

## ***Efforts To Protect Water Quality From Agricultural Runoff***

Streams and rivers in the United States and across the globe are the lifeblood of Earth's inhabitants. Water is a basic, renewable natural resource that provides not only crop irrigation, but also drinking water, recreational uses, and habitat for water-living creatures. Clean and usable water, then, should be a high priority for us all.

More than 90 percent of the nation's privately owned land is in agricultural and forest production. Agriculture uses 65 to 70 percent of the total fresh water resources in the United States and the world, and there is increased interest in how agriculture affects water quality and in the steps that can be taken to improve it.

The U.S. Department of Agriculture has long been an advocate of finding ways to provide adequate and reliably clean water for the various uses in this country. USDA and its chief scientific research agency, the Agricultural Research Service (ARS), have responded to droughts and the Dust Bowl of the 1930s and to the floods that inevitably sweep across the landscape, with innovative and sound science to alleviate these challenges.

There are physical and biological dimensions in detecting contamination, tracing the sources, defining treatment technologies, monitoring human health consequences, and addressing both the pollution and its consequences. Solutions to water pollution require not only new technologies but also societal and institutional change. For example, the Farm Security and Rural Investment Act of 2002 (the 2002 Farm Bill) has significantly changed U.S. agricultural policy on conservation practices for water quality and other environmental benefits.

Farmers, ranchers, and landowners can now receive incentive payments for conservation buffers and other farming practices that reduce water contamination on agricultural lands. At the same time, farmers and ranchers can continue to produce food and fiber crops without retiring their land or leaving it idle. People living on farms, in rural communities, or in cities can all benefit from improved agricultural practices that protect our nation's water quality.

The Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture has recently developed handbooks and guidelines to assist landowners in effectively using the CORE 4 concept. The CORE 4 approach is associated with using key practices to significantly improve water quality for cropland agriculture. These practices will also provide opportunities for many other conservation benefits when

applied as a system. CORE 4 practices include various categories or types of conservation buffers, conservation tillage, nutrient management, and pest management practices.

ARS researchers have found that many conservation practices besides CORE 4 items can be effective in improving water quality. These practices include improved irrigation management systems, drainage management systems, establishment of wildlife habitat, protection and restoration of stream corridors or streambanks, and improved manure management practices and treatment technologies.

ARS has a long tradition of providing ways to improve agricultural production and devising more environmentally sound farming techniques. Some of the solutions the agency has developed require long-term commitment of resources for the problems to be alleviated. One such problem is nonpoint-source pollution—that is, pollutants that can't be traced to a particular source or location. Because it is commonly believed that nonpoint-source pollution comes mainly from agricultural activities, ARS has played a leading role in water quality research from a national and international perspective.

Water quality impairment can come from nutrients in manure and fertilizer; soil sediment; other agricultural chemicals, such as pesticides; and pathogenic organisms. Sometimes, nutrients or chemicals hitch a ride on the soil particles that enter streams and rivers. Concentrated animal production sites are of particular environmental concern because of their potential to release nutrients, pathogens, particulate matter, and gases into water and air.

ARS currently has 38 locations that address water quality issues. These are mainly associated with the ARS Water Quality and Management National Program and the Manure and Byproduct Utilization National Program. The article on page 4 describes 9 years of research on using conservation buffers to reduce nutrient runoff or loadings from manure application sites in the Southeast and to reduce herbicide runoff. Besides this research, which was conducted at Tifton, Georgia, ARS also studies the benefits and management of conservation buffers at various locations around the country, including Beltsville, Maryland; Ames, Iowa; Oxford, Mississippi; Columbia, Missouri; El Reno, Oklahoma; Corvallis, Oregon; University Park, Pennsylvania; and Florence, South Carolina.

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