

Appendix II: Debunking the Myths that Pesticides Are Safe and Necessary

Debunking the Myth that Pesticides Are Safe

While humans have long used various pesticides in agriculture, what we think of as modern-day pesticides — synthetic chemicals — were not widely used until the post-World War II period. Weapons-grade chemicals were converted into peacetime uses in agriculture. Nerve gas agents became organophosphate pesticides. The insecticide DDT, used to thwart mosquitoes and lice to stave off malaria and typhus among soldiers, was pushed for agricultural use after World War II. In the ensuing decades, pesticides have become widely used around the world in farming and beyond, including in war. The US government tapped Monsanto and other chemical manufacturers to produce the toxic defoliant dubbed Agent Orange that was sprayed extensively during the Vietnam War.⁵³⁶ Today, U.S. agriculture uses more than 1.1 billion pounds of pesticides annually, representing approximately 15 percent of total global pesticide usage.⁵³⁷

The widespread use of pesticides has led to the inevitable ecological result: resistance to these very pesticides by insects and weeds. By one count, more than 360 weed varieties and 540 insect species have developed resistance to pesticides.⁵³⁸ As a result, farmers are stuck on a “pesticide treadmill” — a term coined by the American entomologist Robert van den Bosch in 1978 to describe the problem that farmers must spray more often and use more toxic pesticides to deal with ever more resistant pests.

The scientific record shows that an ecological, rather than chemical, approach to agriculture is dramatically more successful at managing pests without incurring environmental and health costs. As just one example, a recent study found that farmers who *did not* use insecticides and relied on ecological methods to manage pests had *10 times less* pest pressure than farmers who used insecticides.⁵³⁹ Ecological farming methods work with nature to disrupt pest cycles. Rather than toxic chemicals, they

use crop rotations, foster natural predators of pests and increase crop diversity to disrupt growth of pest populations, they plant “trap” crops that draw insects to the edges of fields, and they build healthy soils that confer greater pest immunity to plants.

Pesticides do not discriminate between pests and beneficial insects like pollinators. A peer-reviewed study co-authored by Friends of the Earth found that U.S. agriculture has become 48 times more toxic to bees and other insects since the introduction of neonicotinoid insecticides 25 years ago.⁵⁴⁰ This study came on the heels of the first meta-analysis of global insect declines which found that 40 percent of insect species could face extinction in coming decades, leading the authors to warn of “catastrophic ecosystem collapse” if we don’t change the way we farm.⁵⁴¹

Along with life aboveground, pesticides destroy biodiversity belowground. A recent meta-analysis shows that pesticides harm the living organisms that are the basis of healthy soils — which we need to prevent erosion, conserve water and draw carbon down from the atmosphere.⁵⁴² Scientists warn that we are experiencing the “sixth great extinction” and that this collapse of biodiversity is on par with the climate crisis.⁵⁴³

Many pesticides also harm human health. The same properties that make pesticides toxic to insects and weeds can also make them toxic to other forms of life, including us. More than 90 percent of the U.S. population has detectable pesticides in their bodies,⁵⁴⁴ and there are more pesticide residues on our food now than a decade ago.⁵⁴⁵ Decades of studies show that pesticides can disrupt and derail the healthy functioning of our bodies. Pesticide exposure is linked to cancers, asthma, neurodevelopmental disorders like autism and ADHD and to neurological diseases like Alzheimer’s and Parkinson’s.^{546,547,548,549} Exposure is also associated with reproductive disorders like infertility and birth defects and metabolic diseases like obesity and diabetes.^{550,551}

Emerging science reveals more than 50 pesticides are endocrine disruptors, meaning they can mimic, block or scramble our hormones.⁵⁵² Miniscule exposures to endocrine disruptors may lead to various cancers, ADHD, Parkinson's, depression, fertility problems, obesity, diabetes, and birth defects.⁵⁵³ Timing of exposure also matters, putting pregnant women, infants, children, and adolescents at greatest risk. Exposure during these important developmental windows can lead to lifelong impacts.

Farmers, farmworkers, and pesticide applicators, and those living in communities abutting farm fields are particularly impacted. Farmworkers can be exposed at levels hundreds of times higher than consumers' exposure to pesticides. Farmers, farmworkers and their families have higher rates of acute poisonings, cancers, birth defects, asthma, infertility, autism, and other neurological and reproductive effects.⁵⁵⁴

U.S. regulatory systems are not based on the latest science on the harms of pesticides. The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) has proven to be woefully inadequate to protect human health and the environment from toxic pesticides. While some countries have in recent years banned the most toxic pesticides, the U.S. still allows use of over 80 pesticides that have been restricted or banned in other countries.⁵⁵⁵

While the Environmental Protection Agency (EPA) sets legal limits for pesticide residues on food, referred to as maximum residue limits, many scientists and medical professionals say that these limits are outdated.⁵⁵⁶ They do not reflect the unique vulnerabilities of infants, children, pregnant women, and the elderly nor do they account for our cumulative exposure to pesticides via food, water and the environment. Companies and regulatory agencies typically do not test for the health risks of exposures from multiple pesticides and whether there are synergistic effects, and whether those effects are linear or nonlinear. These exposures add up. One study found that approximately 40 percent of U.S. children may have cumulative exposure to organophosphate pesticides at a level greater than benchmarks for neurological impacts.⁵⁵⁷

National and global institutions are taking note. A report from the President's Cancer Panel of the National Cancer Institute highlights the health concerns of pesticides, and noted the ways to reduce risk, including "choosing, to the extent possible, food grown without pesticides or chemical fertilizers."⁵⁵⁸ In a 2012 report, the American Academy of Pediatrics warned: "children's exposure to pesticides should be limited as much as possible."⁵⁵⁹ And a 2017 policy paper from the United Nations Special Rapporteur on the Right to Food noted that: "Pesticides...are a global human rights concern, and their use can have very detrimental consequences on the enjoyment of the right to food...as well as the right to health."⁵⁶⁰

Debunking the Myth that We Need Pesticides to Feed the World

Despite all this, the pesticide industry continues to push the message that pesticides are safe. They do so along with the message that we need these products to "feed the world." It follows then, according to their narrative, that raising concerns about pesticides and calling for stricter regulations or reductions in use poses a threat to food security. But the evidence doesn't add up: We do not need pesticides to feed the global population; indeed, their continued unbridled use threatens food security.⁵⁶¹

To understand why, it's critical that we first look to the root causes of hunger. Experts have long underscored that world hunger is not primarily the manifestation of a scarcity of food, but a scarcity of democracy — of who has power over what is grown, where, and with what methods.⁵⁶² Hunger is the result of poverty and unequal access to land, water and other resources, not simply "not enough." Focusing on increasing productivity does not uproot these underlying forces.

Despite the industry's public relations efforts to insist that GMOs are necessary to "feed the world" — and many media outlets that repeat this narrative uncritically — the truth is that the majority of acreage is devoted to commodities like corn and soy used for livestock feed or industrial processes like corn-based ethanol.⁵⁶³ In addition, if we *do* take productivity as a

primary goal, data show that GMO crops have overall failed to increase crop yields.⁵⁶⁴

What's more: pesticide use is actually undermining the basis of food security. A United Nations report noted pesticides have had "catastrophic impacts on the environment, human health and society as a whole."⁵⁶⁵ The industrial food system has decimated biodiversity, destroyed soil health, and polluted water resources — all of which exacerbates the conditions of world hunger and poverty.⁵⁶⁶ The United Nations Food and Agriculture Organization estimates that industrial agriculture, of which pesticides are a key input, costs the world *three trillion dollars every year* in damages to the environment and public health.⁵⁶⁷

Another path forward is possible. Research shows notable benefits in using ecological principles on farms instead of toxic pesticides.⁵⁶⁸ Organic farmers grow abundant food without the use of over 900 active pesticide ingredients allowed in non-organic farming.^{569,570} Recent studies show that farmers who rely on ecological methods to manage pests may outperform their conventional counterparts. One study found that using ecological methods to protect pollinators increased yields of oil seed crops more than the yield benefit associated with pesticide

use.⁵⁷¹ Another study from France concluded that most farmers would be able to reduce pesticide use significantly without sacrificing profit or productivity, and in some cases, can improve yields and decrease farm costs.⁵⁷² A global synthesis found that managing farms to increase biodiversity of pollinators and beneficial insects results in higher yields and better pest control, and another study found that organic farm management boosts the natural defenses of plants to prevent pest damage even when pests are abundant.^{573,574}

A years-long process involving over 400 independent experts from every continent culminated in the 2009 International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD).⁵⁷⁵ The message was clear: "Business as usual is not an option." The report calls for a paradigm shift in agriculture from industrial models dependent on intensive inputs of pesticides and synthetic fertilizers to an agroecological pathway that protects natural resources. These findings have been repeatedly bolstered in a series of expert reports in the decade since. As the United Nations Special Rapporteur on Food notes, "Without or with minimal use of toxic chemicals, it is possible to produce healthier, nutrient-rich food, with higher yields in the longer term, without polluting and exhausting environmental resources."⁵⁷⁶

