

## **Assessment of Raw and Pelletized Poultry Litter: Desired Product Characteristics, Use and Application Preferences and Necessary Infrastructure**

Interviews were conducted with poultry litter processors, fertilizer dealers and potential end-users of raw and/or processed poultry litter from October 2003 to January 31, 2004. Fertilizer dealers and agricultural suppliers were interviewed by Ron Mullikin, ARC Inc. of Bentonville, Arkansas; some additional fertilizer and agricultural suppliers were interviewed by Dr. Kenneth B. Young, Division of Agriculture. Producer and crop consultant focus groups were conducted by one or more of the following persons: Dr. H.L. Goodwin, Jr., Dr. Kenneth B. Young, and Julie West, all of the Division of Agriculture. Summaries of these interviews and focus groups appear below.

### **Producer Focus Groups**

#### **Stuttgart, Arkansas**

Description of Participants. All farmers produced rice and soybeans. Some also produced wheat and corn.

Product Characteristics – Raw and Pelletized Litter. Many producers reported that they had experience with both pelleted and raw litter at Stuttgart. Crop producers at Stuttgart complained about the variation in different raw litter shipments and wanted more quality control. They recommended that all loads should be tested to standardized litter quality. Litter is considered very important for cut soils. They reported that it takes 3-5 years for yields to stabilize after land leveling. Some farmers had tried the Delaware litter pellets. They thought that the Delaware pellet company might have up to 30 percent of its sales in eastern Arkansas.

Product Application. A farmer can rent an eight-ton capacity litter spreader for \$4.50 per acre. Raw litter application is 2 tons per acre for corn and one ton per acre for rice. Farmers do not own fertilizer application equipment. They estimated that at a rate of one ton per acre, only 100 acres could be covered in one day.

Infrastructure. Farmers do not have storage space for raw litter. Farmers were skeptical about using “middle-men” to move litter to eastern Arkansas from northwest Arkansas because of the added overhead cost. They suggested that a farm cooperative may be organized to buy litter from the proposed northwest Arkansas poultry litter bank.

Cost. Raw litter was available from Star City and Pine Bluff for a delivered price of \$23 per ton plus \$7 per ton per acre for custom spreading.

#### **Clarendon, Arkansas**

Description of Participants. All of the growers produced rice, soybeans and wheat; three also produced corn.

Product Characteristics – Raw and Pelletized Litter. Most of the producers contacted in Clarendon had experience with either raw or pelleted broiler litter. The pelletized litter could be spread much faster, was easier to transport, and preferable to raw litter. Farmers wanted demonstration plots and agri-grow concept farms to evaluate the benefits of litter use. All of the groups preferred to use pelleted or granulated litter except for application on cut land.

Product Application. Spreaders could be rented locally for \$4.00 per ton that could spread 80 acres per day at a rate of one ton per acre. About one ton per acre was applied on cut soils. One farmer used pelletized litter prior to wheat with application by dealer-supplied, air-flow equipment or an Adams spinner buggy.

Infrastructure. One farmer said there was a problem delivering raw litter by end-dump trailers because of wet ground and that a walking floor trailer would do better. Farmers did not like the idea of contracting to buy litter. They preferred to do business without any contracts. They said they had no storage space available for raw litter. The logistics, handling and transport time, and equipment use all favored use of pellets or granules rather than raw litter.

Cost. Prices of local raw litter were reported to range from \$24 to \$30 per ton including freight.

## **Lonoke, Arkansas**

### Description of Participants

Product Characteristics – Raw and Pelletized Litter. Participants in this focus group reported that they had purchased turkey litter from Plummerville and broiler litter from brokers with OrganoGro in Russellville. Litter is especially needed on cut land on both cut and fill areas. Litter is considered to be worth more for the P and K than for the N. Rice uses less P and K than cotton; however, some new rice varieties have P and K recommendations. One farmer has used gin trash on cut land but said litter was much easier to handle.

There was interest in litter pellets and granules but economics was considered the key in comparing litter and commercial fertilizer for general fertilizer requirements. It was noted that litter granules fortified to 12% N would be four times the weight of commercial fertilizers and would cost twice as much to apply in the field. It was estimated that cotton needs 0-18-36 with K=200% of P plus 100 pounds of N applied in two applications to make a 2-bale cotton crop. Soybeans need a 0-1-2 ratio. Some N is applied pre-plant on wheat but the N needs to be limited to prevent excessive vegetative growth. Up to two tons of litter may be applied on silt loam or clay soil without a problem.

Product Application. At Lonoke, a litter spreader is available that rents for \$50 per day. Farmers can use their own tractors and loaders to spread litter. Commercial fertilizer is applied for an application cost of \$4 to \$5 per acre. Custom litter spreading costs \$8 per acre. They put urea on top of the ground for cotton now. Land is usually cut in the summer. There is a better window for raw litter application in late summer/early fall than in the spring.

Infrastructure. Farmers have a serious labor shortage. Local farmers have their own semis and hopper trailers used to haul urea from the Little Rock Port. Short hauls cost \$2 per loaded mile. Farmers can haul urea from Little Rock (about 30 miles) for \$3 per ton with a 25-ton load.

Cost. Prices paid for litter ranged from \$22 to \$24 per ton delivered. Local litter may be purchased for as low as \$15 per ton but local litter may run up to 50% moisture. Farmers at the Lonoke meeting expressed interest in using litter as a fertilizer replacement if the cost is competitive (including handling and application).

Other. Paul Sebourn owns 10 broiler houses in the south end of Lonoke County and Dutton-Gould has production in the Rison area.

## **Harrisburg, Arkansas**

Description of Participants. All farmers produced rice. Other crops produced were mostly soybeans. Soils were classified as silt loam.

Product Characteristics – Raw and Pelletized Litter. Participants at Harrisburg expressed a strong preference for litter pellets or granules. They said about one third of the country used for rice has poorer quality of land that would benefit from annual litter application. Additional litter is needed for cut ground. A crop consultant at the Harrisburg meeting, showed reports on the nutrient analysis of some local litter. A sample hen manure analysis with no bedding after one year showed 3.26-1.40-2.24 on % as is basis and 4.19-1.80-2.87 on a dry weight basis. Two sample broiler litter analysis with rice hull bedding and 5 flocks age showed a range of 2.04-4.32N, 1.37-1.52 P, and 2.13-2.48 K on an as is basis. All of these samples were analyzed at the Agricultural Diagnostic Laboratory in Fayetteville in 2002 to 2003.

Product Application. They were concerned about the spreading problem with raw litter as they have only about a month window in spring. They can only cover up to 150 acre per day with raw litter compared with 100 acre per hour with pellets. They wanted to see results of spreading litter in the fall when they have a much larger window. They were only applying 300 to 500 pounds per acre. All farmers had applied litter on rice fields. Farmers using pelleted litter spread 250-300 pounds acre and as a “maintenance application” on their poorer rice land each year and two to three times this application level on cut ground.

Infrastructure. Local trucking costs are estimated to be \$2.50 per loaded mile for a 24-ton end-dump trailer for short hauls up to 100 miles. Kenneth Ray (501-680-5463) provides custom litter service and has a large tandem axle truck. Harrisburg is 50 miles from the Augusta port where litter pellets are stored. Bunge also stores wheat and beans at Augusta. Harrisburg is 60 miles from the Osceola Port. The Harrisburg group made a strong recommendation for the Ozark Poultry Litter Bank to use local fertilizer dealers to sell and apply any pelleted or granulated litter as they know the crop producers and their land, they know how and where to apply the pellets and they can keep good records on their fertilizer customers.

Cost. Pellets cost \$110 per ton plus spreading. They considered this expenditure of \$20 to \$40 per acre as an insurance policy to help get a good rice stand on poorer quality land. Prices for raw litter are \$20 per ton FOB but only \$10 per ton if picked up in the fall from the poultry buildings. A Caldwell layer operation with 360,000 layers near Searcy also sells for \$20 per ton FOB. Some “Unity” (a dried municipal sludge product) has been sold locally for \$140 per ton.

Other. Some raw litter is locally available including in Cal-Maine poultry operation. The Caldwell layer operation is expected to double in the future and now has 1.5 million birds.

## **Newport, Arkansas**

Description of Participants. All farmers produced soybeans and rice.

Product Characteristics – Raw and Pelletized Litter. Participants at Newport have relatively large farms and all reported some experience with using litter. In contrast to the Harrisburg group, all of the groups thought that litter pellets are too expensive and that the small application of pellets are not worth the money. Newport farmers reported that they have a labor shortage and trouble hiring spring labor. They could only get low-skilled temporary workers that don’t want to work full time. They said they paid about \$65 per day for a worker capable of operating a tractor.

Product Application. Manure was stockpiled at the edge of the field and spread with a tractor drawn flotation tire spreader. On cut land, one farmer applied one ton for three years. Two tons per acre were applied to deep cuts. Application rates for raw litter included an estimate of 108 acres in three hours with three spreader trucks and a front-end loader on a backhoe loading litter from piles in the field. Farmers reported a problem of incorporating litter on rice land with a stale feed bed (minimum tillage system). They question whether litter incorporation is necessary if the main benefit of litter is not N anyway. Litter was mostly applied to rice land in spring. One farmer with \$10 per ton litter used raw litter on both cut ground and other ground as a fertilizer replacement including on land used for grain sorghum. Litter applied to rice land was followed up with normal urea applications.

Infrastructure. One farmer suggested that the litter bank use a cheap central storage facility for raw litter in key Delta locations like the pod storage system that Riceland Foods uses for rough rice at Grubbs. He suggested a concrete slab with three-foot sides and a canvas cover. Most farmers don't want raw litter stored near their yards. The proposed central storage would need a simple weighing method to keep track of trucks coming and going and may be fenced off except for high demand periods such as in spring. The farmers thought that many farmers would haul and spread it themselves or get their own custom operators if the litter was priced cheap enough. Local trucking cost were quoted at \$1.40 per loaded mile with a 36-foot hopper trailer to carry 20 tons per load. There were reported to be lots of land leveling in Jackson County and one farmer said he was doing 200 acres per year himself. The farmer got a 10% tax credit from the state for leveling as a water conservation improvement.

Cost. Quotations on local raw litter included \$25 per ton from Lawrence County about 40 miles away including spreading. Another farmer reported that he paid \$27 to \$30 per ton delivered and spread. He bought the litter from XXX that originally came from broiler farms in Smithville, Cave City and Salem. A third farmer had a "sweet heart deal" to buy all the litter from seven broiler houses located 15 miles away for \$10 per ton.

### **Osceola, Arkansas**

Description of Participants. Most of the participants in Mississippi County have relatively large farms. Some produced only cotton and others produced rice, wheat, soybeans, grain sorghum and corn as well as cotton. Soils varied from clay, silty clay, sandy loam and sand. This county has numerous blow sand areas in fields where there is poor crop production due to low nutrient and water retention. Participants asked about the feasibility of applying litter in fall or winter rather than spring because of their labor constraint in spring

Product Characteristics – Raw and Pelletized Litter. None of the participants had any experience using poultry litter. One had used "Unity" on cut fields. The participants recommended that demonstration trials be conducted on cut fields and blow sand areas to determine the benefits of applying broiler litter in that county.

Product Application. Most of the farmers are using minimum tillage practice and they dislike the idea of incorporating the litter after it is applied in the spring.

Infrastructure. No fertilizer spreaders are available in the county. Participants recommended that imported litter be marketed through local fertilizer dealers such as the local Co-op, Home Oil Company, in Osceola. Participants suggested that steel I-beams, gin trash or cottonseed are possible backhaul possibilities if litter is trucked there from northwest Arkansas. Truckers currently deadhead to this county to pick up steel. Gin trash has to be used for broiler house bedding in lieu of rice hulls.

Cost. Local fertilizer prices at the Osceola Coop are reported to be \$165 per ton for potash, \$215 per ton for triple super phosphate, and \$245 per ton for urea as of January

23, 2004. The P and K in a ton of litter are worth nearly \$20 at these prices, excluding the value of N.

Other. The proposed improvement on Highway 412 from Springdale in northwest Arkansas to Jonesboro would potentially reduce the truck hauling distance compared with using Interstate 40 to access Mississippi County.

## **Nevada, Missouri**

Description of Participants. Most of the participants in the Missouri focus group had fairly large farms (100 plus acres); several farmed over 2000 acres. The predominant cropping system represented by the twelve farmers was a two year wheat-soybean-corn rotation. Some farms had acreage dedicated to only one or two of the crops. Two farms had considerable hay acreage and one was a fescue seed producer. Four of the farmers had used litter in the past (turkey, hen and broiler). One had utilized composted litter. Most of the farmers were no till or minimum till operations.

Product Characteristics – Raw and Pelletized Litter . Several producers wondered whether the raw litter or pelleted litter would have guaranteed analysis. Apparently, in Missouri any soil amendment with a guaranteed analysis would be subject to taxation at the rate of 50 cents per ton. In addition, the level of nitrogen present, its stability and its availability to plants was questioned. It is important to these growers that nitrogen would be utilized in the crop year applied rather than at a later time. They also questioned whether the nitrogen would be bound by the bedding materials. The thought of “doubling up” on application to cut application costs was raised; producers realize this would likely result in loss of N over the two-year period. Objectionable odor was also raised as a significant issue, and that incorporation into the soil would be necessary to minimize odor problems. Use of pelleted litter would diminish, if not eliminate, the odor problem. In addition, pelleted litter would create advantages when using a hopper-type applicator on both corn and wheat and would save field application time. Raw litter would require a specific litter spreader for application.

Product Application. One grower uses Jenkins Lime Applicator (local business) to apply their poultry litter in a 40’ wide row at a cost of \$4/acre, spreading one ton per acre. It is common practice to top dress wheat in February or March. Producers asked if they could get raw litter in February or March or if they would need to put litter on wheat in the fall due to equipment requirements

One grower related that he knows someone who applied litter to pasture that resulted in a selenium problem with the cattle such that the cattle would not dilate and therefore not breed properly. There were also questions raised regarding the future governmental regulations and whether “they be watching us like hawks if we start applying poultry litter”. Application will definitely require a completed farm plan.

Infrastructure. The majority of discussion surrounding infrastructure centered on transportation and litter storage facilities required or desired to smooth out supply and

demand differences from season to season. End-dump or walking-floor trailers are the likely transport container for raw litter. These trailers would facilitate maximum flexibility and speed of loading and unloading and minimum maintenance over the useful life.

Storage for litter is scheduled to be at the demand end to facilitate flexibility for the end-users. This is desired so that costs of storage would be less and that handling costs would decrease. Some storage at poultry farms in the form of litter stacking sheds will be available so that litter can be provided year-round (winter cleanout is not desirable for the poultry farms). There was also discussion of the possibility of using hoop buildings for litter storage once they have been approved by NRCS for this purpose. Cost sharing funds would be welcomed to offset construction costs.

Farmers present asked a variety of questions regarding suitability of structures on their operations that might be suitable for litter storage (old silo without a top, trench silo, silo with top ventilation, etc.). Ventilation is important to allow litter to be stacked higher than six feet (this will save on construction costs) but there will be a considerable nitrogen loss with this option over time.

Cost. Price of the litter available in Missouri currently ranges from \$10 to \$15 per ton. This may or may not include spreading costs, paid either on a per ton or per acre basis. Some opinion was expressed that before too long there may be price decreases for litter due to the environmental problems facing the Arkansas Ozarks area. None of the farmers present said they would pay any more for litter than for an equivalent amount of commercial fertilizer; most thought they should pay less due to the hassle factor (odor, timing, handling and storage issues, spreading costs, etc.). Goodwin anticipated that the cost delivered to the Missouri area would be around \$24 per ton (this cost covers transport, administrative staff, equipment, etc.). Approximate fertilizer costs in Missouri: 1) 0-0-60 = \$154/T; 2) TSP = \$184/T; 3) DAP = \$225/T; 4) Urea = \$0.26/lb.

Additionally, two growers were concerned about timing of payment. With commercial fertilizer, they apply it in the fall and pay for it in the spring. When would payment be made to a litter bank? Payment would be made at the time of delivery to the farm and to the litter bank if delivery is made by the litter bank. If farmers arrange for their own transport, it would be different. It all depends on how transport is arranged.

## **Vinita, Oklahoma**

Description of Participants. There were four participants at this focus groups; the group of six producers coming from Nowata County did not show for the meeting. All four present were wheat-soybean-corn rotation farmers with between 100 and 2500 acres. In addition, these producers managed several hundred acres of pasture and hay acreage.

Product Characteristics – Raw and Pelletized Litter. Participants at this meeting have access to litter in eastern Oklahoma. One farmer had the exclusive rights to take all the litter from a Cobb-Vantress breeding and test farm for free about 22 miles from Vinita.

The litter from Cobb-Vantress was deep stacked outside their buildings and much of the N was lost to ammonia in the heating process. The Cobb-Vantress litter was applied in corn-wheat-soybean crop rotations. The nutrient density of the Cobb-Vantress litter is very low at about 20 pounds per feet<sup>3</sup> compared with about 30 pounds per feet<sup>3</sup> with normal broiler litter. Other farmers are not using litter now. One wanted it around October 1 but it was not available then. The participants thought that fall and early winter is the only window for crops if the litter is used.

*Product Application.* One farmer did his own litter application, as he didn't want large trucks making tracks in his fields. He recommended using a floater to spread litter and the use of tater-hopper vans that could kick out the litter several feet into the field when unloading the litter. This farmer applied three tons per acre and could adjust the spreader with GPS equipment up and down by 50 percent. Estimated litter spreading cost is \$5 per ton. Others only applied urea and were not concerned about the P and K. They could apply 100 pounds of urea cheaper than using broiler litter. Also, the time factor is a problem. There is a short window to plant corn and the spreader can only do 40 acres per day at three tons per acre. Estimated equipment cost for litter handling included a floater costing \$40 - \$80 thousand used and \$55 to \$60 thousand for a new tater-hopper trailer. The floater can move 25 tons of litter through the field but the practical range is limited to about half a mile.

*Infrastructure.* It was noted that an end dump truck with 39 feet length and 5 foot height could haul 25 tons of raw litter but many dump trucks have a modified bed to only haul 21 to 22 tons of litter. To do business in the Vinita area, the participants recommended a "turn-key" operation, including soil sampling, delivery and custom spreading when the farmer called for the litter to be spread. However, the expected payment for all service is only about \$20 per ton according to the participants at this meeting. For any backhauling of grain, it may be necessary to sanitize a dump bed that might cost about \$125. It is considered difficult to sanitize a walking-floor or belt-floor trailer. One farmer suggested that we stack litter near the Catoosa Port in Oklahoma so that trucks bring in grain to barge out could have a backhaul to where the grain came from. He said that raw litter could be transported in a regular hopper trailer if a bottom agitator was used.

*Cost.* It was widely stated that growers would only be willing to pay around \$15 per ton for litter for a "turn-key" job (hailed and spread at the appropriate time for the farmer with no more than two weeks lead time). Based upon the results of this focus group, Vinita does not appear to be a viable market for poultry litter.

## **Muskogee, Oklahoma**

*Description of Participants.* Corn, soybeans and wheat were the predominant crops produced. A few of the farmers present also produced vegetables on contract. Very few of the participants had experience with litter.

*Product Characteristics – Raw and Pelletized Litter.* Many of the farmers present were worried about the smell of raw poultry litter and the complaints they might receive from



their neighbors. One producer felt that composting the raw litter might resolve the odor problem. Composting was discussed as an option for lowering the odor of the raw poultry litter, but it was also mentioned that composting could cause a significant decrease in the nitrogen levels.

A second topic of discussion focused on weed growth. One farmer was particularly concerned with the possibility of litter application heightening weed growth in his pastures. Although application of raw litter might cause the weed seeds to germinate more actively, application of raw litter is not thought to increase the weed concentration in pastures.

*Product Application.* Timing of delivery and price of litter were key issues among all the farmers present. All agreed that if the litter could be made available at the appropriate time (September – November), they would apply litter at a rate of 2 tons per acre.

One producer was specifically interested in applying litter to Bermuda, but he wanted to see results this year. Discussions related to the application of litter on pasture revealed that results are almost immediate for pasture application of raw litter.

Ease of application was discussed as a priority of the farmers apply it themselves. One farmer thought using a pump truck might ease application. Unfortunately, this would require saturating the litter with large amounts of water before it could be pumped. This would likely be more quite difficult and time consuming.

Environmental restrictions related to application of litter concerned one producer. Soil tests would be required prior to application. If the farmer wanted to apply litter themselves, they would be required to get an applicator license.

*Infrastructure.* Equipment and storage present quite a problem in this area. Most of the farmers present at this focus group do not have the equipment needed to apply litter. Two producers said that the system would have to be well coordinated for them to be interested in using raw litter. One went further and said that he would only be interested if the litter bank provided delivery and application services or they worked with a local applicator to have it applied on-farm. Most were not interested in applying the litter themselves even if the equipment were provided by the litter bank.

There is no access to storage in this area, and EQIP funds are not available for cost-sharing storage facilities. One farmer suggested setting up “dump sites” for the litter. Then, farmers could have access to the litter when needed and apply it to their crops (or they could hire someone to perform these services). It was decided that if “dump sites” were used, storage would have to be set up to prevent total nitrogen loss prior to use.

*Cost.* Producers agreed that the litter must be cost-competitive. Due to the ease of applying commercial fertilizer, it was determined that raw litter would have to be priced \$5-\$10 below the cost of commercial fertilizer prices. There was no interest in pelleted or granular litter in this area due to the high cost associated with producing the

pellets/granules. One farmer preferred that the cost of litter include the cost of application, as well.

### **Agricultural Suppliers**

In general, fertilizer dealers in Arkansas have a huge concern with the public opinion on the connection between poultry litter and water quality. They are also concerned with possible new regulation on the application of poultry litter. It is their experience that raw poultry litter contains a great deal of foreign material (steel, rocks, concrete weeds, and poultry equipment) that is detrimental to the soils and the equipment applying the litter. The one dealer which tried to store raw litter for a short period had complains from neighboring residents.

Application rates of pelleted litter from 250 lb. to 500 lb. per acre benefit rice production. Spreading pelleted litter must be done with a spinner type spreader. Many problems persist with air-flow spreaders.

Pelleted litter at the Augusta terminal is owned by Perdue Farms. They control the pellet market in the Delta. Pelleted litter will sell for approx. \$100 per ton this spring. Local Extension Service does not support pelleted litter.

No dealer interviewed has tried to mix pelleted or raw litter with commercial fertilizer. Several related that pellets sometimes are more dust than pellet. To move any volume of litter into the Delta region will require setting-up some type of structured system that in no way is in place today.

### **Lonoke, Clarendon, Stuttgart and Brinkley, AR**

Six fertilizer dealers and agricultural suppliers in Lonoke, Jefferson and Arkansas Counties were interviewed. A summary of the discussions follow.

Lonoke Fertilizer & Chemical has not sold raw or pelleted litter and has no interest in doing so, as they have significant concerns with environmental issues.

Oakley Fertilizer in Beebe sells approximately 80 tons of pelleted litter per year, all in bags. They expressed no interest in custom spreading bulk or raw litter.

United Agricultural Products in Stuttgart sold 40-55 tons of pelleted litter last year at \$180 per ton. Because of continued water quality issues and environmental concerns they will probably not sell any this spring. They have had problems in the past with the consistency of the pellets. When they need product, they take a spreader to Searcy to get the tonnage they need. The area does have a farmer that spreads approximately 800 of raw litter per year.

United Agricultural Products in Clarendon sold 10-15 tons of pelleted litter last year. They have no plans to handle litter of any type this year and they believe that UAP as a company will stop handling litter.

Nash Applicators in Brinkley handles no litter and has no plans to do so.

Tri-County Farmers Association sells 25-30 tons pelleted litter per year. They store no litter in-house and sell on demand only. Raw litter is spread in the area by a few local farmers, but Tri-County will not spread raw litter. In the past they have, but because litter debris damaged spreading equipment, they will not spread it again.

### **Searcy, Des Arc, Hazen, Waldenburg and Newport, AR**

The folks at Agriliance in Hazen had use only pelleted litter in the past. Those pellets had come from a distributor in Searcy. (Searcy Farm Supply) They had only spread pellets by themselves, not mixed with commercial fertilizer. Total litter tonnage for this facility is less than 20 ton per year. Also they had a problem with inconsistencies in pellets.

Prairie Farmer Supply had sold raw litter several years ago. They say they would never do it again for four reasons: 1) odor complaints from the neighbors; 2) litter sets-up in storage and gets hard; 3) concern with content of noxious weed seeds; and 4) debris in litter that damages spreading equipment ( steel, rocks and dirt).

Farmers Supply Association in Waldenburg sells more pelleted litter than anyone else in the area, approximately 1500 tons last year. They will sell product this year for \$100 ton. With support of the local Extension Service tonnage would double. Current application rate are between 200-300 lbs. per acre. They too have no interest in selling or applying raw litter for many of the same reasons as mentioned before.

Newport Fertilizer in Newport does not sell or spread any litter and does not plan to handle litter.

Searcy Farm Supply in Searcy has supplied many fertilizer dealers in the area their pelleted litter. This business has sold this winter and was closed at the time of the interview trip. A number of phone calls were made with no result.

### **Braggs, Wagoner and Muskogee, OK**

Four different fertilizer dealers in Oklahoma were interviewed. Junior Martin and Sons in Wagoner related that with the environmental issues in Oklahoma concerning poultry litter they want nothing to do with litter. One of the employees did say some farmers were using it and liked it on winter wheat and pasture lands. He had no experience with or knowledge of pelleted litter but said farmers did use raw litter in the area.

Midwest Fertilizer in Muskogee said they do no business in poultry litter but would consider it if a demand developed.

Farmers Association in Muskogee indicated that some farmers north of the Muskogee area were buying raw litter from poultry growers. They had heard some good things from ranchers. There was some concern with how to store and spread litter. Farmers have said they are not sure the environmental risk is worth it.

Farmers Coop in Braggs said that farmers in the area used some raw litter on pasture land. They felt that there are too many problems with litter for them to get involved with it, such as environmental risks, storage difficulties and competing with commercial fertilizer. They also they knew of a paper company that had tried using it poultry litter on their land and liked the results.

The environmental climate in Oklahoma may make it a difficult place to promote an increased market for litter.

### **Lamar and Sheldon, MO and Iola, Chanute and Independence, KS**

The follow information is a summary of my conversations I had with fertilizer dealers in Missouri:

MFA in Lamar has not used litter and had no one asking for it. The use of raw poultry litter on pasture land in the area may be a possibility. Cost and storage were key concerns.

Metz Grain in Sheldon has no customers using or asking for raw litter. Three years ago a few farmers used pelleted litter that farmers bought from a wholesaler around Monett, MO. This firm wondered how litter would work on wheat.

Iola Grain in Iola said they have heard some talk from some farmers about using litter on pasture land and winter wheat. There is a concern of dealers hauling litter over state lines based upon environmental liabilities.

Chanute Fertilizer Company in Chanute related that one of the salesmen had worked in the Arkansas Delta and was aware of the use of litter on crop land. He felt that it might have merit for use in that area if it was marketed properly.

SEK Grain in Independence was aware that some farmers have used raw litter in the area, but this dealer has not sold or spread any. They have environmental concerns.

Travels and interviews through this area made the following impressions. A market could be developed in the area. Environmental concerns and marketing approaches could be overcome. The area is close enough that it could become a major area for litter shipments. Dealers in the area, with the right marketing approach and support system, would support litter applications.

### **Litter Processors**

Litter processors contacted include Lee Harris (owner) and Dave Vickers (consultant) that produce pelleted broiler litter in a plant near Cave Springs in northwest Arkansas. Their product "Honey Crest" has a guaranteed nutrient analysis of 4-2-2. The processing plant is reported to have a total capacity of 45,000 tons per year of pelleted product.

Harris reported a high maintenance cost for pelleting dies because of the abrasive rice hulls used in broiler bedding. The maintenance and electrical cost of the pellet mill are considered too high to produce a competitive product to sell to farmers (Dave Vickers, personal communication, October 22, 2003.)

Vickers has recently evaluated the possible conversion of their operation from a pelleting to granulation plant using a blend of about two-thirds broiler litter (dry basis) to one-third dried municipal sludge. A tipping fee of up to \$25 per ton may be available to take dewatered sludge from Fayetteville and other population centers in northwest Arkansas. The sludge is currently transported to an Oklahoma landfill because of phosphorus runoff concerns. The estimated processing cost to make a granulated litter-sludge product at 10% moisture is about \$65 per ton including an energy charge for natural gas and electricity of \$48 per ton (Dave Vickers, personal communication, December 1, 2003). Estimated processing cost of granules per ton FOB the plant with \$25 per ton tipping fee received on the dewatered sludge is about \$35 assuming no cost for litter used in processing. Estimated processing cost for straight poultry litter granules excluding litter procurement cost is \$40-\$45 per ton (Vickers, January 28, 2004).

No other litter processors besides the one at Cave Springs are known to be operating in Arkansas. The Delaware AgriRecycle litter pellets are railed to Memphis and then trucked from Memphis to a storage silo near Augusta for \$6.40 per ton. The product is sold retail to farmers by fertilizer dealers for about \$110 per ton, excluding the spreading cost. The fertilizer dealer mark up is not exactly known for Delaware pellets, but is believed to be about \$30 per ton.

Dried municipal sludge from the northeast United States is currently barged to Helena and used to make a 16.5-0.5-0-19 (N-P-K-S) nutrient analysis "unity" granule at Helena, which is also sold by some fertilizer dealers. The N is enhanced and 19 percent sulfur is included to make the product similar to ammonium sulfate. Some of this "unity" product is applied to cut soils in eastern Arkansas as a substitute for poultry litter at over \$100 per ton retail.

### **Patterson, Osceola and Waldenburg, AR**

Fertilizer dealers handling either litter pellets or "unity" product were contacted in Patterson, Osceola and Waldenburg to obtain information on marketing and distribution of these items. Fertilizer dealers generally sold only a few hundred tons of pellets per year in their service area. However, one expected to sell about 1,000 tons per year. Information on poultry litter pellet distribution in Arkansas was also obtained from a trucker in Mississippi County. The trucker transported pellets from Memphis to the Bunge storage silo at Augusta and backhauled wheat from Newport back to Memphis.

Fertilizer dealers confirmed that the ease of handling and transporting and speed of spreading are important reasons why some crop producers strongly prefer pellets or granular compared with raw litter. It was reported that most fertilizer dealers, like the farmers they serve, have a major labor shortage in the spring during planting and preparation. In a long working day (from 5:30 am to 10:30 pm), a spinner truck could apply pellets on as many as 1,000 acres if feeder trucks are used and an application rate of 250-300 pounds per acre is maintained. The spreading cost is \$3.50-\$3.70 per acre. A spinner truck driver can use cut sheets and acre counters for precise application of pellets in the field where they are needed. Spreader trucks can travel 45 miles per hour on the highway and work up to 30-40 miles from the dealership. Pellets have 10% moisture and are guaranteed to be 3-4-4, but generally contain higher nutrient levels.

A fertilizer dealer handling “unity” reported a cost of \$75 per ton at Helena plus freight to his dealership. Application rates for unity were 350-400 pounds per acre on cut ground. At least one fertilizer dealer interviewed reported that he assessed a \$1.40 per ton tax on litter pellets but he thought that other litter pellet dealers might not be assessing this tax on pellets. The Arkansas State Plant Board lists only about 2,200 tons of dried poultry manure sold each year in the state.

A trucker contacted in Mississippi County by the Osceola Port confirmed that he was hauling litter pellets from Memphis to Augusta for \$6.40 per ton in a hopper truck and was backhauling wheat from Newport to Memphis for \$0.18 per bushel. He made two round trips per day and hauled 53,000 pounds of pellets or 850 bushels of wheat in his hopper trailer. He said that the conveyer belt loader in Memphis could load his trailer with pellets in 12 minutes.

### **Summary Observations**

Based upon results of the numerous producer focus groups and agricultural supplier and consultant interviews, the following markets for raw litter appear to hold the most promise, they are in order of priority: Lonoke/Stuttgart/Clarendon (Arkansas), Nevada (Missouri), Muskogee (Oklahoma), Newport (Arkansas), and Harrisburg (Arkansas). Vinita (Oklahoma) is not a viable market for reasons delineated in the preceding text. At this time, it appears as though Osceola (Arkansas) is too distant a market to be developed or sustained. More specific analyses of transportation and storage infrastructure and delivered costs will be specified as the next phases of this project evolve. The final markets selected may well change from this initial assessment.