



Environmental Issues, Environmental Considerations and Dairy Farms

Robert E. Graves, Professor of Agricultural Engineering

An action taken today on a dairy farm can have an adverse environmental impact many miles away or many years in the future. Larger dairy farms and increasing public awareness require that environmental consequences be considered in the dairy manager's decision making process. Those whose income depends on prosperous dairy farms must also be aware of the environmental impact of their advice or product.

Environmental protection is more complicated than considering where or when manure is applied to crop or pasture land. Dairy farms can impact surface and ground water, be a source of noise, odor, dust, and flies, track mud and manure on highways, and obstruct the skyline. Large modern buildings may represent the latest in dairy technology yet be considered a blight on the pristine landscape by the local tourist council. The environmental nutrient balance around many dairy farms is directly related to the amount of feed brought onto the farm. An addition of 100 more cows to a dairy farm may be necessary to provide income for another family on the farm, it also may result in increased water pollution if manure is applied to a static or decreasing cropland base. The first complaint against a dairy farm is often related to odor, dust or noise. Regulations and requirements concerning odor are unclear or nonexistent. Options available for prevention and control of odor are often inconsistent, expensive and ineffective. In an effort to gain relief from a real or perceived problem, water quality concerns often evolve from odor complaints.

Water Pollution

Water pollution concerns from dairy farms include nutrients, organic matter, and microorganisms. Excess nutrients can result in algae and aquatic weed growth in surface water and elevated nitrates and pH problems

in ground water. As organic matter in surface waters decomposes it competes with aquatic life for oxygen. It can also have adverse effects on the appearance of surface and ground water. Microorganisms, including bacteria and cysts, can adversely affect surface waters and ground waters. Areas where limestone, creviced bedrock or other features permit direct flow of surface water to ground water require particular care and concern when planning manure storage and handling systems.

Major sources of water pollution on dairy farms include manure application (amount, location and timing of application), barnyard runoff, manure storages (leakage, overflow, failure), milkhouse and milking center wastewater, and silage effluent. Dairy farms often receive regulatory attention due to traceable flows to streams, lakes and road ditches from milkhouse drains, silos, and barnyards. Water pollution from these sources is often obvious, readily traced and easily sampled. These sources are usually easily controlled by application of simple technology such as minimizing flow rates and diverting flows away from nearby surface waters.

Silage Effluents

There is increasing concern over silage effluents. This potent waste water has a very high oxygen demand (BOD 12,000-80,000 mg/l) and a low pH (3.6-5). Both of these can upset the balance of life in waters receiving silage effluent. Larger silos, uncovered horizontal silos, and ensiling of higher moisture silage increase the likelihood and amount of silage effluent. Silage effluent can be collected and handled with milking center wastewater, exercise lot runoff water or in a liquid manure system. Mixing silage effluent and liquid manure increases the production of deadly hydrogen sulfide in pump pits and tanks. Therefore

use extreme caution when agitating and pumping stored silage effluent. Do not enter collection sumps or underground tanks that are part of the silage effluent handling system.

Safety Concerns

Everyone has an obligation to design, supply, buy, operate and maintain manure storage and handling systems that are safe for workers and visitors.

Manure systems present hazards from asphyxiation, poisoning, drowning, and machinery entanglement and entrapment. Pumps, pits and tanks can easily contain poisonous gases or lack of oxygen that will not be apparent until someone enters the tank and is overcome. Multiple deaths have occurred as a result of failure to follow appropriate procedures for working in these confined spaces. **Do not enter manure sumps, pits, or storage tanks without appropriate safety apparatus and procedures.** No tool, pump part or farm chore is equivalent in value to the cost of a human life! Another common hazard is failure to provide adequate guarding at manure tank openings and push off ramps to prevent entry by people, tractor scrapers or cows. All open storages must have adequate fencing to prevent visitors, including small children, from gaining entry.



Manure pit accidents often result in multiple fatalities.

Environmental Regulations

Environmental quality regulations exist on local, state and national levels. Regulation at the national level includes the Coastal Nonpoint Pollution Control Program, Farm Bill, Federal Water Pollution Control Act, and Clean Water Act. It is important for dairy managers and advisors to be informed about applicable state and local regulations. General guidance for

handling manure in Pennsylvania is found in the Department of Environmental Resources publication *Manure Management for Environmental Protection*. Pennsylvania farmers are also affected by local ordinances (usually health or building code related), Chesapeake Bay Program agreements and the recently passed Nutrient Management Act. The Nutrient Management Act will require farmers with more than 2000 pounds of animals per acre to submit a nutrient management plan to their conservation district. Regulations resulting from the Nutrient Management Act are currently under development.

Summary

Farmers often have the first opportunity to protect or pollute our water resources. Farmers and those advising and serving farmers will be held accountable for the environmental consequences of operating decisions. Many problems would be minimized or avoided if we all worked harder at being better neighbors! Neighbors may include people next door, down stream, groundwater consumers and our grandchildren. Just as a great philosopher and teacher taught many years ago, we need to be constantly on the look out for who our neighbor really is. Clean, safe, environmentally friendly farms that are profitable, and pleasant and safe to work on, must be the goal of anyone involved with farming.

For more information on Pennsylvania's nutrient management act and how to determine application rates of manure visit your Penn State County Extension office, refer to *Nutrient Management Legislation in Pennsylvania* (Agronomy Facts 40) and *A Nutrient Management Approach for Pennsylvania: Introduction, Plant nutrient stocks and flows and decision making* (Agronomy Facts 38-A,B,C), or contact your county conservation district.

PSU 2/94

For a copy of our Fact Sheet Listing contact:
Agricultural and Biological Engineering Extension
246 Agricultural Engineering Building
University Park, PA 16802
814-865-7685 FAX: 814-863-1031