

## Fossils, Fertilizers, and False Solutions

How Laundering Fossil Fuels in Agrochemicals Puts the Climate and the Planet at Risk

## **EXECUTIVE SUMMARY**

ver the last six decades, the global production and use of nitrogen fertilizers has grown ninefold, from 12.9 million tonnes in 1961 to more than 123 million tonnes in 2020. High-income countries like Japan, the United States, and parts of western Europe use 85–135 kilograms (kg) (187–298 pounds) of nitrogen fertilizers per capita, with industry now focused on dramatically increasing fertilizer use in the Global South. The production and use of pesticides has followed a similar trajectory, with early dramatic growth in pesticide use in North America and Europe shifting in recent decades to a heavy focus on pesticide exports to the Global South as consumers and regulators in the Global North demand safer alternatives. Since 1960, the value of global pesticide exports increased by 15,000 percent, reaching USD41 billion in 2020.

Overwhelming scientific evidence demonstrates that decades of overuse of synthetic fertilizers and pesticides - collectively agrochemicals — and the pervasive spread of industrial agriculture based on those agrochemicals, is contributing to catastrophic biodiversity collapse and toxic pollution, pushing the earth beyond critical planetary boundaries, and resulting in widespread violations of human rights, particularly in the Global South. This overuse also impacts fenceline communities in both the Global North and South where agrochemicals are made.

These impacts are compounded by the significant but oftenoverlooked role of agrochemicals in the accelerating climate crisis. Agriculture accounts for roughly a third of global greenhouse gas (GHG) emissions, and fossil fertilizers synthetic fertilizers derived from fossil fuels — are an unrecognized contributor to this figure. A peer-reviewed study published in August 2022 found that the global climate impact of nitrogen fertilizer alone exceeds that of commercial aviation, contributing roughly 2 percent of all global GHG emissions.

These emissions arise both from emissions-intensive fertilizer production and from ongoing and diverse climate impacts when nitrogen fertilizers are applied to agricultural soils. For example, producing the ammonia (NH3) on which nitrogen fertilizers are based releases an estimated 450 million tonnes of carbon dioxide (CO2) per year — equivalent to the total energy system emissions of South Africa. Similarly, agriculture accounts for roughly two-thirds of global emissions of nitrous oxide (N2O), a greenhouse gas 265 times more potent than carbon dioxide. Agricultural soils treated with nitrogen fertilizers are a dominant source of those emissions. Recent studies report that observed atmospheric concentrations of nitrous oxide are beginning to exceed even the most pessimistic climate models used by the United Nations Intergovernmental Panel on Climate Change (IPCC). In addition, continued overuse of both pesticides and fertilizers could be impairing the soil's own ability to absorb and sequester carbon. Alarmingly, and despite these risks, the Food and Agriculture Organization of the UN (FAO) projects that nitrogen fertilizer use could grow another 50 percent by 2050.

Both the agrochemical and the fossil fuel industries stand to benefit. Already, synthesizing ammonia for nitrogen fertilizers consumes an estimated 3-5 percent of the world's fossil gas. The International Energy Agency (IEA) projects petrochemicals will account for more than two-thirds of global oil demand growth through 2026, and account for more than half (55 percent) of all petroleum usage by 2050. Plastics and fertilizers, which together account for nearly three-quarters (74 percent) of all petrochemicals produced, are the major drivers of that growth. According to the IEA, fertilizers represent the greatest near-term growth sector for petroleum feedstock use, with fertilizer production projected to demand more than 100 billion cubic meters (bcm) of natural gas in 2025, and global ammonia production growing up to 30 percent by 2050.

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This convergence of interests is reflected in deep and pervasive interlinkages between the industries themselves. While the pervasive role of oil and gas companies in the petrochemical buildout and the ongoing plastics crisis is well-documented, links between the fossil fuel and agrochemical industries have received far less attention. Of eight leading fertilizer companies examined for this report, seven showed extensive past or current ties to the fossil fuel industry through board interlocks, corporate ownership structures, or direct engagement in fossil fuel production. Notably, this is in addition to well-known historic ties to fossil fuel industries among longtime agrochemical leaders like DuPont and Dow.

Perhaps unsurprisingly, therefore, agrochemical companies are drawing with growing intensity on the fossil fuel playbook to argue that they can make the massive climate impacts of fertilizer production disappear through widespread deployment of carbon capture and storage (CCS) and other false climate solutions. More troublingly — and largely unnoticed by media and civil society watchdogs - oil, gas, and agrochemical companies are partnering on a rapidly growing wave of new projects that would use CCS and related technologies to produce fossil gas-based ammonia (and its hydrogen precursor) not only as a critical fertilizer input, but as an energy carrier, and a combustible fuel for transport and energy. Fertilizer and fossil fuel companies are operating, developing, proposing, or actively exploring dozens of such projects in at least nine countries across the world. This report particularly highlights the buildout plans in the US where projects have been proposed in eight states. Unsurprisingly, the same states and communities that are already experiencing impacts of petrochemical and CCS production are also primary targets for the fossil fertilizer industry's expansion into blue hydrogen and blue ammonia.

Scientific research demonstrates compellingly that such fuels are not only technically and economically infeasible for most uses, they are as bad or worse for the climate than burning fossil gas directly.



Nonetheless, by positioning this fossil gas with CCS-derived ammonia as a clean energy source, both industries are maneuvering to exploit not only the marketing potential of allegedly "clean" and sustainable fuels, but also massive government subsidies for infrastructure investments in the name of climate mitigation.

Put simply, the fertilizer and fossil fuel industries are increasingly collaborating to launder fossil fuels — particularly gas — as an ever-expanding source of both "clean" energy and "clean" agrochemicals. It is neither.

Yet the acceleration of these proposals and the narratives underpinning them threaten to extend and deepen global reliance on both fossil fuels and industrial agriculture in the face of growing global recognition that both must be urgently reduced.

Beyond the threats it poses to biodiversity, human health, and the global climate, the deep integration of fossil fuels and industrial agrochemicals poses profound threats to global food security — as starkly illustrated by the 2022 market shocks in food, fuel, and fertilizer prices. As this report goes to design in mid-September 2022, acute gas shortages and massive near-term price spikes have spurred leading fertilizer companies to announce short-term production cuts even as long-term investment plans expand. Given the global food system's current heavy dependence on chemical inputs, the widespread overuse and inequitable allocation of those inputs, and the disruption of both grain and fertilizer exports caused by Russia's invasion of Ukraine, there is reason to be concerned that a further decline in fertilizer access will compound the near-term threats to food security created by the invasion itself. But the roots of these concerns lie in the systemic flaws of industrial food production, rather than shortages of a product that in actuality does not promote food security but instead undermines food sovereignty. As this report details, there has never been a clearer moment nor a more urgent need to reconsider the current system, especially the role of fossil fertilizers.

As the world must urgently transition away from the fossil economy, it must also confront and abandon the current fossilbased model of intensive, industrial agriculture, with the goal of scaling up resilient, regenerative models that enhance food and energy sovereignty so that the ecosystems and communities that depend on them can thrive. Such transitions can only be achieved by confronting head-on the fossil-fueled system that is pushing the earth and its inhabitants beyond critical planetary boundaries. Against the present backdrop of intersecting crises, the case for doing so has never been clearer.

Read the full report at: www.ciel.org/reports/fossil-fertilizers

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