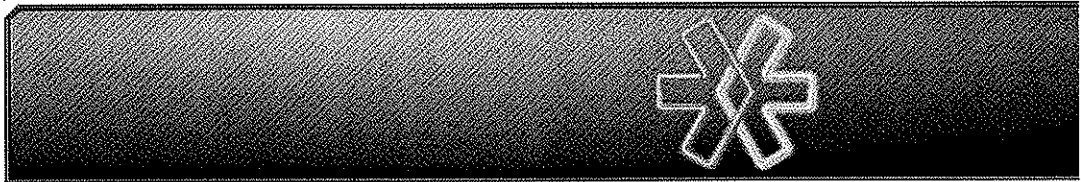


Air Pollution
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N.C.'s country air isn't what it should be

WILLIAM H. SCHLESINGER AND VINEY P. ANEJA

Fresh country air just isn't what it used to be. So concluded more than 300 agricultural scientists at a recent conference outside Washington, D.C.

Farmers provide food for an increasing number of humans both here and abroad through intensive agriculture. Massive use of industrial fertilizers has improved crop yields, and efficient, confined animal feeding operations ("CAFOs") now dominate the production of pork and poultry, especially here in North Carolina. In the United States, we have access to organic foods at a premium price, but for most of the world's 6.5 billion people this is not an affordable option. Agro-industry feeds the world.

Images of idyllic rural life exempt farmers from most of our concerns about air and water pollution. Yet in recent years, we have recognized that the runoff from fertilized fields and from animal wastes has dramatic effects on local rivers. Importantly, the air quality conference identified a number of new impacts of agriculture on air pollution and the health of humans and their environment.

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We may smell the presence of a nearby hog lagoon, but few of us realize how gaseous nitrogen compounds from farms might also affect air quality over broad areas. Each day about 300 tons of ammonia are emitted from hog production facilities in North Carolina. This gas forms small particles in the atmosphere, exacerbating respiratory diseases such as asthma and emphysema.

New studies show that much of the ammonia travels long distances before it is deposited. Atmospheric ammonia can contribute to excessive nutrient enrichment of rivers, estuaries and coastal waters, resulting in toxic conditions for fish. Airborne nitrogen has direct effects on the growth of pine trees, so the emissions from farm fields can also lower the productivity of nearby forests.

Agricultural soils emit large amounts of nitric oxide (NOx), ranking third behind cars and coal-fired power plants as a source of this air pollutant in the Southeast. North Carolina's Clean Smokestacks legislation went a long way toward cleaning up our power plant emissions, but persistent emissions of NOx from farms contribute to high concentrations of ozone in rural North Carolina air. Ozone, of course, is well known for its human health effects, which now include an increased risk of heart disease.

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Methane and nitrous oxide emitted from anoxic waste lagoons become "greenhouse" gases in Earth's atmosphere, where they contribute to global warming. Lowering the emissions of these gases from agriculture may be the easiest way for North Carolina to reduce its impact on the Earth's climate.

All told, atmospheric scientists know that more than 400 gases are emitted from agricultural operations in the United States. As with all pollutants, it is easier to control emissions of nitrogen gases and other compounds from agriculture at their source, rather than after they have dispersed to downstream or downwind areas.

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Legislation and technologies to ensure the judicious use of nitrogen fertilizer; to capture ammonia from the buildings that house hogs and chickens so that it can be reused as fertilizer; and to manage waste lagoons to minimize the loss of nitrous oxide and to capture methane, where it can be used for energy, all deserve our serious consideration. With careful management and control, soil processes and wooded areas on farms may be harnessed to remove gases and aerosols from the atmosphere.

North Carolinians have supported landmark initiatives to improve the quality of their air, such as the Clean Smokestacks legislation. Increasingly we must also reduce emissions from rural sources, such as high density livestock and poultry farms.

Production agriculture has adopted modern technologies and chemistry to maximize productivity, but it has not been subjected to the same environmental regulations that other modern industries must obey.

Farms do not have to be a source of air quality problems; they can and should be a source of solutions.

(William H. Schlesinger is dean of the Nicholas School of the Environment and Earth Sciences at Duke University. Viney P. Aneja is a professor of air quality at N.C. State University.)

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