

# CONSERVATION CHOICES

# FOR MARYLAND FARMERS

A guide to best management practices for farms in the Chesapeake Bay watershed, coastal zone and western regions.





# **ABOUT THIS GUIDE**

As a Maryland farmer, you play a key role in protecting water quality in our streams, rivers, and the Chesapeake Bay. With two million acres of agricultural land, farming activities can significantly impact water quality across Maryland. As the state strives to meet federal mandates for reducing nutrients and sediment in the Chesapeake Bay, known as the Total Maximum Daily Load (TMDL), your conservation efforts are increasingly vital.

In this guide, you'll find popular conservation practices—best management practices (BMPs)—for maintaining farm production, controlling soil erosion, improving soil health, managing nutrients, safeguarding water quality, providing wildlife habitats, and enhancing air quality.

Look for the six symbols throughout the guide showing the benefits of each best management practice:



Helps enrich soil health and reduces erosion and sediment runoff.



Helps protect or improve water quality.



May help increase profits by lowering costs, boosting production, or both.



Provides wildlife habitat or food.



Helps build climate resilience and improves air quality.



May qualify for state and/or federal cost-share and financial assistance.



# **COMPREHENSIVE FARM PLANNING**

A Soil Conservation and Water Quality Plan (SCWQP) or "farm plan" offers a simple way to address your farm's natural resource concerns. Technical experts in your local soil conservation district provide these plans free of charge. A typical plan includes:

- Land use maps
- Soil information
- An inventory of natural resources
- Engineering notes
- Recommendations for best management practices based on your input and needs

Conservation plans are "flexible" and provide guidance for making environmental improvements based on time, need, and money.

Many federal and state programs require Soil Conservation and Water Quality Plans. Some live-stock and poultry farms are required to obtain farm plans as part of the Maryland Department of Environment's Confined Animal Feeding Operation (CAFO) permitting process.

Farm plans are also important to the health of the Chesapeake Bay and are included in Maryland's restoration program.

Contact your local soil conservation district for a free personalized farm plan. District staff will help you to estimate installation costs to install conservation practices AND navigate federal and state cost-share and financial assistance programs.



# Questions to ask when developing your Soil and Water Conservation Plan

- What natural resources and sensitive areas are on my farm?
- What crops do I plan to grow?
- Am I rotating crops to increase biodiversity and reduce disease and pest problems?
- Am I using commercial fertilizer, animal manure and/or other nutrients based on my nutrient management plan?
- Have I minimized runoff?
- Could I use wetlands or vegetated buffers to reduce nutrient runoff?
- What types of wildlife do I want to see?
- Will a new best management practice interfere with or cancel out another practice?

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# **Contour Farming**



Tillage, planting and other farming practices performed on or near the contour of the field—not up and down the hill.

# **DESCRIPTION**

Crop row ridges built by tilling and planting on the contour to reduce erosion. Contour farming may be used with stripcropping, where crops like corn are alternated with strips of crops that grow close together (hay, alfalfa, clover, and small grains). Alternating strips slows runoff, increases infiltration, traps sediment, and provides cover. Crop rotation with legumes as part of stripcropping will add nitrogen to the soil.

#### **BENEFITS**

- Slows water flow and increases infiltration, reducing soil erosion by as much as 50 percent.
- Promotes better water quality.

# **PLANNING**

- How many key contour lines will you need because of steep or irregular slopes?
- Will stripcropping, crop residue management, diversions, or other practices be needed for steeper slopes?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Establish a key contour line around the hill.
- The key contour line grade should not exceed two percent, except within 150 feet of a grassed waterway, field border, or other stable outlet. In these cases, the row grade may be up to three percent.
- Perform all tillage and planting operations parallel to the key contour line.
- Replace end rows with field borders to reduce erosion.
- Contour strips of open row crops such as corn should be about the same width as strips of close-grown crops, including small grains or meadow grasses.
- Strip widths may be adjusted to accomodate equipment.

- Use grassed waterways to prevent gully erosion
- Keep strip widths consistent from year to year.

# **Conservation Drainage**



Practices that treat drainage water from artificially drained agricultural fields providing numerous environmental benefits.

# **DESCRIPTION**

These edge-of-field practices help reduce the movement of sediment, nitrogen, and phosphorus from artificially drained agricultural land into surface water. Practices and components commonly used in Maryland include subsurface denitrifying bioreactors, saturated buffers, created wetlands, water control structures, underground outlets, and subsurface drains.

#### **BENEFITS**

- Removes nutrients from subsurface drainage water before it leaves the farm.
- Wetlands and saturated buffers help maintain stream flow by storing excess water and slowly releasing it into adjacent streams.

# **TYPES OF PRACTICES**

• Subsurface Denitrifying Bioreactor—A buried trench filled with a carbon source, usually wood chips, and installed at a field's edge to remove nitrate-nitrogen from subsurface agricultural drainage water.

- **Saturated Buffer**—A biological treatment system used to divert subsurface drainage water to a vegetated area for treatment.
- Wetland Creation—A wetland is constructed at the edge of a field to treat and filter drainage water. Wetlands remove sediment, nutrients, organic matter, and other pollutants from subsurface groundwater linked to farming operations.
- Water Control Structure—Used together
  with the above practices or as a standalone to help prevent gully erosion,
  manage water to improve crop production,
  and reduce the movement of nitrates to
  downstream waters.
- Subsurface Drain
   An underground pipe used to collect and transport subsurface drainage water to a buffer, wetland, or bioreactor.
- Underground Outlet

  —Tubing, tile or pipe installed to move surface water from a treatment practice to a designated outlet.



# **PLANNING**

- Consider how this practice may affect surface water quality.
- Will the practice impact downstream flows or aquifers?

#### **TECH NOTES**

- Work with your local soil conservation district to determine the best practice for your farm.
- A subsurface denitrifying bioreactor must be designed to achieve at least a 30-percent annual reduction in the nitrate-nitrogen load of the water flowing through the bioreactor.
- Saturated buffers must intercept a subsurface drain outlet draining at least 15 acres and be a minimum of 30 feet wide.
- Created wetlands should be located in landscape positions and soil types that are able to support the planned wetland functions.
- Water control structures may be used as part of a water management system to control the stage, discharge, distribution, delivery, or direction of water flow.

- Subsurface drains and underground outlets must be installed using another best management practice to ensure the draining water undergoes a nutrient reduction process.
- Cost-share funding is not available for field drainage laterals.
- Reduced cost-share funding is available for drainage mains.

- Trees and shrubs in the soil above and around these practices must be controlled by hand, machine, or chemicals.
- Install a rodent guard to protect outlets from rodents and other animals.
- Inspect periodically—especially following significant rainfall events—to keep inlets, trash guards, and collection boxes and structures clean and free of debris that can reduce flow.
- Repair eroded areas at pipe outlets.

# **Cover Crops**



A small grain or legume crop traditionally planted in the fall to recover unused nutrients from the root zone, control soil erosion, and improve the soil.

# **DESCRIPTION**

In the fall, cover crops, including cereal grains (such as wheat, rye, or barley), brassicas (cabbage family plants), or cool-weather legumes such as clover are sown after harvesting crops like corn or soybeans.

#### BENEFITS

- Ties up leftover nutrients and reduces leaching to surface and groundwater supplies.
- Protects soil from wind and water erosion.
- Improves soil health and increases water retention.
- Reduces weeds and other pests.
- Cuts down on fertilizer needs in the spring.

#### **PLANNING**

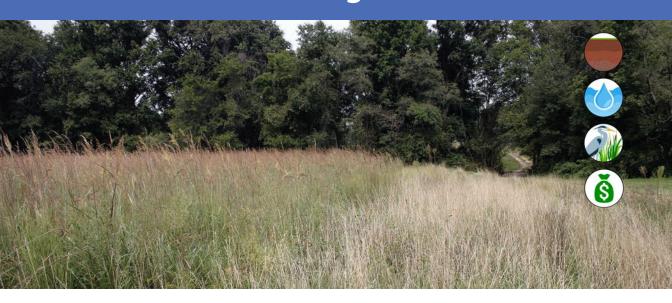
- Can the cover crop be planted into standing crops?
- Will the seeding method allow you to meet fall planting deadlines for nutrient uptake?
- Are adequate soil conservation measures installed?

# **TECH NOTES**

- Cover crops are recommended to improve nutrient management.
- Cover crops need 30 to 40 days of good growth before the first hard frost. Plant fall cover crops from early August until mid-October for best results.
- Cover crops are often recommended when growing low residue-producing crops such as soybeans or corn silage.
- To optimize germination, use planting methods achieving soil-to-seed contact.
- Cover crops may be aerial seeded before harvesting summer crops or seeded post-harvest using no-till, vertical tillage, or conventional methods.
- Follow NRCS recommended seeding rates.
- Increase aerial seeding rates by 25 percent.

- Cover crops may be green chopped or grazed once well established.
- Kill cover crops in the spring via mowing or herbicide application.
- Avoid using deep tillage to terminate cover crops because it will bury residue.

# **Critical Area Planting**



Planting grass or other vegetation to protect a severely eroding area from soil erosion.

# **DESCRIPTION**

Grasses and legumes are established in areas with excessive soil erosion, often in places with bare ground or steep slopes. Vegetation creates surface cover to stop erosion caused by raindrop splash and helps slow runoff.

#### **BENEFITS**

- Reduces soil erosion.
- Improves water quality by reducing sediment, nutrient, and pesticide runoff.
- Protects dams or gullied areas where vegetation may be hard to establish.
- Provides nesting cover for birds and small animals.

# **PLANNING**

- Will the planting provide protection?
- Will the planting provide wildlife cover?
- Will you use the planting for grazing livestock?
- Are proper soil conservation practices installed above the planting area?
- Can the area be stabilized using other conservation methods?

#### **TECH NOTES**

- Contact your local soil conservation district for free guidance.
- Apply lime and fertilizer, if needed, in the top three inches of the soil before planting.
- Follow recommended seeding rates.
- Plant annual grasses to protect against erosion until permanent cover is established.
- Severely eroded areas may need a nurse crop like oats. Mow before they head out, and mow high to avoid clipping the permanent seeding.
- Areas disturbed during construction on barren slopes 4:1 or steeper should be mulched to provide temporary protection before seeding.
- Mulches include hay, grain, straw, or commercially produced wood fiber matting.

- Avoid grazing the year after planting; prevent overgrazing after the permanent cover is established.
- Fence, if needed, and permanently exclude livestock from extremely steep slopes.
- Periodic burning may benefit native or warm-season grasses by reducing and removing competing plants.

# **Crop Residue Management**



Residue from the previous crop is left on the soil surface through the use of reduced tillage practices.

# **DESCRIPTION**

Crop residue management is part of reduced tillage and continuous no-till systems and may be used with conventional tillage. All tillage operations are reduced, and some crop residue is always on the soil surface. Residue helps shield the soil from rain and wind until the next crop can produce a protective canopy. Continuous no-till systems provide the best soil protection by leaving the soil untilled and all residue on top of the ground. Seasonal residue management can be used with conventional tillage systems when crop residue is left in the fall to protect fields during winter.

# **BENEFITS**

- Ground cover prevents soil erosion.
- Residue adds organic matter and improves soil quality.
- Fewer trips across the field and less tillage reduce soil compaction and save time, energy, and labor.

# **PLANNING**

- Will the crop produce enough residue to protect the soil from erosion?
- Is special equipment needed?

#### **TECH NOTES**

- Contact your local soil conservation district for free guidance.
- Ensure ample residues are spread evenly over the field by combine at harvest.
- Reduce the number of unnecessary tillage passes.
- Use straight points and sweeps on chisel plows instead of twisted points, which can bury 20 percent more residue.
- Adjust tillage tools to shallower settings.

# **MEASURING CROP RESIDUES**

Estimate residue levels using a line with 50 or 100 equally divided marks. Stretch the line diagonally across crop rows. Count the number of marks that have residue under the leading edge. Walk the entire length of the rope. The total number of marks with residue under them is the percent of residue cover. If the line has only 50 marks, multiply the count by two. Repeat three to five times in representative areas of the field. Reduced tillage systems should leave at least 30 percent residue after each planting. Continuous no-till systems will leave much more.

# **Crop Rotation**



Regularly changing the crops grown in a field to naturally break the cycle of weeds, insects, and diseases.

# **DESCRIPTION**

Crops are changed or rotated seasonally or every few years in a planned order. Hay crops are often grown across sloping lands in wide strips, alternating with grain crops like corn. After a few years, the crops are rotated so that the hay strips are planted to grain crops and vice versa. On flat land, fields are rotated from one crop to the next, sometimes within the same year (such as soybeans planted after wheat).

# **BENEFITS**

- Adds biological diversity to an operation
- Pesticide costs are often reduced by breaking the cycle of weeds, insects, and diseases naturally.
- Rotation of grain crops (corn, wheat and barley) with legumes (alfalfa, soybeans and clover) reduces fertilizer needs by adding nitrogen to the soil.
- Crops that grow close together (hay, alfalfa, clover, and small grains) can reduce soil erosion dramatically.

#### **PLANNING**

- Are there insect, weed, or disease problems that must be controlled?
- What crops are needed to support the farming operation? (For example, hay for livestock.)
- Is there a market for other crops?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Crops must be suited to soils and climate.
- Design rotations to meet the residue needs of crop residue management plans.
- Rotations that include small grains or hay provide better erosion control.
- For crop rotations that include hay (meadow grasses, perennial clovers, or alfalfa), the rotation can be lengthened by maintaining the existing hay stand for several years.

- Switch crops to use perennials in the rotation, if necessary.
- Consider herbicide carry-over to avoid crop failures.

# **Diversion**



A long earthen embankment built across a slope to direct runoff water from a specific area.

# **DESCRIPTION**

A channel built across a steep slope with a supporting ridge on one side. It may be used to divert runoff away from a feedlot or to collect and direct water to a pond.

# **BENEFITS**

- Reduces soil erosion by intercepting and preventing runoff from reaching farmland or sensitive resources downslope.
- Vegetation in the channel filters runoff, improving water quality, and provides cover for small birds and animals.
- Allows better crop growth on bottomland soils.

# **PLANNING**

- Are proper soil conservation measures installed to prevent the diversion from filling with sediment?
- Is the outlet planned in a location that will not cause erosion?
- Are the diversion and outlet large enough to handle the runoff from the site?

#### **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Must be built to carry at least the peak amount of runoff generated by a 10-year, 24-hour storm.
- Should not be built in high-sediment producing areas unless installed in conjunction with other conservation methods.
- Minimum top width for a diversion ridge is 4 feet.
- An outlet, such as a grassed waterway, grade stabilization structure, or underground outlet, must be provided.
- Establish vegetated outlets before the diversion is constructed.

- Keep the outlet clear of debris.
- Keep burrowing animals out of diversions.
- Maintain vegetative cover on the diversion ridge.
- Fertilize based on soil test results.
- Install filter strips above the channel to trap sediment and protect the diversion.

# **Grade Control Structure**



Earthen, wooden, concrete, or other structure built across a drainageway or gully to control and reduce water flow.

# **DESCRIPTION**

Structures that drop water from one stabilized grade to another to prevent gullies from advancing up a slope.

# **BENEFITS**

- Prevents gully erosion by stabilizing waterway outlets.
- Grassed, non-eroding waterways with a grade control structure improve water quality, can be crossed with equipment, and defend against gully formation in areas with severe erosion issues.
- If planned to retain water, a grade control structure will trap nutrients and sediment and may provide a water source and habitat for wildlife.

# **PLANNING**

- Are adequate conservation practices installed above the structure to reduce erosion and sedimentation?
- Is the planned location in the proper place to achieve the level of control needed?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Obtain necessary permits or authorizations before construction.
- Remove all trees and shrubs within 30 feet of the structure.
- Clear debris approximately 50 feet downstream from the spillway outlet.

- Keep burrowing animals off earthen structures.
- Repair cracks or damage to concrete, wood, or other structural components.
- Control vegetation and invasive species.
- Keep outlets free of debris.

# **Grassed Waterway**



Shaping and establishing grass in a natural drainageway to control soil erosion and prevent gullies from forming.

# **DESCRIPTION**

A natural drainageway is graded and shaped into a smooth, parabolic-shaped channel, seeded with sod-forming grasses. Runoff water flows over the grass instead of tearing the soil away to form a gully. An outlet is often installed at the base of the drainageway to stabilize the waterway.

# **BENEFITS**

- Grass cover protects the drainageway from gully erosion.
- Vegetation may act as a filter, absorbing some pesticides and nutrients in runoff water.
- Vegetation provides cover for wildlife.

#### **PLANNING**

- Is major land reshaping needed?
- Is there a proper outlet for surface runoff at the bottom of the waterway?
- Will tile drainage be necessary to stabilize the waterway?
- Are conservation measures installed to prevent siltation?

# **TECH NOTES**

- Contact your local soil conservation district for free guidance.
- A waterway should be designed to carry the peak runoff from a ten-year, 24-hour storm.
- Seed at recommended time and rate. Place seed about 1/4 to 1/2 inch deep. If feasible, plant across the slope to reduce erosion.
- A nurse crop, temporary cover, or mulch may be necessary until permanent cover is established

- Fertilize based on soil test results.
- Do not use the waterway as a roadway.
- Lift implements off the ground and shut off spray equipment when crossing.
- Maintain the width of the grass area when tilling surrounding fields.
- Avoid planting end rows along the waterway to prevent a new gully from forming on the outside edges.

# **Integrated Pest Management**



If pests reach threatening levels, a site-specific combination of pest prevention, avoidance, monitoring, and suppression strategies are used.

# **DESCRIPTION**

Crops are scouted to determine the type of pest (insects, weeds, or diseases), development stage, and extent of the problem. The potential damage from the pest is weighed against the cost of control. All options are evaluated based on cost, results, and environmental impact. Precautions are taken to keep pesticides from leaving the field by leaching, runoff or drift.

#### **BENEFITS**

- Scouting and spot treatment for pests that threaten crop health or yields can save money.
- Using less pesticides protects water quality.
- Treatment for specific pests in targeted areas prevents over-use of pesticides.

# **PLANNING**

- Which soils are likely to leach pesticides?
- Have vegetative buffers been established?
- Have you considered pest control alternatives?
- Have you reviewed crop records and controls?
- Have you rotated crops to reduce pest problems?

# **TECH NOTES**

- Complete a pesticide risk assessment.
- Scout to identify pests.
- A Private Pesticide Applicator Certificate is required before purchasing or applying a restricted-use pesticide.
- Use the lowest effective application rate to treat the problem.
- Rotate pesticides to reduce pest resistance.
- Use spot treatment when possible.

- Keep accurate records.
- Calibrate application equipment.
- Inspect equipment for wear and damage.
- Follow all label directions when applying pesticides.
- Mix and load pesticides in an area that will not contaminate soil or water.
- Apply pesticides during periods of minimal potential for drift or runoff.
- Dispose of pesticide containers and bags according to label directions.

# **Pollinator Habitat**



Permanent vegetation (herbaceous and/or woody plants) planted in an agricultural landscape suitable for pollinator habitat.

# **DESCRIPTION**

Typically established as part of a conservation management system, pollinator habitat provides wildlife with food and cover, reduces soil erosion, and protects water quality.

# **BENEFITS**

- Provides nectar and pollen sources for pollinators.
- Offers low-disturbance areas for nesting birds.

# **PLANNING**

- Use plant species that can provide food and cover for pollinators during spring, summer, and fall.
- A minimum of 0.5 acres of habitat is required to provide pollinators with enough space to find food and nesting sites.

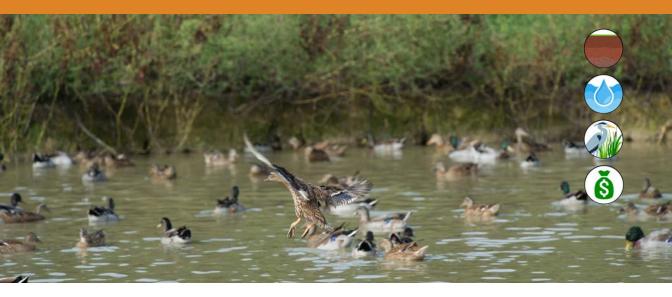
# **TECH NOTES**

- Prepare the site to ensure the survival and growth of the selected species.
- Be sure to treat any existing or potential weed problems before planting, which may take up to a year to resolve. Consult with a weed specialist.

- No-till establishment is highly recommended.
- Follow NRCS seed mixture recommendations for site conditions.
- Include at least three plants from each grouping (early, mid, or late season blooming) in the mix.
- Avoid fertilizing, as it will promote weed growth.
- Mulch newly seeded areas if necessary.
- Oats may be used as a companion crop to prevent erosion.

- Actively manage habitat(s) to prevent the spread of noxious or invasive plants.
- Inspect and repair habitat after storms.
- Do not mow or burn during nesting season (May through mid-August) to protect ground-nesting wildlife.
- Prevent pesticide drift onto pollinator habitat.
- After plants are established, mow no more than 30 percent of a pollinator planting in any one year.

# Rare and Declining Species Habitat



Establishing or restoring unique or diminishing habitats to support communities of native plants and animals.

# **DESCRIPTION**

Managing or reestablishing habitat by planting trees, shrubs, and other vegetation to provide food and cover for target fish and wildlife species. Restoration of these habitats increases the diversity, abundance, and survival of desired species.

# **BENEFITS**

- Provides food and cover for wildlife.
- Increases species biodiversity.
- Reduces erosion and protects water quality.

# **PLANNING**

- What wildlife are you looking to attract?
- Is a specific area of land better suited for habitat than for crops or livestock?
- What is the land use and habitat like in the surrounding area? Will it have an impact on achieving your restoration goals?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Obtain all necessary federal, state, and local permits before restoration.

- Identify and control invasive and undesirable species that may have contributed to the habitat's degradation.
- To attract a particular species, choose habitat conditions specific to that species.
- Include birdhouses and feeders.
- Create a diverse habitat to attract a wide variety of species.
- Federal and state cost-share is available for this practice.

- Evaluate conditions annually to ensure the desired habitat is present in sufficient distribution, quantity, and quality.
- Manage weeds and other pests to maintain desired plant and animal species.
- Maintain permanent vegetative cover.
   Regularly inspect for disease and weather damage and repair or replant as necessary.
- Avoid performing maintenance activities during seasons of primary habitat use by the targeted species unless needed to achieve desired habitat conditions.

# **Riparian Buffers**



Trees, shrubs, or grasses planted next to waterways filter runoff, improve water quality, control erosion, and provide wildlife habitat.

# **DESCRIPTION**

Vegetative buffers slow water flow, trapping sediment and other pollutants like pesticides and nutrients. Trees and shrubs planted along waterways (including rivers, streams, and drainage ditches) provide wildlife habitat and lower stream temperatures, benefitting aquatic life.

# **BENEFITS**

- Prevent contaminants from entering waterways and provide shade, food, and habitat for wildlife and aquatic life.
- Help stabilize streams.
- Trees and shrubs sequester additional carbon from the atmosphere.

#### **PLANNING**

- Are adequate soil conservation measures installed upslope of the buffer?
- What types of plants are suitable for site conditions?
- How wide should the buffer be to meet your goals?
- Will you need fencing to exclude livestock from buffers?

#### **TECH NOTES**

- Work with your local soil conservation district to select plants for the buffer and determine its width.
- Prepare the site to ensure the survival and growth of selected species.
- Use tree shelters to increase the survival rate of young trees.
- Treat existing or potential weed problems prior to planting. Resolving weed problems may take a year. Consult a weed specialist.

- Wait to mow grass areas until after August 15 to protect nesting birds.
- Troubleshoot survival problems before replanting; replace dead trees and shrubs as needed.
- Remove tree shelters 2 years after trees emerge.
- Control weeds and other undesirable vegetative competition.
- Repair fences and check for damage to livestock crossings.

# Tree and Shrub Establishment



Establishing trees and shrubs on agricultural land outside the stream corridor to improve water quality and sequester carbon.

# **DESCRIPTION**

Tree/shrub establishment can be applied on any site where woody plants can grow, including land enrolled in conservation programs sponsored by USDA, other federal and state agencies, and private organizations.

#### **BENEFITS**

- Woody plants can be used for forest products.
- Controls erosion.
- Produces woody biomass for energy.
- Improves energy conservation and beautifies the landscape.
- Stores carbon and improves water quality.
- Provides wildlife habitat.
- Controls drifting snow.

# **PLANNING**

- What is the goal of your tree/shrub planting?
- Will plantings be protected from wildlife damage?
- Will you need access lanes?
- Will pesticide drift from cropland harm plants?

#### **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Choose species adapted to soil site conditions.
- Only use viable, high-quality, and adapted planting stock or seed.
- Choose the planting method appropriate for existing site conditions and species capabilities.
- Timing and equipment should be in line with site and soil conditions.
- Follow state and local regulations for locating plants adjacent to roadways.
- Avoid creating blind corners and intersections.
- Protect the planting from livestock, wildlife, and fire damage.

- Control competing vegetation until plants are established.
- Inspect regularly for pest damage.
- Maintain firebreaks around all plantings.
- Replant as needed.
- Irrigation, mulching, geo-textile mats, and tree shelters may be needed.

# **Wetland Restoration**



Restoring the water and plant community in a former or degraded wetland to improve water quality and provide wildlife habitat.

# **DESCRIPTION**

Small structures are built to hold water in an area where drainage, filling, or other methods were previously used to remove natural wetland features. Surface drains and subsurface tile lines may be plugged. Concrete and earthen structures, like low dikes or ditch plugs, are installed to retain water and maintain a specified water level. Sometimes, adjustable outlets allow the landowner to fluctuate water levels during different seasons.

# **BENEFITS**

- Improves water quality by intercepting surface runoff, trapping sediment, and processing nutrients and organic wastes before they reach open water.
- Wetlands temporarily store water, allowing it to seep slowly into the ground, evaporate, or be absorbed by wetland plants. This storage reduces peak water flows after storms.
- Provides habitat for waterfowl and many other species of wildlife.

# **PLANNING**

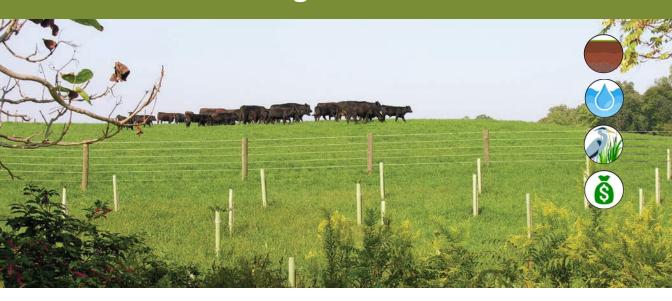
- Is there an adequate water supply?
- What types of wildlife do you want?
- Will the entire site need to be planted?
- Will plugging drains or breaking tile lines to restore the wetland adversely affect other parts of the farm or neighboring farms?

# **TECH NOTES**

- Work with your local soil conservation district to select plants for the restoration site, buffer, and any earthen structures.
- Obtain necessary permits or authorizations before construction.
- Keep livestock away from the area unless it is included in a grazing management plan.

- Some vegetation may need to be replanted until well established.
- Keep burrowing animals out of earthen structures and outlets free of debris.
- Inspect and repair pipe structures.

# Livestock Fencing



Enclosing or dividing an area of land with a suitable permanent structure that acts as a barrier to livestock.

# **DESCRIPTION**

Fencing prevents livestock from trampling streambanks, destroying vegetation, and stirring up sediment in the streambed. It also excludes livestock from areas needing protection from grazing or browsing, contains animals in a designated area, and encourages animals to use stream crossings.

# **BENEFITS**

- Reduces erosion by controlling access to designated areas by grazing animals.
- Benefits water quality and fish habitat by reducing the amount of nutrients and sediment entering a stream.
- Allows vegetation to be established or recover.
- Enables farmers to develop rotational grazing systems that improve forage, evenly distribute manure, prevent erosion, and improve water quality.
- Improved forage production will help increase livestock production.

# **PLANNING**

• Do you need a livestock watering facility?

#### **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Establish vegetative cover on all disturbed surfaces; use gravel or lining to control erosion where vegetation will not survive.
- The distance between the fence and streambank is determined by the land-scape, stream characteristics, flood levels and frequencies, state laws and regulations, public drainage maintenance right of ways, and wildlife/environmental considerations.
- Riparian forest buffers should be at least 1/3 of the width of the floodplain or 35 feet wide to benefit water quality.
- Complete habitat/stream protection benefits may require a wider buffer strip.
- Comply with federal, state, and local requirements.
- Temporary fences are not eligible for costshare.

- Inspect and repair fences regularly.
- Clear brush and fallen limbs from fence lines.
- Avoid damaging buffer zones with herbicides from surrounding cropland.

# **Livestock Stream Crossing**



Provides a hard, stable surface to transport livestock and farm equipment for pasture maintenance without damaging the streambed or banks.

# **DESCRIPTION**

Allows safe animal access to hard-to-reach pastures while helping to control streambed and bank erosion. The crossing may also be used to transport equipment needed to maintain pastures.

#### **BENEFITS**

- Provides livestock access to all pastures.
- Encourages livestock to use the crossing rather than streambeds to navigate streams.
- Allows vegetation to stabilize streambanks and promotes wildlife habitat.
- Reduces risk of livestock injury due to unstable footing in stream channels.
- Lowers risk of livestock breaking through frozen stream surfaces in winter.
- Improves livestock health by keeping animals out of the mud.

#### **PLANNING**

- How will you exclude livestock from the stream?
- Can a livestock watering system be installed?
- Are soil conservation practices in place?
- What are conditions like upstream?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Slope the streambanks on each side and provide a firm streambed.
- Make banks flat enough for livestock or equipment to move safely down the bank.
- Protect banks with gravel laid over filter fabric.
- Make the streambed firm enough for cows to walk across or equipment to cross without causing ruts.
- Comply with federal, state, and local requirements.

- If livestock use the crossing, ensure fences are in place.
- Inspect after major storm events.
- Remove buildup of organic matter, woody material, or excess sediment.
- Replace the surface stone used for the livestock crossing as needed.

# **Livestock Watering System**



A system of troughs and water lines to provide livestock with water from a spring, pond, well, or other source.

# **DESCRIPTION**

Carefully placed watering troughs can significantly improve pasture management. This approach allows farmers to manage grazing more effectively while preventing erosion and water pollution. By keeping livestock away from environmentally sensitive water sources such as streams and springs, these troughs help protect the surrounding ecosystem.

#### **BENEFITS**

- Provides a clean, reliable, and accessible water supply for animals.
- Allows farmers to divide large pastures into smaller units and rotationally graze livestock to maintain quality forage.
- Helps reduce erosion from muddy areas due to livestock having uncontrolled access to springheads and streams.
- Can reduce mastitis or hoof problems by providing water for livestock in dry pastures.

#### **PLANNING**

- Will the system have the capacity to meet livestock water needs?
- Will the system affect downstream flows or aquifers?

- Will wetlands or other water-dependent wildlife habitat be impacted?
- Will you need fencing to keep livestock out of streams and sensitive areas?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Locate troughs to promote even grazing.
   Place them as far from streams and drainageways as practical.
- Use an underground outlet to handle trough overflow.
- Use reinforced concrete or an equally durable material for permanent watering troughs.
- Get necessary permits or authorizations before construction.

- Reseed and fertilize around the trough as needed to maintain vegetative cover.
- Inspect the water source, pipelines, and outlets regularly.
- Clear any debris, algae, or sludge in the trough.

# **Pasture Planting**



Planting grasses and legumes improves forage production, enhances livestock nutrition, protects the soil from erosion, and safeguards water quality.

# **DESCRIPTION**

Establishing perennial grass cover provides quality forage for livestock, stabilizes eroding areas, filters runoff water, and provides wildlife habitat and cover.

#### **BENEFITS**

- Heavy grass cover slows water flow, reducing soil erosion.
- Protects water quality by filtering runoff water and increasing infiltration.
- Provides cover and habitat for wildlife.
- Increases organic matter in the soil.

# **PLANNING**

- Are selected species suited to soil types?
- Will the species selected minimize pesticide use?
- Will the plant species selected meet livestock needs?

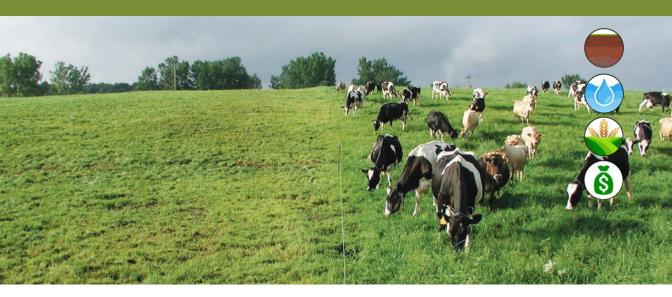
# **TECH NOTES**

 Fertilize or lime based on current soil test data. For best results, allow several months before planting for lime applications to take effect.

- Before reseeding, graze or closely clip pastures.
- Use legumes to improve forage quality and extend the grazing season.
- Simple mixes of one grass plus one or two legumes are easier to manage and generally preferred.
- Do not mix warm and cool season grasses in the same pasture.
- For most grasses and legumes, drill seed uniformly to a depth of 1/4 to 1/2 inch or broadcast and cultipack on a conventionally prepared seedbed.
- For new pastures, plant a nurse crop on steeper slopes or where weeds may interfere with establishing a good stand. NRCS recommends seeding a small grain at 3/4 of a bushel per acre as a nurse crop.

- Wait until the pasture is well established before grazing.
- Mow weeds when they reach 6 to 8 inches.
- Control persistent weeds with herbicides.

# **Rotational Grazing**



Moving livestock from one section of a pasture to another gives each area a chance to rest. This helps maintain high quality forage.

# **DESCRIPTION**

The pasture is divided into two or more areas or paddocks with fencing. Livestock are moved between on a planned schedule based on forage availability and nutritional needs. Livestock are not allowed to graze plants below a specific height. Allowing paddocks to rest and recover until the next grazing rotation maintains a vigorous plant community and high-quality forage.

# **BENEFITS**

- Improves vegetative cover, protects soil from erosion, and improves water quality.
- Helps ensure high-quality forage throughout the grazing season.
- Distributes manure more evenly.
- Improves habitat for birds and wildlife.

#### PLANNING

- Is water available in all pastures?
- Will you need additional fencing?
- Are current forages adequate for the stocking rates and grazing system?
- Does forage quality meet the nutritional needs of livestock?

 How will you adjust for periods of low forage production, such as droughts?

# **TECH NOTES**

- Work with your local soil conservation district to develop a rotational grazing plan.
- Plan the rotation so that the paddocks are grazed at different times every year.
- Plan rest periods so paddocks have enough time to recover from grazing.
- Know the proper grazing heights for forages in the grazing system.

- Check fences regularly and make repairs.
- Mow or harvest paddocks during periods of fast growth.
- Remove portable water systems in winter and reinstall the in the spring.
- Adjust the rotation schedule to match plant growth.
- Apply lime and fertilizer based on nutrient management plan recommendations.
- · Control weeds.

# Silvopasture



Woody plantings in active livestock pastures filter runoff, provide shade and shelter for livestock, and sequester carbon.

# **DESCRIPTION**

Silvopasture integrates trees, shrubs, and compatible forages on the same land.

# **BENEFITS**

- Provides forage, shade, and shelter for livestock.
- Shaded, cool season forage plants can be more nutritious for livestock.
- Improves water and soil quality; reduces soil erosion.
- Increases plant nutrient uptake efficiencies.
- Increases carbon sequestration and storage.
- Enhances wildlife habitat and improves biodiversity.
- Improves the value of timber products.

# **PLANNING**

- Do you plan to establish a silvopasture in existing woodlands or introduce new trees into a pasture?
- What type and breed of livestock do you plan to graze? Will they be suited to the silvopasture system?
- Are you prepared to rotate animals to allow areas to rest and recover?
- What types of trees do you plan to grow? Do they match the soil type?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Tree and forage species must be adapted to the site and compatible with its planned management.
- Establish forage species and understory shrubs that will provide forage, browse, seed, cover, or nesting habitat for wildlife.
- Do not use plants designated as federal or state noxious weeds.
- Plant trees at a density that allows acceptable forage production and wood products.
- Protect plantings from grazing until an adequate stand is established.
- Apply nutrients based on soil test results and the farm's nutrient management plan.

- Work to provide appropriate light conditions for forages and shade/shelter conditions for livestock.
- Inspect the site to determine if tree and shrub survival rate meets objectives.
- Replant or provide supplemental planting when survival is poor.
- Control competing vegetation until plantings are established.

# **Agrichemical Handling Facility**



A facility with an impervious surface that provides an environmentally safe area for the handling of on-farm agrichemicals.

# **DESCRIPTION**

A safe environment for the storage, mixing, loading, and cleanup of agrichemicals. Helps prevent spills and leaks from soaking into the ground and impacting surface water, groundwater, air, and/or soil.

# **BENEFITS**

- Provides a stable, safe surface for equipment storage and operation.
- Reduces the risk of spills or leaks during loading, unloading, or mixing.
- Protects the environment by confining spills; allows for faster, more effective actions to clean the area of contaminants.
- Reduces the potential for accidental spills to reach waterways and groundwater.
- Reduces risks to humans handling agrichemicals.

# **PLANNING**

- Will the facility be located a safe distance from waterways?
- Is an adequate water supply available?
- Are soils and topography at the selected site suitable for construction?

# **TECH NOTES**

- Design and construct the facility following all federal, state, and local laws.
- Secure all necessary permits to install and manage the facility.
- Follow NRCS specifications.
- Average the farm's agrichemical requirements over the last five years to determine the facility size.

- Develop an operation and maintenance plan that addresses all safety requirements, design criteria, and federal, state, and local laws and regulations.
- Handle and mix all farm chemicals on the concrete slab.
- Keep pumps and pipes in good working order.
- Regularly check chemicals to ensure they are safe and dry.
- Contain, wash down, and clean up spills immediately.
- Post chemical spill emergency and toxic safety telephone numbers.

# **Heavy Use Area Protection**



Stabilizing areas disturbed because of frequent and intensive use by livestock or farm equipment.

# **DESCRIPTION**

Vegetative cover, concrete pads, or other artificial surfaces are installed to protect water quality by stabilizing areas with heavy animal equipment traffic.

# **BENEFITS**

- Reduces soil erosion through permanent cover such as tough grasses, gravel, or concrete.
- Can be designed to include storage for stackable manure.
- Improves water quality where livestock/ animal manure is concentrated.
- Concrete walkways or pads allow farmers to easily scrape up manure and manage it for future use.
- Improves livestock health by providing firm footing and eliminating mud.
- Improves air quality by reducing windblown dust.

#### **PLANNING**

- Consider nearby land uses and proximity to residences, utilities, wetlands, or other environmentally sensitive areas.
- Will windbreaks be installed?
- Is the heavy use area as far away from

- waterways as possible? Can a vegetated buffer be planted?
- If adjacent to existing buildings, have you installed adequate roof runoff control to keep additional water off the heavy use area?

# **TECH NOTES**

- Contact your local soil conservation district for free guidance.
- Keep heavy use areas as small as practical.
- Provide surface and subsurface drainage for disposal of runoff without causing erosion or water quality concerns.
- For vegetative heavy use areas, choose appropriate plant species.
- Fence all livestock walkways.
- Collect, store, and utilize manure and manure-laden runoff.

- Inspect the area annually and after significant storm events.
- Replant vegetative areas as needed.
- Vegetative heavy use areas may need periods of rest for successful stabilization.
- Remove manure regularly.

# Hedgerow



Dense woody vegetation planted in a linear design for natural resource conservation purposes.

# **DESCRIPTION**

Small trees, shrubs, and grasses planted along the edges of farm fields or roads to filter runoff and act as a living fence and wildlife corridor. Hedgerows are planted on land in production agriculture to address air and water quality issues.

# **BENEFITS**

- Protects water quality and improves air quality
- Provides shelter for wildlife.
- Improves aesthetic value.
- · Reduces noise.

# **PLANNING**

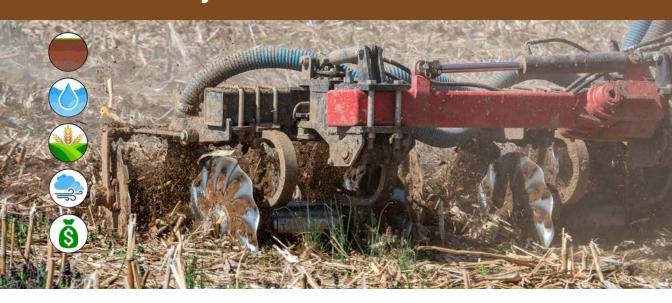
- What is your goal in planting hedgerows?
- Will plantings be protected from livestock or wildlife damage?
- Will you need access lanes?
- Will pesticide drift from cropland harm plants?

#### **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Use herbaceous and/or woody species.
- Use viable, high quality and adapted planting stock or seed.
- Choose the planting method appropriate for site and soil conditions.
- Follow state and local regulations for locating plants adjacent to roadways.
- Hedgerows should be a minimum of 6 feet wide if seeded and one row wide if planted with seedlings or large stock.
- Fertilize or lime based on soil test results.
- Protect the planting from livestock, wildlife, and fire damage.

- Inspect periodically and repair or restore as needed.
- Watch for impacts from heavy vehicle and pedestrian traffic, pest infestations, and pesticide use on nearby lands.
- Mow when weeds reach 6 to 8 inches.
- Control persistent weeds with herbicides.

# **Manure Injection**



Uses special equipment to incorporate manure into the soil instead of spreading it on the surface.

# **DESCRIPTION**

Liquid manure—an organic fertilizer source—is injected below the soil surface to help prevent nitrogen and phosphorus runoff, reduce odors, and preserve beneficial surface residue.

# **BENEFITS**

- Reduces nitrogen volatilization, making more nitrogen available to crops.
- Reduces odors and complaints from neighbors.
- Minimizes soil disturbance and helps prevent soil erosion and nutrient losses.
- Works well with no-till and strip-till systems.
- Increases organic matter.

#### **PLANNING**

- Will you use a custom applicator to inject manure?
- Will you lease or buy equipment?
- What equipment will you use? For example, you must decide on a dragline vs. a manure tank hauling system and a shank vs. disc injector.
- Injecting manure requires more time, fuel and labor than surface application.

# **TECH NOTES**

- Contact your local soil conservation district for free guidance.
- Injection must be done based on recommendations outlined in your farm's current nutrient management plan.
- State cost-share funds are available on a per-acre basis.

# Manure Storage Structure



Structures used to store poultry and livestock manure until transport is arranged or conditions are right for field application.

# **DESCRIPTION**

Structures that safely hold manure to lower nutrient loss, prevent runoff, and protect water quality. The type of storage structure depends on the operation, animal waste management system, and field application. Manure can be pumped, scraped and hauled, pushed, or flushed into the structure.

# **BENEFITS**

- Allows for field application based on the farm's nutrient management plan.
- Cuts fertilizer costs by reducing nutrient losses.
- Protects manure designed for transport.

# **PLANNING**

- When choosing a location, consider the landscape, odor problems, sensitive resources, visibility, aesthetics, and compatibility with existing farm buildings.
- Will the structure allow manure to be stored in a way that can be handled using your equipment?
- Will you plant buffers around the structure?
- Is the structure the right size to handle the amount of manure produced?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Storage period is decided by the farm's nutrient management plan.
- Manure stored as a solid should be protected from precipitation.
- Divert runoff from nearby land and buildings away from the structure.
- Fence off in-ground structures for livestock and human safety.
- Ramps built for handling equipment must meet safety standards.

- Do not fill the structure above the planned storage capacity. Overfilling is a safety risk and can lead to severe environmental impacts.
- Inspect regularly for leaks and seepage.
- Repair damaged fences immediately.

# **Manure Transport**



Transporting livestock or poultry manure away from areas with high soil phosphorus levels as part of a nutrient management plan.

# **DESCRIPTION**

Poultry and livestock producers with high soil phosphorus levels or inadequate cropland immediately surrounding the production site transport manure to other farms, fields, or alternative use facilities that can use the product safely.

#### **BENEFITS**

- Protects water quality.
- Improves soil health in receiving fields.

# **PLANNING**

- Do you have a storage structure to protect stockpiled manure from the elements until transport?
- Has the manure been analyzed to determine nitrogen and phosphorus levels before transport?
- Does the receiving farm have a safe off-loading site that does not threaten water quality?
- Does the receiving farm have a nutrient management plan?
- Is equipment available to transport the manure?

# **TECH NOTES**

- Biosecurity measures must be followed for all transported manure.
- Do not transport poultry litter containing dead birds that are not fully composted.
- Schedule manure transport to be compatible with weather conditions, use by the receiving facility, and following a nutrient management plan
- Cost-share is available for manure transport and satellite storage for receiving operations.

- Make certain that all equipment is in good working order.
- Promptly clean up manure spilled during loading and unloading.
- Ensure there is no leakage or loss of material from the transport vehicle, especially on public roads.
- Clean, wash, and disinfect all transport and handling equipment before it is used again.

# **Nutrient Management**



Farmers who follow the 4Rs of nutrient management apply the right fertilizer source, at the right rate, the right time, and in the right place.

# **DESCRIPTION**

A nutrient management plan outlining the 4Rs determines how much fertilizer, manure, or other nutrient sources may be safely applied to crops to achieve yields without impacting waterways. In Maryland, nutrient management plans are required for all agricultural land used to produce plants, food, feed, fiber, animals, or other agricultural products. Plans are prepared by University of Maryland Extension advisors, private certified consultants, or farmers certified to develop their own plans.

#### **BENEFITS**

- Sound nutrient management cuts fertilizer costs and protects water quality.
- Applying manure to fields following the 4Rs can improve soil health.

# **PLANNING**

- Have you set realistic yield goals?
- Have soil and manure been analyzed?
- Are conservation practices installed?
- Have nitrogen credits been accounted for?

# **TECH NOTES**

- Use a pre-sidedress nitrogen test when corn plants are between 6 and 12 inches tall.
- Use split applications of nitrogen to minimize nitrogen losses.
- Test soil at least once every three years.
- Test manure, if used, every other year.
- Calibrate spreading equipment.

- Make sure your farm's nutrient management plan is current and not expired.
- Use the Phosphorus Management Tool (PMT) to manage fields with a soil phosphorus Fertility Index Value of 150 or greater, as outlined in your nutrient management plan.
- Keep all fertilizer application records and receipts.
- Submit annual fertilizer reports to the Maryland Department of Agriculture by March 1 of each year.
- Follow nutrient application setback requirements to protect waterways.
- Follow winter nutrient application restrictions.

# **Poultry Mortality Composting Facility**



A roofed structure designed for composting the normal mortality rates at a poultry operation.

# **DESCRIPTION**

Composting safely disposes of dead birds by converting nitrogen-rich materials (manure and birds) and carbon-rich materials (straw or sawdust) into a humus-like substance.

# **BENEFITS**

- Well-managed composting substantially reduces carcass volume, eliminates odors and most pathogens, and produces a stable, odorless, humus-like material that is useful as a nutrient source and soil amendment.
- Reduces the potential for groundwater contamination and protects public health by eliminating on-site burial of large numbers of carcasses.

#### **PLANNING**

- When deciding on a site location, consider on-farm traffic patterns, wind direction, drainage ditches, sensitive areas, topography, and neighbors.
- Is a carbon source available?
- What equipment is available?

#### **TECH NOTES**

- Work with your local soil conservation district to establish this practice and your local University of Maryland Extension office for additional assistance.
- Follow suggested straw-bird-litter ratio to create the compost pile.
- Always cover dead birds completely with dry litter.
- Use a thermometer to monitor temperatures within the compost bin.
- Do not pile birds against composter walls or leave them exposed to flies or scavengers.
- Turn and reactivate compost before applying to land.

- Obtain and follow an operation and maintenance plan from NRCS. Instructions should outline the materials to be used in the compost mix, moisture content, temperature goals, aeration schedule, and end use for compost.
- The facility should be inspected at least twice a year when empty for structural integrity.

# **Roofs and Covers**



A roofed structure placed over a heavy use area to divert clean water from animal management areas such as barnyards or feedlots.

# **DESCRIPTION**

Installing roofs and covers over an existing or planned heavy use area helps prevent rainwater from mixing with animal manure and carrying pollutants to nearby waterways.

# **BENEFITS**

- Prevents clean water from entering a barnyard or feedlot where it can become contaminated.
- Provides a temporary animal confinement area during inclement weather.

# **PLANNING**

- How many animal units regularly use the area to be covered (one animal unit equals 1,000 pounds of live animal weight)?
- Does your heavy use area pose a significant water quality issue?

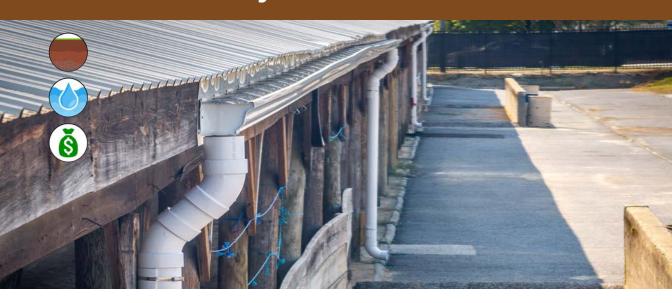
#### **TECH NOTES**

- Your local soil conservation district can provide design and construction specifications.
- Get necessary permits and authorizations before construction.

- Must be built over a concrete heavy use area.
- To qualify for state cost-share, at least 15 animal units must regularly occupy the heavy use area. Operations with 1 to less than 15 animal units may qualify based on pro-rated eligibility formulas.
- A minimum of 100 square feet per animal unit is required, with 20 square feet available or constructed at your expense.
- To be cost-share eligible, the roof or cover may not be attached to an existing structure but can be connected to one under construction.

- Inspect areas around the roofed/covered heavy use area after major runoff events and immediately repair as needed.
- Maintain surrounding grassed areas.
   Reseed according to the operation and maintenance plan.
- Fill in low areas and re-grade as needed using materials similar to the original ones.

# **Roof Runoff System**



System for collecting, controlling, and disposing of runoff water from non-residential farm buildings.

# **DESCRIPTION**

Water transport devices such as gutters and downspouts prevent roof runoff from causing severe erosion or mixing with animal manure and carrying pollutants into waterways.

# **BENEFITS**

- Improves water quality.
- Reduces soil erosion and increases infiltra-
- Protects buildings and other structures.
- Runoff can be collected and used for irrigation or drinking water.

#### **PLANNING**

- Does runoff need to be diverted away from structures or contaminated areas?
- Will you be collecting and using runoff for other purposes?

# **TECH NOTES**

- Work with your local soil conservation district to establish this practice.
- Runoff can empty into surface or underground outlets.

- Outlets must not let out near wells, septic system drain fields, basements, or buried tanks.
- Dispense runoff at least 5 feet away from the building. The discharge area must slope away from the structure.
- Avoid discharging outlets directly into surface waters.
- When able, divert runoff onto pervious landscapes such as lawns, infiltration trenches, and natural areas.
- Runoff collected for drinking water must be treated before consumption.

- Keep systems clean and free of debris or blockages that interrupt flow.
- Inspect regularly and repair as needed.

# **Well Protection**



Changing farming practices near the farmstead to reduce the risk of contaminating water sources, particularly domestic water supplies.

# **DESCRIPTION**

How you handle materials near a water supply and the distance of possible contaminants from a well or other water source can dramatically affect the quality of drinking water on the farm. Mixing pesticides near wells risks contaminating the drinking water supply. To protect wells from contamination, take an inventory of farming practices, including pesticide mixing, container washing, and disposal methods. Follow up by assessing the risk of contamination and making needed changes.

#### **BENEFITS**

- Farm modifications may improve efficiency and reduce operating and production costs.
- The drinking water supply and other water resources will be protected from contamination.

#### **PLANNING**

- Are soil conservation and water quality practices in place?
- Have you taken inventory of activities near the farmstead?

 Have all abandoned wells near the farmstead been properly closed and sealed?

# **TECH NOTES**

- Soil conservation practices may be installed to divert runoff from the well area.
- Mix farm chemicals and rinse containers at least 100 feet from a well.
- Apply pesticides on days with minimal wind to prevent chemical drift.
- Use a backflow device in the hose when filling a sprayer tank to prevent chemicals from siphoning back into the well.

- Keep an emergency chemical spill kit handy.
- Maintain filter strips surrounding the farmstead or wellhead.
- Repair the wellhead casing as needed.
- Repair cracks in concrete pads used for chemical mixing, loading, or container washing.

# Windbreaks for Poultry Houses



Trees and shrubs planted near poultry houses improve air quality, create visual screens, protect against winter winds, and provide shade.

# **DESCRIPTION**

One to three rows of trees and shrubs are planted adjacent to poultry houses. At least one row is usually planted with evergreens.

# **BENEFITS**

- Improves air quality by trapping bits of feathers, ammonia, and other odors blown out of ventilation fans.
- May reduce energy costs by keeping poultry houses cooler in summer and warmer in winter.
- Can be used as a visual barrier to screen the production area from nearby roads and neighbors and improve farm appearance.

# **PLANNING**

- What types of plants are suitable for the site?
- Is a water source available for temporary drip irrigation during establishment?
- Are utility lines nearby?
- Consider on-farm traffic patterns, wind direction, nearby drainage ditches, and neighbors.
- What setbacks are needed to allow equipment access to poultry houses?

# **TECH NOTES**

- Work with your local soil conservation district to select plants for the windbreak type and configuration.
- Additional site preparation may be needed around buildings and other structures. Soil may be heavily compacted or contaminated with construction debris, gravel, and other fill material and may severely limit plant rooting and survival.
- Planting one to two-gallon container plants in the spring, along with irrigation and weed control optimizes plant survival and growth.

- Troubleshoot survival problems before replanting.
- Replace dead trees and shrubs as needed.
- Control weeds and other undesirable vegetation.

# MARYLAND'S CONSERVATION PARTNERSHIP

Free technical and financial assistance to install best management practices is available from local, state, and federal agencies, including soil conservation districts, the Maryland Department of Agriculture, USDA's Natural Resources Conservation Service and Farm Service Agency, and the University of Maryland Extension. In addition, private nutrient management consultants, crop advisors, and agribusiness specialists may be hired to assist with conservation planning. Your local soil conservation district can help you get started.

# **SOIL CONSERVATION DISTRICTS**

Allegany	240-609-3493	alleganyscd.com
Anne Arundel	410-571-6757	aacounty.org/soil-conservation-district
Baltimore County	410-527-5920, ext. 3	bcscd.org
Calvert	410-535-1521, ext. 3	calvertsoil.org
Caroline	410-479-1202, ext. 3	
Carroll	410-848-8200, ext. 3	carrollsoil.com
Cecil	410-398-4411, ext. 3	cecilscd.com
Charles	301-638-3028	charlesscd.com
Dorchester	410-228-5640, ext. 3	
Frederick County	301-383-8782	fcscd.com
Garrett	301-501-5856, ext. 3	garrettscd.org
Harford	410-638-4828	harfordscd.org
Howard	410-313-0680	howardscd.org
Kent	410-778-5150, ext. 3	kentsoilandwaterconservation district.org
Montgomery	301-590-2855	montgomeryscd.org
Prince George's	301-574-5162, ext. 3	pgscd.org
Queen Anne's	410-758-3136, ext. 3	
St. Mary's	301-475-8402, ext. 3	stmarysscd.com
Somerset	410-621-9310	
Talbot	410-822-1577, ext. 5	talbotscd.com
Washington County	301-797-6821	conservationplace.com
Wicomico	410-546-4777, ext. 3	wicomicoscd.org
Worcester	410-632-5439, ext. 3	worscd.org

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Office of Resource Conservation

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