

OKLAHOMA
Farm & Ranch*A*Syst

Fact Sheet 8

Reducing the Risk of Ground Water Contamination by Improving Poultry Waste Management

Poultry litter, liquid poultry manure, and dead bird residues are nutrient-rich, bacteria-laden materials that can be a threat to ground water if not properly managed. These waste materials can benefit the farmstead if they are properly stored, handled, and applied to land. An animal waste management plan (AWMP) developed by the USDA-Natural Resources Conservation Service (USDA-NRCS) is designed to use poultry waste in an environmentally safe manner. A sound AWMP includes every phase of poultry waste handling and waste management—the collection, storage, treatment, transfer, and utilization (sale or application to land as fertilizer).

The manner in which poultry waste is collected, stored, treated, and applied to land can make a big difference in its fertilizer value. Stored poultry waste and compost residue materials should be sampled and tested to determine how much nitrogen, phosphorus, and potassium they contain. The litter, liquid poultry manure, and compost nutrient information will help determine fertilizer needs, along with waste application rates for a pasture or crop.

Dead bird disposal options and guidelines for waste handling and nutrient management are available to poultry producers. Specific guidelines and considerations for any of these disposal methods can be obtained from the Oklahoma State Department of Agriculture (OSDA), Oklahoma Cooperative Extension Service (OCES), USDA-NRCS, USDA-Consolidated

Farm Service Agency (USDA-CFSA), Oklahoma Department of Environmental Quality (DEQ), and the Oklahoma Conservation Commission (OCC).

Litter Management

Storage

Litter should always be stored in a roofed area that is well protected from rain and wind. A stacking shed (roofed structure with a concrete floor) is the safest method for temporary storage of litter. Large quantities of litter can be stored and kept dry, allowing easy handling and uniform distribution.

Cost sharing for stacking sheds may be available from the USDA-CFSA. These funds are available only for farmsteads that have an approved waste management plan. Approved plans are developed through the USDA-NRCS and include application acreages, crop nutrient requirements, litter application rates, and application times. These factors are considered along with the size of the operation to arrive at design specifications (i.e., storage volume requirement) for a planned stacking shed. The stacking shed design must be approved by the NRCS before it can be accepted by the CFSA.

Application

Most broiler operations produce 1.0 to 1.4 tons of litter per 1,000 birds. For a flock of 15,000 birds, this is between 15 and 21 tons of litter per flock. Assuming total nitrogen (N) content of

the litter is 3 percent, this would result in the litter containing one-half to two-thirds ton of total N for each 15,000-bird flock. As much as 25 percent of the total nitrogen contained in fresh litter could reach ground water.

The following guidelines are recommended for inclusion in a waste management plan:

- * Distribute litter evenly over application sites according to a field-specific management plan.
- * Do not apply litter when soil is saturated, frozen, or covered with snow, or during rainy weather or when precipitation is in the immediate forecast.
- * Do not apply litter on fields with slopes greater than 15 percent, or in any manner that will allow waste to enter any flowing stream, including channels, ditches, and gullies. Follow a site-specific land management plan, especially if there are unique features to consider.
- * Do not apply litter within 25 feet of rock outcrops, or within 100 feet of streams, ponds, lakes, springs, sinkholes, wells, water supplies, and dwellings.
- * Record litter application dates, rate, and specific location where litter is applied. If the litter is sold or given away, record the name of the purchaser or hauler, the date, and the amount sold or given away.
- * Use covered vehicles if transporting poultry litter on state or federally maintained roads or other public roads for more than one mile.

The best application rate depends on:

- * Crop or pasture type.
- * Soil type.
- * Soil nutrient content before litter application.
- * Litter nutrient content.
- * Season.
- * Number of applications per year.

Liquid Poultry Manure Management

Collection and Storage

Poultry waste from laying hens is typically handled as a liquid or slurry. The collection and storage of liquid waste are combined in one operation. Leaking waterers and other sources of unnecessary water must be properly controlled to prevent premature filling of storage facilities and to reduce the amount of waste handled. Wastes from layers are collected by either of the following methods:

- * Concrete pits, two to six feet deep, located inside the layer houses are sometimes used to contain wastes in a liquid or slurry form. The wastes are typically pumped and transported with a liquid manure spreader directly from the pit to an application site.
- * Shallow alleys beneath caged birds are often used to temporarily collect wastes. The alleys are scraped or flushed, moving the waste into a pit,

Using Poultry Waste as a Fertilizer

The first step in using poultry waste as fertilizer is to determine the available nutrients in the waste. Soil testing and poultry waste nutrient analysis are recommended procedures for best determining the poultry waste application rate. Litter application equipment should be calibrated to achieve an even distribution of the litter. Your county Extension office can provide more information on soil testing, poultry waste sampling methods, analyses, equipment calibration, recordkeeping, and determining land application rates.

storage tank, or lagoon. Alleys are flushed each day with a water flow of 500 to 1,000 gallons per minute. Daily cleaning is recommended to prevent dried wastes from accumulating in the alleys, which makes removal difficult.

Treatment

Anaerobic (without oxygen) lagoons are used to degrade wastes from livestock and poultry facilities which use liquid waste management systems. A typical lagoon for 60,000 laying hens is 10 feet deep and has nearly two acres of surface area at the design water level. Lagoons are often used with caged-layer buildings having shallow concrete alleys beneath the cages. These alleys are initially flushed with fresh water. As the lagoon fills, waste water can be recycled as flush water. The level of the lagoon is managed by pumping effluent onto cropland to dispose of the waste water.

If you have a lagoon, you may want to consider a settling tank system. These shallow concrete structures can be placed between a poultry house and a lagoon to collect settleable solids and to skim floating material from the flush water. The typical settling tank is four feet deep at one end and will have a sloping floor to allow access by a front-end loader for cleanout. The wall at the deep end will have slots to allow drainage of the settled wastes. A floating baffle can be installed to remove egg shells, feathers, and other floating debris. A pair of settling tanks is recommended so that one tank can be drained and cleaned while the other remains in operation. Settling tanks will extend the useful life of a lagoon.

Disposal of Dead Birds

The OSDA is responsible for regulating the disposal of dead birds.

The following are currently approved disposal methods:

- * Composting.
- * In-ground pits (must follow NRCS design in order to be approved).
- * Incineration (requires Oklahoma State Department of Health pre-site approval and an operating permit).
- * Burial (only for smaller operations of less than 1,000 animal units capacity).
- * Rendering: Cooking/feeding to swine or Freezing (regulated by Federal Swine Health Act - "garbage feeding" - cooking method requires cooking at 210°F for 30 minutes). Dead birds can be stored prior to rendering by freezing or fermenting.

Dead Bird Composting

Composting of dead birds is showing real promise as an on-farm disposal method. Composting stabilizes nutrients, eliminates odors, and disinfects the material. As long as the composter is sheltered from rainfall, there are no environmental hazards from composting. There are several different versions of composters available. The OSDA requires that all composters be:

- * Placed on an impermeable weight-bearing foundation.
- * Roofed to allow all-weather operation.
- * Properly sized.
- * Properly sited.

Permits are required for transporting dead birds off your property. These permits can be obtained, free of charge, from the OSDA.

A properly designed USDA-NRCS composter is weatherproof and includes a floor barrier. Some Oklahoma farmers are using a waste storage and treatment shed that has primary and secondary composting bins, as well as ample room for temporary storage of broiler litter. These facilities allow ready access to the storage and compost bins. Materials can be added or removed as often as necessary for their effective treatment and land application. The penalty for improper dead bird disposal, as written in the Oklahoma Feed Yard Act, is \$1,000 per day for each violation plus up to six months in jail. The OCES and USDA-NRCS can provide information on composting, as well as information on other disposal methods.

Contacts and References

Where to call about...

Soil Testing, Litter Analysis, Equipment Calibration, Recordkeeping, and Litter Application—

Your county Extension office.

Your district or area Natural Resources Conservation Service (USDA-NRCS) office.

James Britton, Ph.D., Oklahoma Cooperative Extension Service, Area Poultry Specialist, P.O. Box 430, Poteau, OK 74953. 918-647-8231.

Jerry W. Barker, Program Administrator, Plant Industry and Consumer Services, Oklahoma Department of Agriculture, 2800 N. Lincoln Boulevard, Oklahoma City, OK 73105-4298. 405-521-3864.

Design for Poultry House, or Stacking Shed, etc.—

Your district or area USDA-NRCS office.

Waste Management Plan—

Your district or area USDA-NRCS office or your county Extension office.

Dead Bird Composting and Other Disposal Methods—

The Oklahoma State Department of Agriculture (OSDA) at 405-521-3864.

Dead Bird Disposal Regulations and Permits—

The Oklahoma State Department of Agriculture (OSDA) at 405-521-3864.

What to read about...

Nitrate Contamination of Ground Water—

Nitrates in Soil and Water, OSU Extension Facts F-2242.

Health Effects of Nitrate in Ground Water—

Nitrates and Groundwater: A Public Health Concern. 1988. Freshwater Foundation. The Freshwater Foundation at Spring Hill Center, 725 County Road 6, Wayzata, MN 55391. 612-449-0092.

Management of Poultry Waste—

Poultry Waste Management and Environmental Protection Manual. Alabama Cooperative Extension Service, Auburn Univ., Alabama 36849-5612. *

The Oklahoma Cooperative Extension Service—Bringing the University to You!

The Cooperative Extension Service is the largest, most successful informal educational organization in the world. It is a nationwide system funded and guided by a partnership of federal, state, and local governments that delivers information to help people help themselves through the land-grant university system.

Extension carries out programs in the broad categories of agriculture, natural resources, and environment; home economics; 4-H and other youth; and community resource development. Extension staff members live and work among the people they serve to help stimulate and educate Americans to plan ahead and cope with their problems.

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- It is administered by the land-grant university as designated by the state legislature through an Extension director.
- Extension programs are nonpolitical, objective, and based on factual information.
- It provides practical, problem-oriented education for people of all ages. It is designated to take the knowledge of the university to those persons who do not or cannot participate in the formal classroom instruction of the university.
- It utilizes research from university, government, and other sources to help people make their own decisions.
- More than a million volunteers help multiply the impact of the Extension professional staff.
- It dispenses no funds to the public.
- It is not a regulatory agency, but it does inform people of regulations and of their options in meeting them.
- Local programs are developed and carried out in full recognition of national problems and goals.
- The Extension staff educates people through personal contacts, meetings, demonstrations, and the mass media.
- Extension has the built-in flexibility to adjust its programs and subject matter to meet new needs. Activities shift from year to year as citizen groups and Extension workers close to the problems advise changes.

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