



# LPES Small Farms Fact Sheets\*



Photos courtesy of USDA NRCS.

## Small-Scale Farmers and the Environment: How to be a Good Steward

By Mark Rice, North Carolina State University

### Summary

*Good stewardship is important for everyone, including small-scale animal producers. Using best management practices can protect the environment. These practices can also improve the health and well-being of your animals and increase your farm's profits.*

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## Introduction

Small-scale farms make up 94% of the farms in the United States. They contribute significantly to the nation's food supply and to local economies. They strengthen rural communities and contribute to a diverse and pleasing rural landscape.

Exceeding \$100 billion annually, animals and animal products account for the majority of U.S. agricultural products. However, livestock and poultry farms, regardless of size, are facing increasing attention about the way they affect the environment. Many factors can affect a farm's impact on the environment. These factors include the animal type (kind), size, and number; the distance to water; the soil type; the weather; and the distance to neighbors. They will be discussed in the section titled "What to Consider When Evaluating Your Farm."

## Good Stewardship

Good environmental stewardship means using land and animals in a way that protects and improves the environment. Environmental stewardship

begins by evaluating your farm to identify likely pollution sources and their possible effect on the surrounding environment. The **Small Farms Environmental Stewardship Check List** on page 11 can serve as a starting point.

Overgrazing pastures; applying too much manure; giving animals free access to streams, ponds, wetlands, or marshes; mismanaging manure; and allowing excessive erosion can reduce water quality.

## Possible Pollutants and Nuisances on Animal Farms

The following seven pollutants and/or nuisances are commonly found on small farms: manure, eroded soil, bacteria, odor, ammonia, dust, flies, and rodents.

### Manure

Properly managed manure:

- Contains nutrients, or beneficial material, that improves the soil.
- Provides plant nutrients for growing crops.
- Can supplement or replace fertilizers.



- Can be sold as a farm product if properly treated (Figure 1).
- Can be used as fertilizer to recycle carbon in the soil and reduce carbon in the air.



Figure 1. Some farmers actually make money from manure.

Photo courtesy of USDA.

If not managed well, manure can lead to fly and odor problems. If rain washes manure into nearby streams or wells, the nitrogen and phosphorus found in manure can cause poor water quality. For more information, see the Small Farms fact sheet titled "Manure on Your Farm: Asset or Liability?"

### **Eroded soil**

When grass is not maintained on pastures, eroded soil can wash into streams and ponds. Soil can also be washed from crop fields that are not protected with erosion control practices.

### **Bacteria**

Disease-causing bacteria found in manure and dead animals can enter streams, ponds, and wells.

### **Odor**

Poorly managed animal barns, stored manure, manure-spread fields, or poorly managed pastures can cause odor.

### **Ammonia**

Ammonia nitrogen, a gas, is released from manure. At high levels, ammonia can cause animal and human health conditions. Even at low levels, ammonia can affect both animals and humans. Rainfall can return ammonia nitrogen to the earth where it can cause poor water quality.



**Ammonia nitrogen gas from manure can affect both animals and humans.**

**Dust**

Small dust particles in the air can bother humans and animals and be a nuisance when they settle. They can also cause health conditions when they are present in high amounts and for a long time.

**Flies**

Besides being a nuisance, flies can transmit diseases.

**Rodents**

Rodents like rats and mice can transfer diseases to other areas of the farm or nearby properties.

**What to Consider When Evaluating Your Farm**

As farmers evaluate their farm, they should consider:

- Animal type, size, and number
- Distance to water

- Soil type
- Weather
- Distance to neighbors

**Animal type, size, and number**

The type, size, and numbers of animals affect the amount of management required for your farm.

Overstocking causes most of the water quality damage on small-scale livestock farms. It occurs when too many animals are kept on too few acres. Overstocking can strip areas of pasture, increasing polluted runoff (Figure 2). On farms where animals are confined and manure is collected, overstocking often leads to large amounts of manure that must be managed.

**Keeping too many animals on too few acres causes most of the water quality damage on small-scale livestock farms.**



Figure 2. Soil erosion caused by overgrazing sheep.

Photo courtesy of USDA NRCS.

The choice of management practices can affect how many animals the farm will support. Experienced farmers, extension agents, and conservation district personnel can help farmers estimate the number of animals that they can keep on a small farm while also protecting the environment, improving animal growth, and increasing farm profits.

#### **Distance to water**

Farm animals should not be able to enter streams or rivers (Figure 3). In most cases, even ponds should be fenced off (Figure 4) and a tank used to water the animals.



Figure 3. Fenced stream crossings allow animals to get to pasture on both sides of the stream. Concrete or stone on the stream banks helps control erosion.

Photo courtesy of USDA NRCS



Figure 4. Livestock should be fenced out of ponds and provided with alternative sources of drinking water.

Photo courtesy of USDA NRCS.

Grass strips, or buffers, should be present between fields where manure is applied. Grass buffers should also be used around streams and ponds to filter the soil washed from fields (Figure 5).



Figure 5. Fences keep animals out of the stream and protect the trees and grass on the banks that help control erosion.

Photo courtesy of USDA NRCS.

In areas where the water table is close to the surface, farmers must ensure that polluted water does not seep into water wells used for humans or animals.

### Soil type

Sandy or gravelly soils do not absorb water well. Pesticides, fertilizer, and manure can easily filter through the soil to wells and to streams and ponds.

**Pesticides, fertilizer, and manure can easily filter through sandy soil and wash off clay soil.**

Clay soils absorb water slowly, so fertilizers and pesticides can wash off of fields during heavy rains.

Loamy soils filter out pollution and absorb water well. Generally, very little soil washes directly or filters into water wells. Hilly pastures often erode and lose soil and fertilizers.

### Weather

High rainfall increases the chance that pollutants will enter nearby water sources. During rainy seasons, take steps to prevent pollutants from washing into nearby ponds or streams or seeping into wells.

### Distance to neighbors

If neighbors live close to the farm, take steps to reduce nuisances like odor, dust, and flies.

### Best Management Practices (BMPs)

In general, BMPs are management practices or procedures that protect the environment and maintain or improve the farm's profits.



To be most effective, BMPs should be used for a long time, thus maintaining the farm's value.

**Best Management Practices are management practices that protect the environment and maintain the farm's profits.**

The advantages of BMPs include their variety, completeness, easy implementation, and flexibility. BMPs range from making simple changes to building structures that hold manure. They can be comprehensive and consider how the parts of the farm are related. BMPs are meant to be practical and easy to implement. They can be changed to fit individual animal farms.

In the following paragraphs, some specific BMPs are provided for nutrient management, manure management, pasture management, fencing, grass buffers, animal deaths, and access to drinking water.

### **Nutrient management**

All life forms must have nitrogen (N) and phosphorous (P), but these nutrients can harm water quality when not managed well. Livestock and poultry farmers must maintain a balance between the N and P arriving on the farm as purchased feed and fertilizer and the N and P leaving as animals, crops, or animal products including manure. If more N and P arrive on the farm than leave it, the N and P accumulate and the risk of environmental damage increases (for example, N can seep into water wells and P washes into streams and ponds).

**If more nitrogen (N) and phosphorus (P) arrive on the farm than leave it, the N may seep into water wells and the P may wash into streams and ponds.**



### Manure management

To reduce the amount of manure runoff, cover stock-piled manure and bedding, especially in high rainfall areas. Direct clean roof runoff and land runoff away from animal barns or pastures.

Develop a manure-handling system that will:

- Collect and store untreated runoff and seepage from manure storage areas.
- Store manure and bedding waste before it is spread on fields.
- Consider such items as time of year, rate, and placement when applying manure.
- Enable manure to be spread on fields when the soil is not frozen but is firm enough to prevent tractors and spreaders from packing the soil, and dry enough to avoid manure runoff.
- Allow manure to be applied to pastures or crops to meet the plants' fertilizer needs. To prevent seepage into underground water

supplies, avoid applying too much manure.

### Pasture management

To protect and enhance water quality, farmers need to maintain healthy plants in their pastures. The plants prevent soil erosion and reduce the need to use chemicals on weeds. They also serve as a filter for water draining from barnyards, lots, and fields.

Grazing management depends on how many animals the land can feed and still maintain healthy plants. Factors such as kind of animal, forage type, soil type, soil fertility, and climate determine the number of animals. For more information, see the Small Farms fact sheet titled "The ABCs of Pasture Grazing."

**By maintaining healthy plants in their pastures, farmers reduce soil erosion and the need to use chemicals on weeds.**





### Fencing

Using fences as part of your management plan can help maintain plant cover, encourage hay production, reduce animal feeding costs, decrease erosion, and protect water.

### Grass buffers

Establish grass strips, or buffers, to help filter runoff from barns or pastures and from where manure is stored or applied to land. To filter land runoff, maintain a grass buffer between cropland and rivers. Vary the size of the grass buffer depending on slope, amount of runoff, plant cover, and individual situation.

**Plant grass buffers to filter runoff from barns, pastures or cropland, and manure storage areas.**

### Animal deaths

Manage dead animals by following local rules and regulations. Choices for managing animal deaths include burial, incineration, composting, and

rendering. Dead animals should be taken care of promptly to reduce the risk of disease, rodents, odor, or water pollution. For more information, see the Small Farms fact sheet titled "Managing Animal Deaths: Your Options."

### Access to drinking water

To reduce soil erosion, tanks containing drinking water should be located in areas where the ground is stable and grass will filter runoff from the drinking areas before it enters nearby water sources (Figure 6). If farm animals must be given access to streams or ponds to obtain water, the access should be limited to areas where the banks have been reinforced.



Figure 6. Water tank on stable surface to reduce erosion.

Photo courtesy of USDA NRCS.



### The Next Step

To become a more responsible steward of your land, learn about, plan for, and carry out BMPs. For help and information, contact your Cooperative Extension office, USDA Natural Resources Conservation Services office, or Soil and Water Conservation District office. Local numbers for these agencies are in phone directories; look under your County Government or United States Government, Agriculture Department.

### Points to Remember

- Small farms are an important part of American agriculture.
- Properly managed manure can reduce the need to purchase fertilizer.
- The use of Best Management Practices can protect the environment and help protect your farming investment.



### Small Farms Environmental Stewardship Check List

As the steward of your farm, are you aware of and do you use environmentally sound practices? Read each question and check the appropriate box.

	Yes	No	Doesn't Apply
1. Is the grass in your pasture thick and tall during the growing season and maintained throughout the year?			
2. Do you apply the manure produced on your farm to crops or move it off your farm in a timely manner?			
3. When you apply manure to crops, do you consider the nutrients, or crop fertilizer, that it contains?			
4. Do you direct rainwater away from the barn, manure storage site, and exercise/riding area?			
5. Does water running from the livestock area filter through 100 feet of vegetation, such as grass or trees, before leaving your farm or reaching streams, ponds, or water wells?			
6. Do you use water bowls, water tanks, or automatic waterers to provide clean drinking water for your livestock?			
7. Do you use good housekeeping practices to control flies and rodents?			
8. Do you prevent your livestock from wading in streams and ponds?			

Adapted from Kansas Livestock Environmental Stewardship Small Farms Online Assessments, Kansas State University.



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## **For More Information**

### **Educational Resources**

<http://www.lpes.org/>—To view the Livestock and Poultry Environmental Stewardship (LPES) curriculum resources

<http://www.oznet.ksu.edu/kles/>—To view the Kansas Livestock Environmental Stewardship Online Assessments.

<http://www.reeusda.gov/1700/statepartners/usa.htm/>—To obtain state Cooperative Extension contacts

### **Environmental Regulations Resources**

<http://www.epa.gov/npdes/afo/statecontacts/>—To obtain state environmental agency contact

### **Small Farm Resources**

1-800-583-3071—USDA-CSREES Small Farm hotline

### **State-Specific Resources**

The local contact for your land-grant university Cooperative Extension program is listed in the phone book under “Cooperative Extension” or “(county name) County Cooperative Extension.”

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