

The way we eat is trashing the fragile conditions that make human life possible 21

•In the ongoing debate about whether sustainable agriculture can “feed the world,” it’s important not to lose sight of what industrial agriculture is doing to ecosystems—both in specific areas and on a grand scale. Producing and distributing lots and lots of calories, leveraged by fossil fuel and synthetic fertilizers and poisons, may solve certain short-term problems; but the practice also creates long-term ones that won’t be easily solved.

In June, a study emerged showing that so-called inert ingredients in Roundup, Monsanto’s widely used flagship herbicide, can kill human cells even at low levels—“particularly embryonic, placental and umbilical cord cells,” [reports Scientific American](#). This is an herbicide that’s used on virtually all of our nation’s corn and soy fields, covering tens of millions of acres of cropland. (It’s also widely used by landscapers and on home lawns.)

Then there was the recent atrazine imbroglio. For years, the EPA has been assuring the public that the highly toxic herbicide, still widely used in the Corn Belt, wasn’t showing up in drinking water in worrisome levels. Turns out that was a lie, as some [excellent muckraking](#) by the Huffington Post Investigative Fund revealed. Atrazine exposure has been [strongly associated with reproductive health maladies](#), including a [rise in hermaphroditism among frog populations](#).

Note that corn and soy production, as practiced today, is completely reliant on these two broad-spectrum herbicides.

Now comes news about the hazards of another input critical to the project of industrial agriculture: synthetic nitrogen fertilizer. When farmers apply nitrogen to farm fields, a certain amount enters the atmosphere as nitrous oxide. And according to a study conducted by researchers at the National Oceanic and Atmospheric Administration (NOAA) and published in *Science*, human-generated nitrous oxide is now the No. 1 contributor to ozone-layer depletion.

The study is the first ever to look closely at nitrous oxide’s role as an ozone destroyer. The results are alarming. From a [summary of the study on the NOAA website](#):

For the first time, this study has evaluated nitrous oxide emissions from human activities in terms of their potential impact on Earth’s ozone layer. As chlorofluorocarbons (CFCs), which have been phased out by international agreement, ebb in the atmosphere, nitrous oxide will remain a significant ozone-destroyer, the study found. Today, nitrous oxide emissions from human activities are more than twice as high as the next leading ozone-depleting gas.

The withering away of the ozone layer, which was slowed but not stopped by the 1987 Montreal Protocol phasing out CFCs, is no trivial matter. As the NOAA summary puts it:

The ozone layer serves to shield plants, animals and people from excessive ultraviolet light from the sun. Thinning of the ozone layer allows more ultraviolet light to reach the Earth’s surface where it can damage crops and aquatic life and harm human health.

Moreover, the Montreal Protocol does not regulate nitrous oxide.

Of course, agriculture-induced nitrous oxide isn’t just eating the ozone layer. It’s also a greenhouse gas with 300 times the heat-trapping power of carbon dioxide.

Thus the implications of agriculture’s reliance on synthetic nitrogen fertilizer are literally earth-shaking: The

way we're feeding ourselves is contributing dramatically to two processes—climate change and ozone depletion—that could literally make the planet uninhabitable by humans.

Worse still, we may be seriously underestimating industrial agriculture's nitrous oxide emissions. When considering agriculture's contribution of nitrous oxide to the atmosphere, scientists have assumed that about 1 percent of the nitrogen fertilizer applied by farmers ends up in the atmosphere as nitrous oxide. The EPA operates under that assumption, as did the Intergovernmental Panel on Climate Change. But the real number may be considerably higher. A [2008 study](#) [PDF] by the Nobel-winning atmospheric chemist Paul Crutzen found that as much as 5 percent of nitrogen fertilizer applied by farmers turns into nitrous oxide—which would make agriculture a much larger contributor to climate change (and ozone depletion) than is currently assumed.

On top of all of that, nitrogen runoff from agriculture is also strongly implicated in the creation of coastal dead zones—large algae blooms that suck oxygen out of the sea and snuff out marine life.

What all of this points to is the need to bring ecological considerations into agriculture. And in fact, there's already a budding field known as [agroecology](#). Agroecology is now at best a fringe field in academia; as public funding for university research dries up, giant agribusiness firms like Monsanto increasingly finance—and [control](#)—the research agenda. They have little interest in ecology and vested interests in pushing their own proprietary products.