National Caucus of Environmental Legislators

Pesticides Briefing Book

NCEL
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Environmental Legislators

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Introduction

Pesticides' public perception was forever changed with the publication of Rachel Carson's *Silent Spring* highlighting the harms of DDT. The popular pesticide decreased bird populations so severely that Congress banned DDT in 1972. DDT's phase-out allowed bird populations to recover with many formerly imperiled species, such as the Bald Eagle, being delisted from the Endangered Species Act.

New pesticides pose more serious environmental risks with America applying over 1 billion pounds of these pesticides annually. Today, it is nearly 100% likely that every American has pesticides in their bloodstream due to regular pesticide exposure. Researchers and environmentalists are concerned as U.S. pesticide use increases with the EPA approving new products while failing to restrict harmful pesticides. The United States now uses 85 pesticides that have been banned by the EU, Brazil, or China.

The persistent use of such alarming chemicals is largely due to the EPA's constrained mandate. Industry-funded science, industry pressure, and a lax approval process leads the EPA to approve many pesticide applications. It's often many years after approval that the true and often alarming environmental and human health effects are known. Yet, established scientific risks are not enough. The EPA is burdened to prove that the pesticide cannot be used in a manner that will not significantly harm the public while exploring alternatives to revoke the pesticide. This results in a yearslong evidence collecting and research process before a pesticide can be deemed unsafe. Even then, revocation of a license is rare as industry can appeal the decision and force a lengthy and expensive legal battle.

Meanwhile, states are leading the charge in regulating existing pesticides and constructing a framework for precautionary pest-management technology approval. In 2023 alone, 11 states enacted 20 pieces of pesticide reform legislation with more states introducing and passing legislation each year.

This briefing book provides an overview of pesticides and pesticide policy, including key points, frequently asked questions, and components of effective pesticide reform. It breaks down common classes of pesticides and policies for consideration in states across the country, including: neonicotinoids, organophosphates, and glyphosate.

Overview

Key Points

1. **Pollinator Decline -** Global insect decline, including pollinators, is estimated at 9% to 11% per year.

2. **Human Health -** The mishandling of pesticides can cause sudden illness or death. Meanwhile, persistent exposure to elevated pesticide levels is linked to heightened cancer and developmental abnormalities rates.

3. **Disproportionate Risks -** Children face the most severe health risks due to their developing brains and bodies, and children of color are more likely to be exposed to pesticides. Rural communities with low-income farm workers of color also encounter heightened risks due to persistent and higher rates of pesticide exposure.

4. **U.S. Leads Worldwide Pesticide Use -** The United States uses the most pesticides in the world at approximately 1 billion pounds in 2020. Flawed monitoring means this is likely an underreported number.

5. **Widespread Ecosystem Prevalence -** No land or water is spared from pesticide contamination. Organic farms and conservation areas are even contaminated.

6. **Climate Change -** Pesticides are a fossil fuel intensive product with the transportation, application, and disposal stages fueling emissions. Further, increased pesticide use is expected as warmer temperatures make pesticides less effective and leaves plants more susceptible to disease and pests. Increased use releases more emissions and is linked to pesticide-resistant pests, which in turn drives greater pesticide use.

7. **Need for Alternative Strategies -** Restrictions on one class of pesticides often drives the creation of even more harmful pesticides. Systemic pest management reform can be crucial for healthy communities and a resilient environment.

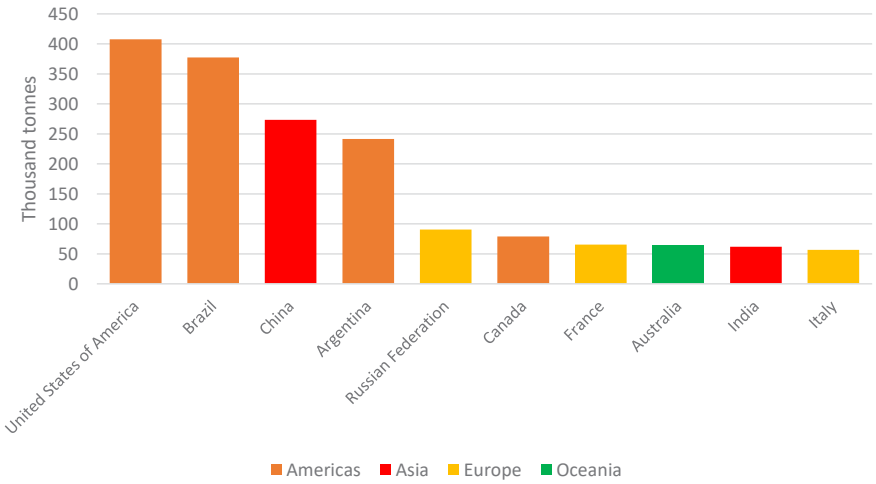

Figure 1: *Countries with the greatest pesticide use in 2020.*
Source: Food and Agriculture Organization of the United Nations

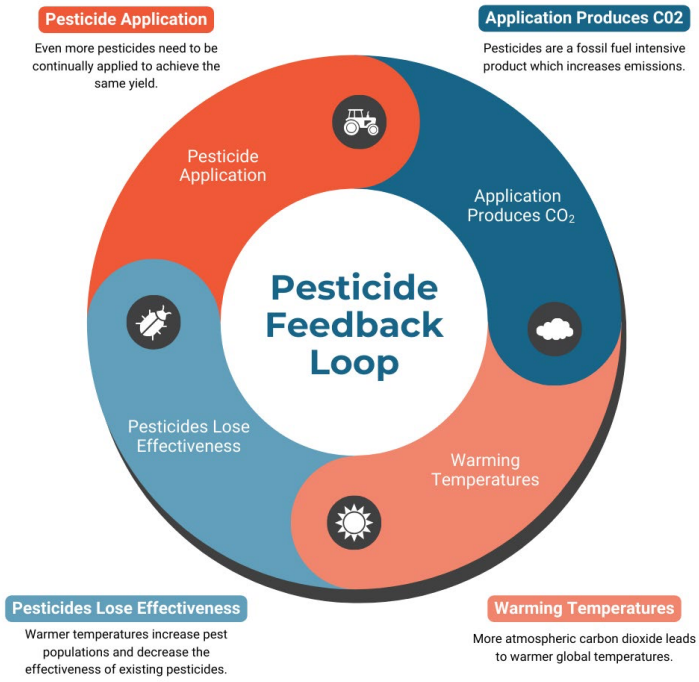

Figure 2: *Pesticide use negative feedback loop.*

How do pesticides affect pollinators?

Pesticides adversely affect all insects that come into contact with crops - not just target pests. Many pollinators that survive initial exposure often die prematurely. Furthermore, herbicides destroy non-target flowering plants that serve as food supplies for pollinators adding additional stressors to pollinator survival.

Do pesticides affect animals besides bees and butterflies?

Deer, birds, fish, and invertebrates all receive unintended impacts from pesticides. Birds' consumption of pesticide-contaminated seeds or insects have adverse health effects with research finding fewer birds in high-pesticide use locations than in conservation areas. Fish are disappearing as pesticides kill non-target insects and decrease food availability. Pesticides even affect mammals with white-tailed deer found to have developmental abnormalities from environmentally common levels of pesticides.

Do pesticides remain at their application sites?

No, pesticides can easily spread beyond their application site due to wind and water flow. Pesticide drift - the wind's spread of pesticide droplets or dust during or soon after application - spreads pesticides for miles. This contaminates lands designed to be pesticide-free such as conservation areas or organic farms. As pesticides are water soluble they can disperse through the water table from nonpoint application sources. The EPA found that 94% of sampled streams contain pesticides.

How prevalent are pesticides in our food?

Pesticides are present on nearly every American's dinner plate. A review of the food our country's leaders eat found that 91% of the food in congressional lunches contained at least one pesticide. Even those who consciously opt for organic fruits and vegetables cannot guarantee the purity of their produce. One study found that 87.5% of organic seeds contained at least one pesticide.

Figure 1: *Untreated corn seeds.*

Figure 2: *Pesticide-treated corn seeds.*

What are pesticide-treated seeds?

Treated seeds are where a pesticide, commonly a neonicotinoid, is applied as a coating before planting. The pesticide is then absorbed into the plant tissue where it repels any insect. The EPA does not consider "treated seeds" as pesticides but rather as a "treated article." It therefore does not track and record the total amount of treated seed used. This makes the claim that the U.S. uses over 1 billion pounds of pesticides per year a likely underestimate.

Without pesticides, will crops successfully grow?

Other countries - such as the European Union - have reformed how they use pesticides without harming their agricultural economy. The EU banned the agricultural use of the three most harmful neonicotinoid pesticides (imidacloprid, thiamethoxam, and clothianidin). Today, agricultural yield is the same as before the ban.

Overview

Neonicotinoids (neonics) emerged on the market in the 1990s and quickly became the world's most widely used class of insecticides. Neonics are different from traditional contact pesticides as they are systemic, meaning they are absorbed into a plant's tissue after application. This quality makes them highly popular in agriculture, which accounts for 90% of neonic usage. Neonics are mostly applied as a preemptive seed treatment. Nearly every agricultural plant is dangerous to the pollinators that land on them.

Neonicotinoid Type	Target Pests	Main Use
Clothianidin	Soil-based Insects	Agricultural: Corn, Soybeans, Canola, Sugar beets
Imidacloprid	Sucking & Chewing Insects	Agricultural, Ornamental: Fruit trees, Vegetables, Golf Courses
Thiamethoxam	Soil-based Insects, Sucking & Chewing Insects	Agricultural: Cotton, Corn, Rice, Potatoes
Dinotefuran	Piercing & Sucking Insects	Piercing & Sucking Insects
Acetamiprid	Sucking Insects	Agricultural, Ornamental, Bed Bug Control: Vegetables, Fruits Trees, Ornamental Plants
Thiacloprid	Sucking Insects	Agricultural: Leafy vegetables
Nitenpyram	Fleas, Ticks	Veterinary: Dogs and Cats
Common neonicotinoid products sold in stores.		

Policy Options ('**' indicates bipartisan support)

- **New York S 1856 (2023)** - Bans neonicotinoid-treated seeds in agricultural use for corn, soybeans, and wheat production and bans residential use.
- ****New Jersey S 1016 (2022)** - Restricts all non-agricultural and non-commercial application of neonicotinoids on plants.
- **Minnesota HF 2310 (2023)** -
  - Article 1: Requires that treated seeds are disposed, stored, and handled in human and environmentally safe manners.
  - Article 4: Chapter Prohibits neonicotinoids' application to wildlife management areas, state parks, state forests, aquatic management areas, and scientific & natural areas.
- **Colorado SB 23-266 (2023) & Maryland SB 375 (2016)** - Prohibits the purchase and sale of neonicotinoids to certified applicators and dealers.
- **Ontario (2015)** - Requires farmers obtain permission before using neonicotinoid- treated seeds.
- **European Union (2018)** - Bans all outdoor agricultural and ornamental uses of the most commonly used neonicotinoids.

FAST FACTS

- **Neonics are extremely toxic to pollinators** with just billionths of a gram enough to kill bees.
- **Neonics kill or seriously impair animals** such as songbirds and white-tailed deer from regular levels of environmental exposure.
- **They are pervasive in the environment**. Only 2-20% of neonics are absorbed by plant tissue with the rest seeping into the soil, lost as dust, or transported by surface & groundwater.Today, over half of U.S. urban and agriculture streams contain neonics and contaminated soils can take up to 19 years to be neonic-free.
- **Neonics pose both acute and chronic health risks to people**. Initial findings link neonic exposure to adverse developmental & birth defects, harm to the reproductive and immune systems, and memory loss.
- **Neonic's usefulness is over-emphasized**. Similar yields for both soybeans and corn can be achieved by using pesticide-free farming methods or less-harmful insecticides.

Overview

Organophosphates were once the main pesticides used in agricultural production. The uncovering of their severe health impacts on people led to many of them being phased out. Yet, high levels of use persist for certain organophosphates even as they are widely understood to be unsafe. The EPA's decision to restrict chlorpyrifos in 2021 was driven by human and environmental health concerns. However, the Eighth Circuit Court of Appeals overturned this decision in 2023 once again putting regulatory emphasis on states to ensure safe and effective management of chlorpyrifos and other organophosphates.

Organophosphate Type	Target Pests	Main Use	Main Threats	Number of States Still in Use
Acephate	Sucking & Chewing Insects	Agricultural: Vegetables, Ornamental plants	Human - Some chronic risks for human health Environmental - Acute and chronic risks to pollinators, birds, and mammals	25
Bensulide	Non-Turf Plants or Grasses	Ornamental & Residential: Golf Course, Ornamental lawns	Human - Acute exposure to frameworks and applicators Environmental - Chronic exposure risks to birds, mammals, and aquatic species	10
Chlorethoxyfos	Soil-Dwelling Insects	Agricultural: Corn	Human - Farmworkers if handled improperly	3
Chlorpyrifos-methyl	Broad Spectrum Insect Control	Agricultural: Stored Grains	Human - Farmworkers that handle stored grain	Unknown
Diazinon	Broad Spectrum Insect Control	Agricultural: Fruits, Vegetables, Nuts Residential use banned in 2004	Environmental - Birds, bees, and other insects	14
Dichlorvos	Broad Spectrum Insect Control	Agricultural & Residential: Most crops, stored products; Pest strips	Human - Acute and chronic effects from exposure	Unknown
Dicrotophos	Sucking & Chewing Insects	Agricultural & Ornamental: Cotton, Non-fruit bearing trees; Ornamental plants	Human - Farmworks and applicators from accidental exposure	15
Dimethoate	Broad Spectrum Insect Control	Agricultural & Ornamental: Vegetables, Cotton; Ornamental plants, Woody plants	Human - Highly toxic to frameworks and applicators Environmental - non-target insects	28
Ethoprop	Soil-Dwelling Insects; Nematodes	Agricultural: Vegetables; Fruits	Human - Acute poisoning risk to farmworkers and applicators	11
Malathion	Mosquitos; Broad Spectrum Insect Control	Mosquito Control & Agricultural: Community- Aerial Spray; Some Fruits & Vegetables	Human - Acute poisoning risk to applicators	28

Naled	Mosquitos; Broad Spectrum Insect Control	Mosquito Control (70%) & Agricultural: Community- Aerial Spray; Corn, Alfalfa	Human - farmworkers if handled improperly Environmental - aquatic organisms	6
Phorate2	Sucking & Chewing Insects	Agricultural: Corn, Potatoes, Cotton	Human - limited risk to farmworkers Environmental - Chronic risks to mammals, birds, and fish, Acute risks to bees	21
Phosmet	Broad Spectrum Insect Control	Agricultural: Grapes, Orchards	Human - to farmworkers and applicators	40
Terbufos	Soil-Dwelling Insects	Agricultural: Corn (87%), Sorghum, Sugar Beets	Human - Acute toxicity to farmworkers and applicators Environmental - Highly toxic to aquatic fish	19
Tribufos	Cotton	Agricultural: Cotton for defoliation	Human - Acute toxicity to farmworkers	17
Additional information on each of the above can be found on Earth Justice's toolkit on organophosphates				

Policy Options

Although organophosphate use has declined, many states allow the use of organophosphates with little regulation. Certain organophosphates such as chlorpyrifos are used widely in agriculture while others such as malathion are used for mosquito control with insufficient safeguard.

- **Maine HP 220 (2021)** - Bans the use of pesticide products with chlorpyrifos as an active ingredient.
- **Connecticut SB 120 (2022)** - Bans the use of chlorpyrifos on golf courses and for any cosmetic or non-agricultural purpose.
- **Minnesota HF 2310 Sec. 15 (2023)** - Prohibits the application of chlorpyrifos on wildlife management areas, state parks, state forests, aquatic management areas, or scientific and natural areas.
- **California SB 86 (2020)** - Requires the Dept. of Pesticide Registration to issue quarterly reports on granular chlorpyrifos use, monitoring, and exposure during the quarter.
- **Washington SB 5693 Sec 604 (36) (2022)** - Allocates $500,000 to fund research on developing alternatives to growers currently using organophosphates.

Overview

Glyphosate is the dominant herbicide in the U.S. 280 million pounds of glyphosate are applied to 298 million agricultural acres annually. An additional 24 million pounds are applied by homeowners, often as the popular product Roundup. Glyphosate alone comprises nearly 25% of total U.S. pesticide use and is applied to over half (56%) of all crops. Like neonicotinoids, glyphosate is a systemic pesticide - killing plants once absorbed into their tissues. Pesticide drift puts organic farms at risk of accidental and deadly exposure to glyphosate. As a result, all farmers are forced to buy herbicide-resistant crop varieties with nearly all field crops being glyphosate-resistant (corn 90%, soybeans 95%, cotton 94%).

ENVIRONMENTAL THREATS

- **Glyphosate is a danger to pollinators**, leaving bees more susceptible to disease & death from disruptions to bees navigational abilities and gut microbiome. It also destroys native plants that are critical food sources to pollinators.
- **Non-target nature is at risk**. It is water soluble and threatens aquatic life. The EPA found risks to birds, mammals, and non-target plants.
- **There are 48 glyphosate-resistant "weed" varieties**. More toxic pesticide products must be developed to handle these plants.

HUMAN HEALTH THREATS

- **The World Health Organization classifies the pesticide as a probable carcinogenic**. A University of Washington study discovered a 41% increase in the risk of developing non-Hodgkin's lymphoma in glyphosate users
- **Bayer settled for $10 billion** with cancer patients who claimed they developed non-Hodgkin's lymphoma after using Roundup (a glyphosate-based product).
- **Glyphosate should not be applied to any residential lawn**, claims UC Berkeley researchers after finding that childhood exposure can lead to liver inflammation & metabolic disorders in early adulthood, with links to cancer, diabetes, or heart disease.

Policy Options

- **Maine HP 382 (2021)** - Prohibits the application of glyphosate on or within 75 feet of school grounds.
- **Massachusetts H 4002 (2021)** - Funds a scientific review of the impacts of glyphosate and its most common alternative herbicides on the environment & public health; A determination if current uses of glyphosate pose unreasonable adverse effects to the environment; Recommendations if current registered uses of glyphosate should be altered or suspended.
- **New York S 6502A (2019) and S 899 (2021)** - Prohibits the majority of use of glyphosate by state agencies, state departments, public benefit corporations, or their contractors and subcontractors on state property.
- **Washington HB 1109 (2019)** - Allocates funding for the querying and inventorying of all state uses and amounts of glyphosate.
- **Nevada SB 215 (2019)** - Designates glyphosate as a known carcinogen that is associated with multiple myeloma

Pesticide regulation can take a variety of pathways. The following are important components and possible components to consider in crafting legislation that bolsters economic integrity, protects the environment, and sustains healthy communities.

Policy Components and Considerations

1. **Use Restrictions -** Restricting when, how, by whom, and for what are the basis for safe and efficient pesticide use.
   - **A. For What -** Restrictions can be placed on what pesticides can be applied to. Residential and non-productive use restrictions are the most common regulation. Restrictions on commercial and agricultural use are also popular when the economic and environmental costs outweigh economic benefits.
   - **B. When -** Pesticide application can be restricted during windy conditions that cause pesticides to disperse further than normal. Application can also be restricted during the crop's blossoming stage to limit exposure to pollinators.
   - **C. By Whom -** Use can be limited to those trained in safe pesticide application methods. Many states issue certified applicator licenses. The sale of certain pesticides can also be restricted to certified dealers to ensure the product is only purchased by certified applicators.
   - **D. How -** Certain pesticide methods can be restricted such as aerial spraying or treated seeds. These often release more pesticides than needed to address a pest threat.
2. **Studies -** Research can indicate where policy solutions are needed to protect people and the environment. States have commissioned universities or their own departments to conduct these studies and present science-based recommendations to the legislature.
3. **Plant Breeding -** Plants are genetically modified to withstand pesticides, but less research has been conducted to create pest-resistant varieties.
4. **Monitoring & Reporting -** Many states lack accurate and reliable data on pesticides regarding the total amount used in the states, rates of pesticide mishandling, environmental contamination rates, human poisonings, or violations of the law.
5. **Farmer Transition Programs -** Bans or use restrictions can adversely impact farmers if they are not given resources or time to prepare for improvements in their operations. Many states put an effective date at least 1-2 years from legislation's passage to both spread awareness of coming restrictions and allow for modifications.
6. **Fund Pesticide Alternative Practices -** Organic farming and integrated pest management primarily do not use pesticides, yet the current regulatory structure places them at enhanced financial risks. States can prioritize subsidies or tax exemptions for agricultural entities that do not use pesticides.
7. **Exemptions -** Many states grant exemptions for pesticide restrictions if there is an urgent pest threat that other pest management strategies cannot solve. They may also grant exemptions if the regulations pose undue financial risks.
8. **Empowering Municipalities -** There are some scenarios where local municipalities/political subdivisions may be better equipped to regulate pesticides than the state. However, many states have preemption laws that prevent stricter regulations from being imposed than the states'.
9. **Reform Pesticide Approval Process -** Many states accept the EPA's guidance for pesticide product approval; however, states can change their regulations to be more holistic and focus on the landscape level effects of a new product.
10. **Innovative Policy Solutions -** The above are not limitations to ensuring nuanced pesticide use, for example, the state's pesticide tax can be reinvested to support sustainable farming transition programs. Please reach out to us for additional help.

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