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Best Management Practices for Livestock Farms

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What Is a Best Management Practice?

Best management practices (BMPs) are land management strategies that prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or groundwater. They are designed to protect water quality from potential adverse effects of land management practices from all locations within a watershed. Best management practices include soil and water conservation practices, other management techniques and social actions developed for a particular region as effective and practical tools for environmental protection. Best management practices can be used by homeowners, municipalities, farmers, industries, county, state and federal governments and agencies or anyone who manages or owns land. While BMPs are tailored to a particular land management situation and geographical location, they are implemented for the same basic goal of protecting our water resources. The focus of this fact sheet is on the use of BMPs on livestock farms.

How Are BMPs Developed?

The development of BMPs began with the recognition that potential pollutants can move from landscapes to surrounding streams and underlying groundwater during storm runoff events. Pollutants may move from the landscape, but how we manage the land can impact our water quality in both an adverse and a positive manner. Once this relationship was established, several different management options for livestock production were considered and scientifically evaluated. This has led to creative and effective ways of managing and preventing potential water quality problems.

Do All BMPs Have the Same Effectiveness?

The initial step in selecting a BMP is to first determine if the field or current land management practice is contributing to a water quality issue. In many cases, nutrient and sediment losses may be minimal (at or near natural background levels), so a BMP is not warranted for a given geographical location and land practice. Because pollutants such as nutrients and pesticides can leave a field with little visual evidence, it may be difficult to assess the need for a BMP. Acquiring a farm conservation and nutrient management plan from your local USDA Service Center can assist the landowner in determining the need for BMPs.

Once the need for a BMP is determined, then the effectiveness of BMPs is dependent on several factors:

- proper installation and maintenance;
- selecting appropriate practices for the given combination of water quality issue, impacting

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pollutant, landscape position and geographical location; and

- practical consideration related to production, profitability and sustainability.

For example, BMPs designed to reduce erosion decrease sediment-bound phosphorus but are not necessarily effective at reducing dissolved phosphorus losses. In terms of water quality impact, dissolved phosphorus is immediately available to aquatic biota and is often the main factor accelerating excessive algae growth or surface water eutrophication. Therefore, selection and installation of BMPs must be tailored to the given situation to maximize their impact and effectiveness.

Why Should I Consider Using BMPs on My Farm?

The primary reason to consider using BMPs is their implementation will help conserve and protect soil, water and air resources for generations to come. Another reason to use BMPs on your farm is that many of them are free or cost effective. For example, soil sampling is free and can save money by preventing over-application of nutrient inputs just by knowing the nutrient content of your soil and the recommended fertilizer rate for each individual pasture.

What Are Some BMPs I Can Use on My Farm?

Low Cost BMPs

- **Soil testing** allows for the nutrient content of pasture areas to be known with certainty. After testing your soil and receiving your free soil test report, you will know how much fertilizer to apply to each pasture. The benefits of precise fertilization based on soil test results can both save you money and protect the environment by preventing an over-application of nutrients and reducing nutrient losses from storm runoff. For more information, refer to FSA1035, *Soil Testing for Manure Management*; FSA2121, *Test Your Soil for Plant Food and Lime Needs*; FSA2118, *Understanding the Numbers on Your Soil Test Report*; and FSA2153, *The Soil Test Report*.

- **Nutrient management plans** (NMPs) are effective tools that provide a whole-farm systematic means of identifying water quality concerns and of evaluating the need for BMPs on each individual field. Trained professionals generally develop nutrient management plans. Nutrient management plans have several components that allow farmers to efficiently manage fertilizer applications that save money while also protecting the environment. A typical NMP has a pasture-by-pasture inventory of soil fertility and a corresponding fertilization time, rate and placement for each pasture. A NMP will also contain a place for fertilizer application records and fertilizer application buffer areas. The use of a NMP will reduce nutrient losses in storm runoff from your pastures. To obtain a free NMP, you should contact your local conservation district office. For more information, refer to FSA9516, *Phosphorus-Based Nutrient Management Planning*; FSA9515, *Nutrient Management Planning for Livestock Operations: An Overview*; and FSA9517, *Nutrients and Water Quality Concerns*.

- **Proper manure fertilization** is considered a BMP, and in Nutrient Surplus Areas (NSAs) of Arkansas, the only way you legally can apply manure is with a NMP in place for your farm. For more information, refer to FSA9516, *Phosphorus-Based Nutrient Management Planning*; FSA1037, *Manure Management: Concepts and Environmental Concerns*; FSA8000, *Utilizing Dry Poultry Litter – An Overview*; FSA9519, *Sampling Poultry Litter for Nutrient Content*; and FSA9515, *Nutrient Management Planning for Livestock Operations: An Overview*.

- **Fertilizer spreader calibration** is a good way to ensure that you are delivering your fertilizer at the desired rate per unit area. Knowing that your fertilizer spreading is accurate protects your pocketbook as well as the environment by preventing an over-application of nutrients in your pasture. For more information, refer to FSA1040,

A farmer calibrates a fertilizer spreader before fertilizing to ensure delivery of the intended fertilizer rate to the pasture.

Calibrating Poultry Litter Spreader Trucks; FSA1021, *Calibrating Liquid Manure Tank Spreaders*; and FSA2114, *Fertilizing Your Lawn*.

- **Utilization of warm- and cool-season forages** can reduce sediment and nutrient runoff from pastures, and it can increase the length of the grazing season on your farm.

- **Legume establishment** in pastures allows nitrogen to be fixed in the soil and can reduce your nitrogen fertilization needs. In addition, reducing nitrogen inputs in your pasture legumes also increases the forage quality of your pasture-forage mix. For more information, refer to FSA2117, *Forage Clovers for Arkansas*.

- **Vegetative filter strips** are strips of herbaceous vegetation placed between pasture or cropland and environmentally sensitive areas such as streams and ponds. These strips of vegetation reduce the amount of sediment, nutrients and pesticides transported to streams and ponds from your pasture in storm runoff. For more information, refer to FSA1036, *Runoff Water Management for Animal Production and Environmental Protection*.

A vegetative filter strip is placed around a stream in a pasture.

- **Buffer strips** are areas that do not receive fertilizer or pesticide applications. Buffer strips are most often implemented adjacent to or surrounding a ditch, stream, pond or a wetland area. The use of buffer strips limits the amount of nutrients, sediments and pesticides transported from your pastures in storm runoff.

BMPs That May Require Cost-Share Assistance

- **Litter stacking sheds** provide a structure where dry manure can be stored until it is time to be land applied or hauled off the farm. Dry storage prevents loss of manure nutrient content and potentially negative environmental impacts by protecting the fertilizer source from rain and nutrient transport in storm runoff.

- **Heavy use area protection** is a way to prevent negative production and environmental impacts often associated with heavy use areas on the farm. Heavy use area protection prevents soil erosion and nutrient loss in storm runoff.

- **Riparian buffers** are zones of trees and shrubs located next to streams, lakes, ponds and wetlands. Riparian buffers reduce sediment, nutrient and pesticide loss from the surrounding land area. Riparian buffers also maintain stream bank integrity, which prevents stream bank erosion and pasture loss due to stream bank erosion.

Riparian forest buffers of trees and shrubs located adjacent to streams create shade to lower water temperatures to improve aquatic habitat and prevent stream bank erosion.

- **Stream bank stabilization** is a process that prevents an already eroding stream bank from further deterioration. Stream bank erosion can cause the loss of pasture area, damage to structures near the stream bank and sedimentation and nutrient loading of rivers and lakes.

- **Stream fencing** is the practice of excluding livestock from accessing a stream. Livestock can often degrade stream bank integrity, which leads to stream bank erosion and loss of pastureland. Stream fencing prevents nutrient and sediment loss from pastures.

- **Alternative watering** is a way of providing water for livestock that are fenced out of streams and ponds. Alternative watering is also designed to deliver water to livestock at multiple places on a farm, which enhances a rotational grazing system. The use of alternative watering enhances pastures' nutrient distribution by grazing animals and prevents stream bank erosion.

Stream fencing is implemented to prevent stream bank erosion and nutrient and sediment loss from the pasture.

Alternative water sources can keep cows out of riparian areas and the stream channel.

- **Pasture fencing** is a cost-share BMP that can greatly enhance the efficiency of your farming operation. As more pasture is divided into smaller paddocks, the utilization of forages by grazing livestock can increase. As utilization of forages is increased and cattle are moved more frequently, the ungrazed paddocks will have fresh forage available for grazing and the previously grazed paddocks will have time to rest. Rest periods from grazing allow forage regrowth and prevent overgrazing, which can lead to increased storm water runoff and unnecessary sediment and nutrient loss.

- **Stream crossings** provide a hard, stable area where livestock and equipment can cross a stream without damaging the stream bed or stream banks. Stream crossings prevent sediment loss, nutrient loss and stream bank erosion.

- **Farm ponds** can impound or collect storm runoff from a pasture before it leaves a field or enters a stream. Ponds also capture sediment and nutrients in runoff that would have entered a stream and can provide an alternate source of water for cattle. To increase their longevity, ponds should be fenced to exclude cattle. However, limited access by cattle to a portion of the pond is desired by many farmers. For more information and design specifications, check with your local conservation district and USDA-NRCS office.

Pasture fencing divides pastures and increases the number of grazing paddocks. This allows better utilization of forage by cattle and forage regrowth after grazing.

Cattle crossing on a stream. The crossing keeps the cattle out of the stream except at the time of crossing.

Farm ponds can trap storm runoff, nutrients and sediments from pasture before they enter a stream.

Cost-Share Assistance

Cost-share assistance is available through local USDA service providers and is sometimes available through conservation districts. To receive cost-share assistance, you must first check to make sure that it is available by the USDA or conservation district in your county. Even though cost-share programs may exist in your county, this doesn't necessarily mean that you will receive funds for cost share when you apply, because you must also qualify in order to receive funds. Qualification is usually determined by the amount of potential environmental improvement that could be related to the implementation of BMPs on your farm. To find out if you qualify for cost-share assistance and to see if it is available in your county, contact your local conservation district office and

USDA-NRCS service provider. If there is no cost-share assistance provided by your local conservation district office, then you should check with the USDA-NRCS about their Environmental Quality Incentives Program (EQIP). The EQIP program addresses locally identified problems with natural resources. High priority is given to farms where agricultural improvements will help meet water quality objectives. EQIP offers contracts that provide incentive payments and cost sharing for conservation practices, such as manure management systems, pest management, erosion control and other practices to improve and maintain the health of natural resources.

Summary

Best management practices (BMPs) are management strategies that, when implemented correctly, address, reduce or control a potential water quality problem. There are many BMPs available for use by farmers, and many of them are free or low cost. There are also many BMPs that are costly and may require cost-share assistance. Not all BMPs apply to every situation and may vary in their effectiveness due to the nature of storm runoff. The best way to determine if you need to implement BMPs on your farm is to request a NMP at your local conservation district office or contact your local county agent.

References

Chapman, S.L., and M.B. Daniels. 1994. *Test Your Soil for Plant Food and Lime Needs*. University of Arkansas Cooperative Extension Service Publication FSA2121.

Daniels, M.B., T. Daniel, D. Carmen, R. Morgan, J. Langston and K. VanDevender. 1999. *Soil Phosphorus Levels: Concerns and Recommendations*. University of Arkansas Cooperative Extension Service Publication FSA1029.

Daniels, M.B., N. Slaton, L. Espinoza and M. Mozaffari. 2005. *Soil Testing for Manure Management*. University of Arkansas Cooperative Extension Service Publication FSA1035.

Daniels, M.B., K. VanDevender and T. Riley. 2004. *Nutrient Management Planning for Livestock Operations: An Overview*. University of Arkansas Cooperative Extension Service Publication FSA9519.

Espinoza, L., N. Slaton and M. Mozaffari. 2006. *The Soil Test Report*. University of Arkansas Cooperative Extension Service Publication FSA 2153.

Daniels, M.B., K. VanDevender and T. Daniel. 2005. *Nutrients and Water Quality Concerns*. University of Arkansas Cooperative Extension Service Publication FSA9517.

Jennings, J. 2005. *Forage Clovers for Arkansas*. University of Arkansas Cooperative Extension Service Publication FSA2117.

Patton, A. 2007. *Fertilizing Your Lawn*. University of Arkansas Cooperative Extension Service Publication FSA2114.

SERA-17. 2008. Home Page for Fact Sheets on 32 BMPs is available at http://www.sera17.ext.vt.edu /SERA_17_Publications.htm.

Sharpley, A.N., T. Daniel, G. Gibson, L. Bundy, M. Cabrera, T. Sims, R. Stevens, J. Lemunyon, P. Kleinman and R. Perry. 2006. *Best Management Practices to Minimize Agricultural Phosphorus Impacts on Water Quality*. ARS-163. USDA-ARS, U.S. Government Printing Office, Washington, DC.

VanDevender, K. 2001. *Manure Management: Concepts and Environmental Concerns*. University of Arkansas Cooperative Extension Service Publication FSA1037.

VanDevender, K., J. Langston and M.B. Daniels. 2000. *Utilizing Dry Poultry Litter – An Overview*. University of Arkansas Cooperative Extension Service Publication FSA8000.

VanDevender, K., and G. Huitink. 2003. *Calibrating Poultry Litter Spreader Trucks*. University of Arkansas Cooperative Extension Service Publication FSA1040.

VanDevender, K., P. Tacker and J. Langston. 2002. *Calibrating Liquid Manure Tank Spreaders*. University of Arkansas Cooperative Extension Service Publication FSA1021.

Wilson, M., M.B. Daniels, N. Slaton, T. Daniel and K. VanDevender. 2006. *Sampling Poultry Litter for Nutrient Content*. University of Arkansas Cooperative Extension Service Publication FSA9519.

USDA-NRCS. 2008. *National Conservation Practice Standards*. http://www.nrcs.usda.gov/technical /standards/nhcp.html.

USDA-NRCS. 2008. *Conservation Programs Manual*. NRCS. Webpage: http://www.ar.nrcs.usda.gov /programs/eqip/eqip.html.

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