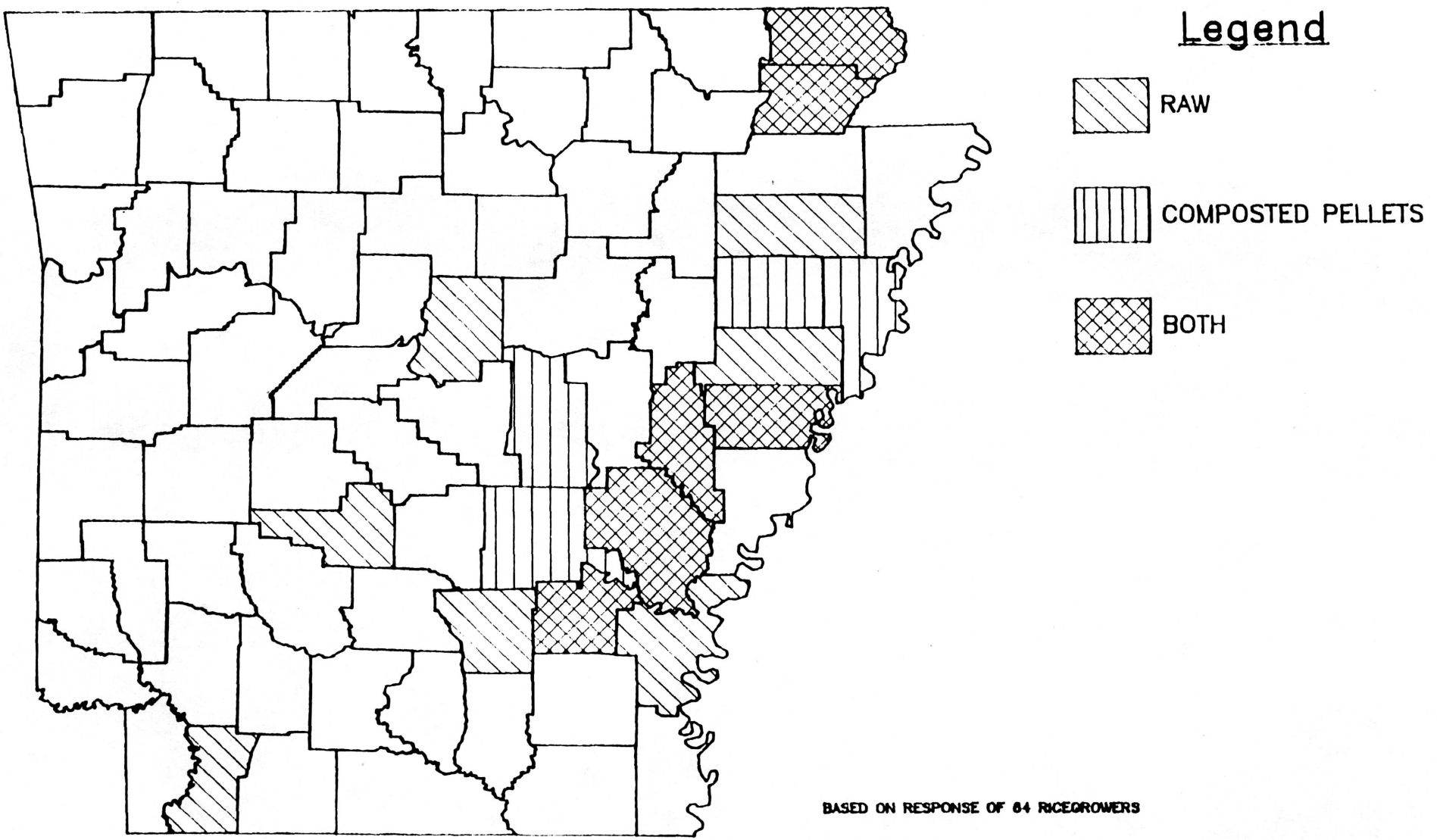
More farmers applied poultry litter on rice than any other row crop as is expected given our sample (rice farmers) for the study. Of the 65 respondents using poultry litter on row crops, 51 (79%) applied some of the litter on rice, 20 on soybeans, 16 on cotton, and 9 on wheat. Of all the farmers who responded to our questionnaire, 35 percent applied poultry litter on rice, 14 percent on soybeans, 11 percent on cotton, and 6 percent on wheat (Table 5). More farmers use composted pellets than raw litter on their row crops, except for soybeans.

**Table 5: Farmers Using Poultry Litter on Row Crops**

| Row Crop | Raw Litter | Compost/ Pellets | Raw and Compost | Raw or Compost | Respondents Using Raw or Compost |
|---|---|---|---|---|---|
| Rice | 25 | 31 | 5 | 51 | 35% |
| Soybeans | 12 | 10 | 2 | 20 | 14% |
| Cotton | 4 | 12 | 0 | 16 | 11% |
| Wheat | 4 | 6 | 1 | 9 | 6% |

Figure 1:

# POULTRY LITTER USE ON ROW CROPS, 1990-1993



The average application rates of raw litter were considerably higher than for compost/pellets for all four crops (Table 6). The average application rate on all crops was 2,291 pounds per acre for raw litter as compared to 464 pounds per acre for compost/pellets. The highest application rates for both raw and compost/pellets were on soybeans, although the average application rate on rice was only slightly less than for soybeans.

The range of application rates was extremely wide for both raw and compost/pellets. For raw litter the application rates varied from 285 to 8,000 pounds per acre. Compost/pellet application rates varied from 100 to 4,000 pounds per acre. There are probably several reasons for this variation in application rates which need further exploration. Many farmers are unsure of the yield response they will get from poultry litter and are trying different application rates. Also, there was a large variation in the cost of poultry litter. Differences in the price of poultry litter require different application rates for farmers to maximize profits.

**Table 6: Average Application Rates (pounds/acre)**

| Litter Type | Rice | Soybeans | Cotton | Wheat | Total |
|---|---|---|---|---|---|
| Raw | 2,354 | 2,636 | 1,625 | 1,625 | 2,291 |
| Composted Pellets | 495 | 656 | 275 | 300 | 464 |

## POULTRY LITTER SUPPLIERS

Poultry litter is marketed by growers, cleanout contractors, pellet manufacturers, local dealers, and others (Tables 7 & 8). Raw litter is purchased primarily from cleanout contractors, while composted pellets are purchased almost exclusively from local farm supply dealers.

**Table 7: Raw Poultry Litter Suppliers**

| | Grower | Cleanout Contractor | Local Dealer | Hauler |
|---|---|---|---|---|
| Farmers purchasing from: | 7 | 21 | 2 | 4 |
| Percent | 20.6% | 61.7% | 5.9% | 11.8% |
| Average Amount Purchased per Farmer (tons) | 183 | 231 | 20 | 190 |

**Table 8: Composted Pellet Litter Suppliers**

| | Grower | Cleanout Contractor | Local Dealer | Other |
|---|---|---|---|---|
| Farmers purchased from: | 0 | 0 | 42 | 1 |
| Percent | 0% | 0% | 97.7% | 2.4% |
| Average Amount Purchased per Farmer (tons) | | | 10 | |

## POULTRY LITTER PRICES

The price of poultry litter is dependent on the type of litter purchased and stage of handling. For example, raw litter that is sold to a cleanout contractor, who sells to a hauler, who sells to a rice farmer is more expensive than raw litter purchased directly from the grower. In addition, composted pellets, which have been manufactured, are more expensive than raw litter. Transportation costs also can be high since most poultry litter is not produced near row crop farming areas. Spreading costs are an added cost of raw litter. Since most rice farmers do not have litter spreaders, most have the supplier spread the litter. The raw litter prices were separated according to who spread the litter (Table 9). Most composted pelleted litter is spread by fertilizer buggies borrowed from the local dealer. The use of the fertilizer buggies is included in the price of litter. Some pellets are spread by the local dealers for an additional charge.

Prices paid by rice farmers for litter, particularly composted pellets, varied greatly. The price for raw litter 1989-1993 averaged $24 per ton and ranged from $0 to $56. The farmer, who said he paid nothing, obtained the litter from his brother who raises poultry. Although this farmer did not pay cash, he incurred transportation costs and more than likely will return a favor in exchange for the "free" litter. If this farmer is dropped from the calculations, the average price paid for a ton of raw litter is $25. Not included in the calculation of this average price is one row crop farmer who purchased raw litter in 1979 for $80/ton. The average price paid for a ton of composted pellets was $237 with a range between $85 and $900.

**Table 9: Average Litter Prices/Ton, 1989-1993***

| | From Grower | From Cleanout Contractor | From Local Dealer | From Hauler | From Other |
|---|---|---|---|---|---|
| Raw Spread Himself | $6 (5) | $18 (6) | (0) | (0) | (0) |
| Raw Spread by Other | $40 (1) | $27 (13) | $58 (2) | $30 (3) | (0) |
| Pellets Spread Himself | (0) | (0) | $256 (12) | (0) | $80 (1) |
| Pellets Spread by Other | (0) | (0) | $160 (3) | (0) | (0) |

* The number of farmers who purchased litter from each source are shown in parentheses.

Many different business arrangements made to get poultry litter from the producer to the rice grower. One raw litter arrangement is for a grower to sell directly to a crop farmer. This is occurring in areas of the state where there are both poultry and row crop farming. A more common arrangement for the sale of raw litter is for a cleanout contractor to remove the litter from poultry houses, then sell the litter to a row crop farmer and spread it on his land. Further follow-up research is necessary to analyze varying hauling distances and costs. Most litter is hauled by cleanout contractors, some is bought by truckers, and some is hauled by the row crop farmers themselves. Although most raw litter is spread by people other than farmers, some row crop farmers have purchased spreader trailers/trucks. A few farm supply dealers have litter spreaders that can be rented.

Raw litter is also purchased by manufacturers for processing into composted pellets. The pellets are sold in bulk or bags to farm supply dealers who then sell the litter to farmers. Spreading composted pellets is much easier and convenient than raw litter. Fertilizer buggies are supplied by most farm supply stores for the spreading of composted pelleted litter. Pelleted litter is also spread by farm supply dealers for a charge.

## FUTURE USE OF POULTRY LITTER

The follow-up calls made to previous buyers of poultry litter revealed that, overall, farmers are very pleased with poultry litter as a soil amendment on leveled or problem soils, but many people said that getting enough raw litter at the time of year when it is needed or knowing where to buy raw litter is difficult. Some made arrangements months ahead-of-time to insure delivery of the amount needed when it is needed. Composted pellet buyers indicated they would like to buy more litter, but the price is too high at this time.

Many of the respondents plan to use litter in future years. Of 121 answering the question, 81% of the rice growers answered that they plan to use litter in the future or indicated they might possibly use litter. Twenty-four respondents did not answer the question asking if they plan to use poultry litter in the future (Table 10).

**Table 10: Future Buyers of Poultry Litter**

| Respondents That: | Plan to Use | Possibly/Uncertain | Do Not Plan to Use |
|---|---|---|---|
| Have Used | 63 | 3 | 3 |
| Have Not Used | 23 | 8 | 18 |
| Did Not Answer if Used | 1 | 0 | 2 |
| Percent of Respondents Answering Question | 72% | 9% | 19% |

## SUMMARY

The business arrangements of getting poultry litter from the producer to the rice grower differ greatly. The price paid for litter also varies greatly depending on the type of litter, from whom purchased, and who spreads.

Poultry litter is being purchased as a soil amendment for leveled and other problem soils by nearly half of the rice growers responding to the questionnaire. It is unclear at this time where much of the poultry litter is originating. Follow-up research is being conducted by the Cooperative Extension Service, University of Arkansas to identify the original sources of composted pelleted litter as well as poultry litter moved by cleanout contractors and other middlemen.

There is clearly a demand for poultry litter by crop farmers in Arkansas. Nearly three out of four answering the question are future buyers of poultry litter with an additional nine percent more as potential buyers. Follow-up personal conversations found that rice farmers are very pleased with poultry litter as a soil amendment. They are concerned about litter prices and the availability of raw litter. Many have not purchased raw litter because they did not know whom to contact.

One objective of the project is to assist in the movement of litter from areas of high concentrations where there is potential for water quality problems to farmland areas where the litter could be productively utilized. This survey of rice growers reveals that a large amount of litter can be productively used by Arkansas rice growers.

## References

Miller, David M., and Bobby R. Wells. "Identifying the Causes of Poor Rice Growth on Precision-Graded Soils. "*Arkansas Rice Research Studies 1991,*" Research Series 422(1991):108-114.

Appendix 1

**Ricegrower Questionnaire**

Your total acres farmed in 1992?
Rice _____ Soybean _____
Cotton _____ Wheat _____

Have you previously used poultry litter?
Yes ___ No ___

If yes, compost/pellets___ or raw___

Was litter used on recently leveled soils?
Yes ___ No ___

On what crops did you use poultry litter?
Rice ____ Rate/lb. per acre ____
Soybeans ____ Rate/lb. per acre ____
Cotton ____ Rate/lb. per acre ____
Wheat ____ Rate/lb. per acre ____

From what county did your litter originate?
_____

Who did you purchase the litter from?
Local dealer___ Grower___
Clean-out contractor___ Other ___

How much did you pay for litter? $____/ton

Do you plan to use litter in future years?
Yes ___ No ___

Your Name_____
Address_____
Phone_____

Appendix 2

**Follow-up Call Questionnaire**

Name: Spoke to:

County:

Phone:

Litter Type:

Name/location of litter source:

How did you hear about it?

What year was the litter purchased and applied?

When was the first year that you applied litter?

What was the quantity of litter purchased?

Litter was applied on how many acres of _____?

Who and how was the litter spread?

Notes/Comments:

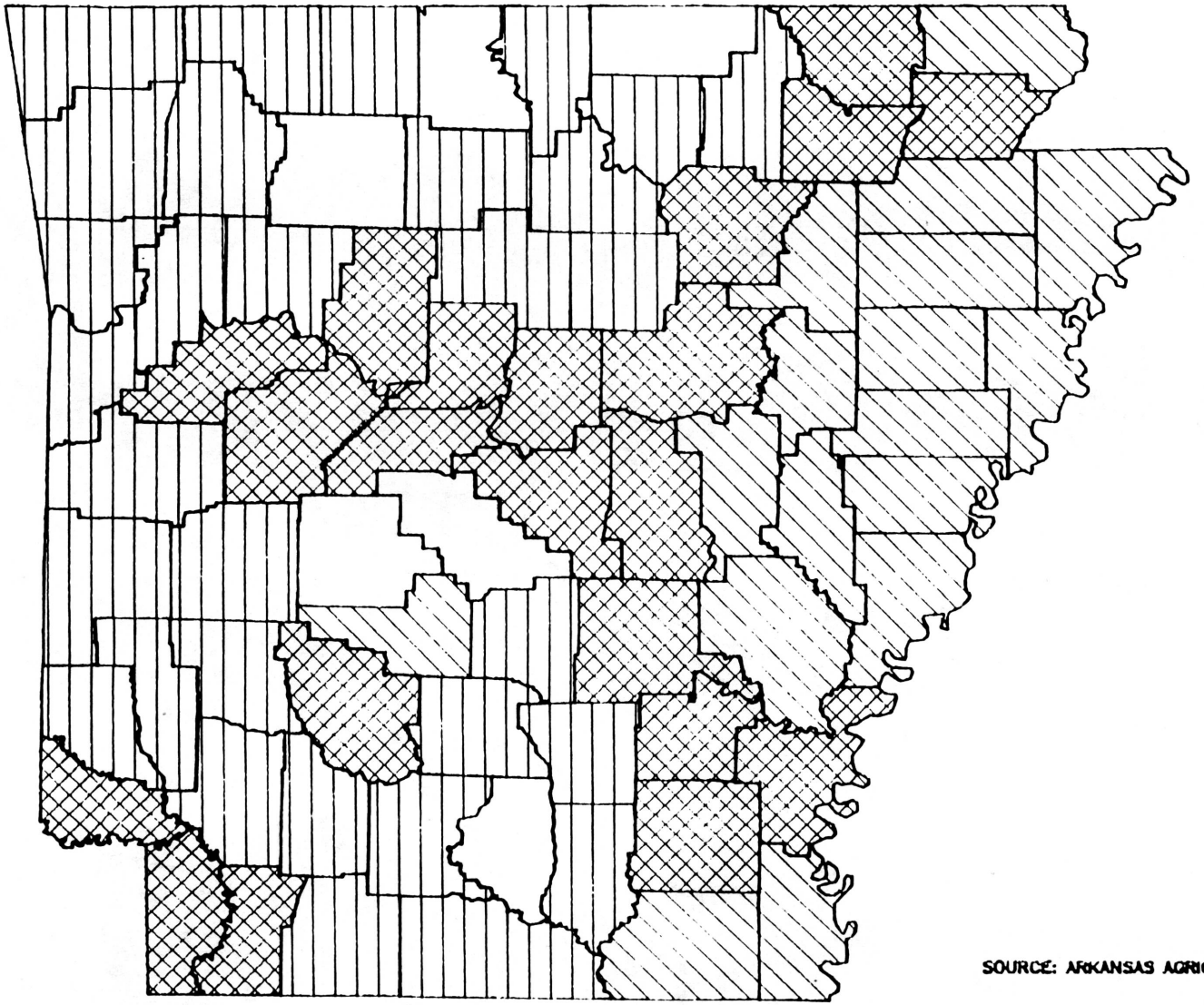
Appendix 3

## Rice Grower Sample by County

| Counties Where Questionnaire was Sent | Number of Questionnaires Sent | Received | Response By County | Response Percent |
|---|---|---|---|---|
| Arkansas | 30 | 17 | 12% | 57% |
| Bradley | 1 | 0 | 0% | 0% |
| Clay | 64 | 27 | 19% | 42% |
| Cleveland | 6 | 3 | 2% | 50% |
| Craighead | 1 | 0 | 0% | 0% |
| Crittenden | 2 | 2 | 1% | 100% |
| Cross | 7 | 5 | 4% | 71% |
| Desha | 2 | 2 | 1% | 100% |
| Faulkner | 3 | 3 | 2% | 100% |
| Greene | 9 | 5 | 3% | 56% |
| Hot Spring | 2 | 1 | 1% | 50% |
| Jefferson | 152 | 48 | 33% | 32% |
| Lafayette | 3 | 2 | 1% | 67% |
| Lee | 6 | 4 | 3% | 67% |
| Lincoln | 16 | 5 | 4% | 31% |
| Little River | 5 | 1 | 1% | 20% |
| Lonoke | 27 | 7 | 5% | 26% |
| Miller | 1 | 1 | 1% | 100% |
| Monroe | 7 | 4 | 3% | 57% |
| Poinsett | 3 | 3 | 2% | 100% |
| Pulaski | 2 | 0 | 0% | 0% |
| Randolph | 1 | 0 | 0% | 0% |
| St. Francis | 1 | 1 | 1% | 100% |
| White | 1 | 1 | 1% | 100% |
| Unknown | | 1 | 1% | |
| Butler, MO | 4 | 2 | 1% | 50% |
| TOTAL | 356 | 145 | 100% | 41% |

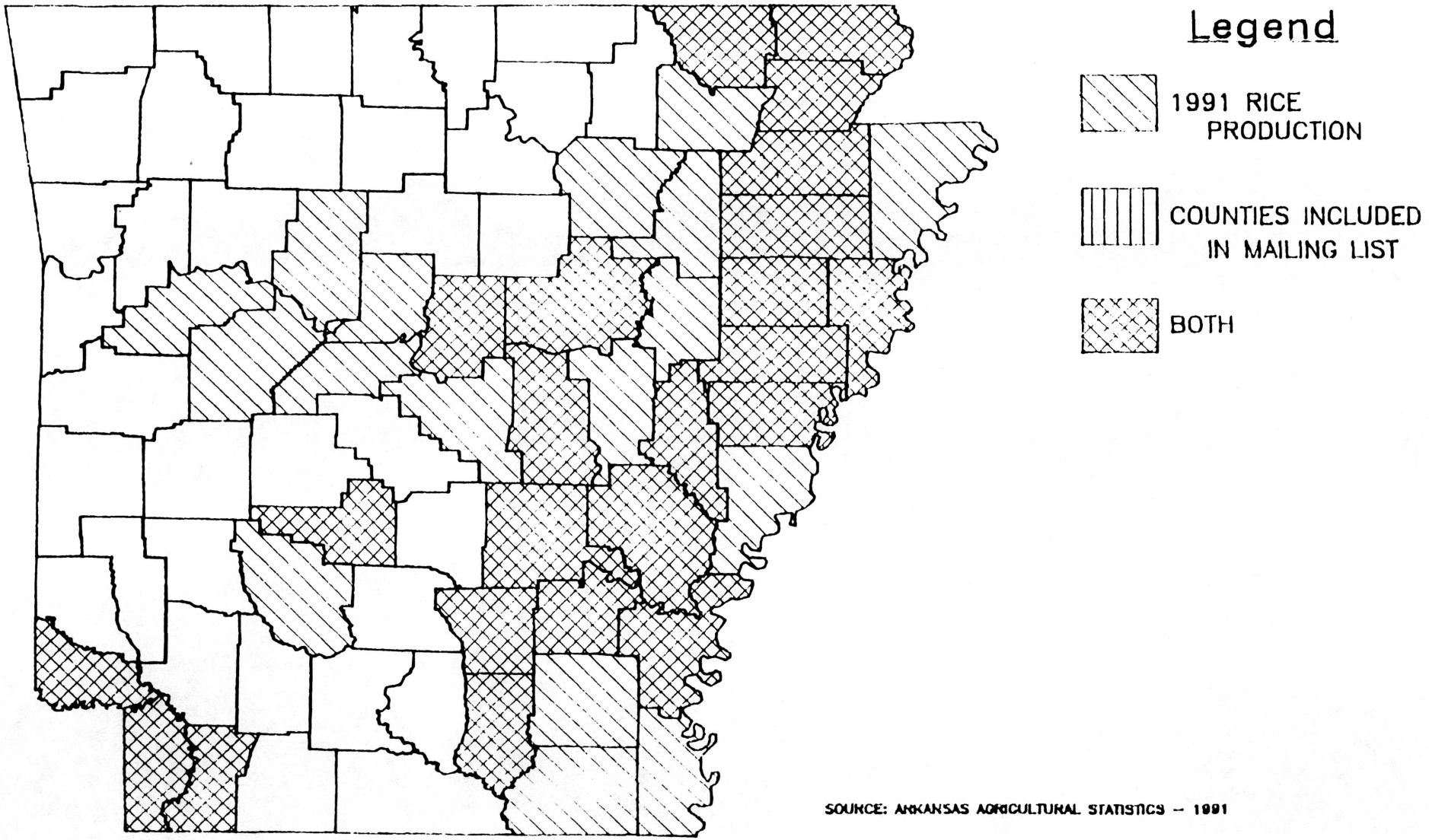
Appendix 4

# POULTRY PRODUCTION & RICEGROWERS




SOURCE: ARKANSAS AGRICULTURAL STATISTICS – 1991

# RICE PRODUCTION & QUESTIONNAIRES RECEIVED




SOURCE: ARKANSAS AGRICULTURAL STATISTICS – 1991

# QUESTIONNAIRES SENT & RECEIVED