FOR MORE INFORMATION: https://ars.usda.gov/Protecting Soil and Air Quality

PROTECTING SOIL AND AIR QUALITY

The ARS soil and air research program protects soil resources essential for U.S. agricultural production, optimizes management of crop nutrients and greenhouse gas emissions from agricultural soils and byproducts, and enhances production management in the face of global climate change. Farms face the challenge of increasing production for a growing population while maintaining profitability, preserving and enhancing natural resources, and instilling public trust. The following FY 2019 highlights demonstrate how ARS helps farmers meet these challenges through research-based practices.

Innovative manure treatment reduces nutrient pollution and creates commercial products. Excess phosphorous found in some manure applied as crop fertilizer can contaminate rivers, lakes, and bays through runoff. ARS researchers in Florence, South Carolina, developed a new biorefinery process that recovers value-added phosphorus, proteins, amino acids, and leftover solids from manures. Their innovation lowers treatment costs and extracts nearly all of the phosphorus from the manure, which can be used as a recycled material to replace commercial phosphate fertilizers.

Perennial living mulch systems increase sustainability of corn production. Perennial living mulches, such as kura clover, provide the environmental benefits of cover crops without the need to replant each year. ARS scientists in St. Paul, Minnesota, have optimized management systems that incorporate kura clover. They developed a rotary zone tillage system that widens rows to eliminate early-season kura clover and therefore reduces corn competition for resources. The net economic return in the kura-corn system averaged over two seasons was $138 per hectare more than conventional corn production.

Reducing phosphorus problems by intensive investigation of best management practices. ARS scientists in Fayetteville and Booneville, Arkansas, and University of Arkansas research partners conducted a 15-year study on 15 watersheds and found that buffer strips and converted pastures to hayfields can effectively reduce phosphorus runoff in southeastern U.S. pastures: unfertilized buffer strips reduced phosphorus runoff 36 percent; fenced, unfertilized riparian buffers reduced phosphorus runoff 60 percent; and converting pastures to hayfields reduced phosphorus runoff 49 percent.

Inexpensive vegetative buffers around poultry facilities reduce air pollution. ARS researchers in Iowa, Maryland, South Carolina, and Texas collaborated with university colleagues to document that a vegetative environmental buffer surrounding a poultry house removed 22 percent of ammonia and reduced net downwind ammonia dispersion 51 percent. The Natural Resources Conservation Service is using these results to define the mitigation potential and limitations of the vegetative buffers.

Adapting anaerobic soil disinfestation (ASD) for commercial production systems. The loss of methyl bromide for soilborne pest control left few registered soil fumigants, and these fumigants are not effective for the array of pests previously controlled using methyl bromide. ARS researchers in Fort Pierce, Florida, and their cooperators found that ASD succeeded in achieving yields equivalent to or higher than those attained from chemical fumigation, translating to profits for growers.