Pesticides: A Growing Problem
Why investors must engage with the pesticides industry
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Executive summary
Executive summary

Biodiversity is declining faster than at any point in history. It is estimated that over 25 per cent of species are now threatened with extinction while 75 per cent of land surface and 66 per cent of ocean area have been significantly altered by human activity.

Pesticides are a significant contributor to the biodiversity crisis. Used in industrial agriculture, pesticides, which include insecticides, herbicides, fungicides and other pest-specific chemicals, contribute greatly to land-use change and pollution. These are two direct drivers of biodiversity loss, according to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). The excessive and inappropriate use of pesticides severely damages terrestrial and aquatic life and compromises ecosystem services like pollination, water purification and soil fertility.

To effectively halt and reverse the loss of biodiversity, the use of pesticides and their devastating impacts on biodiversity must be drastically reduced. The pesticides industry, and its investors, must support this transition and the wider movement toward a more sustainable food system.

Pesticide use is built into our industrialised food system. It relies heavily on chemical inputs to produce food for a growing population – an estimated 99 per cent of global agricultural land uses pesticides to produce food. The world’s largest pesticide-producing companies (who also own patents on two-thirds of the world’s major commercial seeds used by farmers) dominate this system, promoting destructive food production practices and hindering efforts from scientists and policymakers to bring about change. However, despite the narrative of pesticide advocates, a just and sustainable food system can thrive without their excessive and inappropriate use.

There is an extremely limited role for synthetic pesticides in a future where biodiversity loss is halted and reversed. The pesticides industry must urgently transform if they are to exist in the future. Methods of food production that prevent the need for pesticides, such as agroecology, must be scaled up, while pesticide companies can offer sustainable alternatives to synthetic pesticides where pests cannot be prevented. Alongside this important innovation, the pesticides industry must phase out the production of harmful synthetic pesticides and adopt robust strategies for radically reducing their impacts on biodiversity.

Policymakers are waking up to the need to build a more sustainable food system and address the impacts of pesticides on environmental and human health. The Convention on Biological Diversity’s Kunming-Montreal Global Biodiversity Framework, which has set global goals for halting and reversing biodiversity loss by 2030, includes a target on pesticides. Target 7 calls for reducing the overall risk from pesticides by half by 2030. While an essential

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1 In disproportionately high volumes, and in places or circumstances that are unnecessary or highly damaging.
component in meeting the global goals, this falls short of the original aim to “reduce pollution from all sources to levels that are not harmful to biodiversity and ecosystem functions and human health, including by reducing nutrients lost to the environment by at least half, and pesticides by at least two thirds”\textsuperscript{ix}.

However, Parties to the Convention have already started to act on pesticide-related biodiversity loss, and this action will progress as they translate the Framework’s targets into policy solutions. The European Union’s Farm to Fork Strategy, for example, calls for a drastic reduction in pesticide use and risks generated by pesticides, while Thailand has taken action to halt the use of some of the most hazardous pesticides. These regulations already severely restrict the activities of pesticide companies and this scrutiny will only increase. Regulation specifically targeting financial institutions and corporations, like the EU’s Prior Informed Consent (PIC) Regulation and Colombia’s Green Taxonomy, are also beginning to hold companies and financial institutions accountable for their involvement in the use and impact of pesticides. While many regulators want to curb the industry’s impact on biodiversity and human health, pesticide companies continue to lobby policymakers in multiple jurisdictions against these developments.

Over 70 per cent of the pesticides market is controlled by just six companies. As the leading producers of pesticides, these companies use their leverage to uphold a global addiction to input-intensive agriculture, and interfere with government and scientific efforts to reverse this trend. Despite their enormous contribution to biodiversity loss, these companies continue with business as usual while failing to reduce or even comprehensively assess their impacts on biodiversity.

Many of the world’s largest financial institutions are investors in pesticide companies. Over 2,000 investors hold shares in at least one of the five largest public pesticide companies, and dozens of large banks regularly provide and facilitate debt financing to these companies. In this briefing, we present recommendations on how investors can push for urgent changes in the pesticides industry:

- Investors should develop or expand their assessment practices to understand how their investments in the pesticides industry impact biodiversity and develop a strategy to address these impacts.
- Investors should engage with policymakers, either individually or through collaborative engagements, to encourage regulation of the pesticides industry as part of a wider strategy to drive forward biodiversity-related regulation.
- Investors should develop or expand existing biodiversity strategies and stewardship policies to include robust engagement with pesticide companies in their portfolio. They should build escalation policies into these strategies and disclose all engagement outcomes. This should be accompanied by bold stewardship practices across the food and agriculture sector to help drive systemic change.
Introduction
Introduction

Pesticides are a major contributor to global biodiversity loss through their central role in food production, which has the most significant impact on biodiversity of all industries according to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)\(^i\). While pesticides threaten biodiversity and human health in other applications, including fish farming and when used in urban/suburban environments, pesticide use in agriculture has contributed to the sharp decline in biodiversity worldwide: over 40 per cent of all insect species are now threatened with extinction\(^i\), farmland birds in Europe are at historically low numbers\(^i\)\(^i\), and freshwater ecosystems across the planet are contaminated and suffer from the ongoing impacts of pesticide residues\(^i\)\(^i\), \(^i\)\(^v\).

What are pesticides, why are they used, and what does a low-pesticide future look like?

Pesticides are specially formulated chemicals used to prevent crops from being damaged or destroyed by various pests, which can include weeds, insects, small mammals and diseases from fungi, bacteria or viruses.

While some pesticides are used by home gardeners and smaller food production operations, the highest volumes are used on industrial farms. Many of these farms, by design, are more vulnerable to pests and often fail to take steps to prevent them\(^i\)\(^i\). For example, farms that produce just one crop variety – known as monocropping, the most common method used to produce commercially grown crops\(^i\)\(^v\) – provide a food source for just one pest, allowing the pest population to explode. These monocultures also deplete soil nutrients, which leaves crops vulnerable to soil-borne diseases\(^i\)\(^v\). Deforestation and land clearing practices used to establish farms also eliminate natural predators, exposing farms to worse pest problems\(^i\)\(^v\). These conditions create the need for pesticides as biodiversity’s innate ability to control pests declines.

Pesticide use has improved global food insecurity, but this has created a dependency on chemicals to produce food, generated immense human and environmental health costs and delayed the uptake of equally effective and low-impact alternatives\(^i\)\(^x\).

Despite the pesticide industry’s narrative that pesticides are essential for maintaining food security, there are much more sustainable solutions that,
if scaled, can effectively feed a growing population, such as using agroecological methods to prevent pests and using innovative technologies to reduce pesticide applications where pests cannot be prevented. These methods must be scaled up, as they have much less impact on biodiversity and can even improve biodiversity in the case of agroecology. Pesticide companies must significantly reduce the volume and impact of the pesticides they produce and start replacing synthetic pesticides with more sustainable solutions, such as biopesticides (non-synthetic products derived from natural materials like bacteria or minerals), to align with a sustainable food future (Figure 1).

Figure 1. A Formula for Pesticide Avoidance, from Pesticide Atlas 2022

Pesticide companies also insist that pesticides (and genetically modified seeds used in conjunction with pesticides) are necessary for responding to the impacts of climate change, like new pests and worse weather events. However, in the long term, pesticide use can make farms even more vulnerable to these effects by compromising biodiversity and essential ecosystem services, like predation and flood or drought control, that can provide natural resilience to climate change. For example, conventional farms that use pesticides are more likely to experience the acute impacts of drought, like crop losses, than organic farms, as healthy soils have a greater capacity to store groundwater.

A food system that uses preventative and alternative methods to manage pests is essential. As we face the dual crises of biodiversity loss and climate change, pesticide companies must acknowledge and act on their linkages to effectively address and respond to both issues.
Pesticides used in the industrialised food system have dire and widespread impacts on biodiversity. Of all agriculture-related drivers of biodiversity loss, pesticides have been found to have the most damaging effects on bird populations, including severe impacts on survival. Pesticides have been identified as the second leading driver associated with global insect decline, behind agricultural intensification more generally. They are also strongly associated with commodity-driven deforestation, which leads to the destruction of entire ecosystems.

Hilal Elver, former United Nations Special Rapporteur on the Right to Food.

The food system’s "reliance on hazardous pesticides is a short-term solution that undermines the rights to adequate food and health for present and future generations."
Pesticides, soy and deforestation in South America

Intensive soy production is a clear example of the enabling role of pesticides in the biodiversity crisis. The demand for commodity-grown soy (mostly for livestock feed, biofuels and highly processed food products) has fuelled pesticide-intensive agriculture and deforestation throughout South America. This has demolished entire ecosystems and contaminated natural resources that are heavily relied upon by indigenous peoples and local communities.

Argentina, Brazil and Paraguay now produce almost 50 per cent of the world’s soy. In 2019 alone, the three countries deforested over 600,000 hectares of land – the size of nearly 40 football fields – to establish industrial soy plantations. This has resulted in the destruction of richly biodiverse forest ecosystems. As of 2019, soy production in South America stretched across 55.1 million hectares – an area nearly the size of the UK.

Almost all soy grown in these countries is genetically modified to be ‘glyphosate tolerant’ (glyphosate is used in a product line known as ‘Roundup Ready’ sold by the pesticide producer Bayer AG, alongside RoundUp pesticides). This genetic modification enables repeated applications of glyphosate, an organophosphate pesticide with a wide range of toxic effects on organisms and deemed “probably carcinogenic to humans” by the World Health Organization.

But glyphosate is not the only pesticide enabling soy production and driving biodiversity loss in the region. In 2018, Brazil imported more Highly Hazardous Pesticides (HHPs) than any other country, almost two-thirds of which were used for soy production. Five of the industry’s largest companies – Syngenta, Bayer, BASF, Corteva, and FMC Corporation – accounted for most of these sales, which included products with neonicotinoids and other chemicals that have severe impacts on biodiversity. UPL, another leading pesticide producer, also provides Brazil with high volumes of HHPs such as chlorantraniliprole and mancozeb, which pose significant threats to both human health and the environment.

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2 95 per cent in Paraguay, 96 per cent in Brazil, and 100 per cent in Argentina.
3 While many industry-funded studies propose that genetically modified soy has reduced environmental impact, these studies have poorly and inaccurately measured risk.
Pesticides negatively impact terrestrial ecosystems in several ways:

- **Pesticides reduce wildlife population sizes.** Targeted pesticides kill pests such as insects to protect the crops they feed on. But, by reducing the size of the local insect population, pesticides also reduce the ecological benefits insects provide, like pollination or soil enrichment. Pesticides also impact non-target species, such as insect pollinators, soil organisms and birds. Pesticides can harm these non-target species in several ways, including by removing food sources and compromising their reproductive ability.

- **Pesticides contaminate soils and negatively impact soil-based organisms.** This compromises the ability for these organisms to provide healthy and fertile soils, such as by breaking down and transporting nutrients within the soil or suppressing diseases. As a result, pesticides leave soil less fertile, less able to store carbon and filter water, and more vulnerable to droughts and floods.

- **Pesticide use can drive biodiversity loss in surrounding areas where they are not directly applied.** This is because pesticides can contaminate entire animal populations, who can bring pesticides into off-farm ecosystems, and can drift onto neighbouring land during application. This can lead to unintended biodiversity loss in areas where pesticides are not directly applied, such as wildlife areas.

- **Pesticides enable intensive farms that drive biodiversity loss through destructive land-use practices.** These farms, which are often monocultures and therefore require more pesticides due to an inherent vulnerability to pests, drive biodiversity loss in many additional ways, including:
  - clearing land to establish farms, including forests, wetlands and grasslands
  - reducing the genetic diversity of crops
  - damaging soil by using destructive cultivation practices
  - draining resources like groundwater that local communities and ecosystems depend on.

In addition, pesticides severely damage freshwater and marine ecosystems:

- **Pesticides from agricultural runoff damage freshwater ecosystems like lakes, ponds and rivers.** In these ecosystems, pesticide residues can accumulate along the food web as larger animals eat smaller organisms that contain pesticide residues. This can reduce the size of a population, alter reproductive capacity and hinder other biological functions essential to survival in freshwater species, such as liver function and normal embryo development.

- **Runoff can also contaminate marine and estuary environments.** This contamination can have similar effects on marine species as on freshwater species, especially where the pesticides occur in high concentrations. Pesticide residues in the ocean can also evaporate and spread to other ocean areas over time. This can lead to pesticides accumulating in marine organisms and has even led to rainwater containing pesticides.
Highly Hazardous Pesticides (HHPs)\textsuperscript{4} are especially damaging to biodiversity. HHPs are chemicals that cause disproportionate harm to the environment and human health through high acute or chronic toxicity\textsuperscript{v}. HHPs can cause bioaccumulation through the food chain, whereby pesticides spread throughout species and ecosystems as larger animals prey on smaller, contaminated ones. Many HHPs also persist in water or soil, causing long-term contamination and toxicity to life in these ecosystems. Their toxicity can also severely harm aquatic organisms, bees and other animals that provide essential ecosystem services\textsuperscript{vi}. Because of these properties, the environmental effects of HHPs are often more severe than other pesticides. Pesticide companies must phase out HHPs to protect environmental and human health from the severe dangers of these chemicals.

HHPs have already had stark effects on numerous species and habitats. For example, pesticides in the neonicotinoid class of insecticides have led to notable declines in bird biodiversity\textsuperscript{vi} and drastically reduced bee populations\textsuperscript{viii}. Birds and bees are essential to healthy ecosystems because they kill pests and pollinate plants, so the growing use of neonicotinoids – now the most used pesticides in the world – threaten to create systemic risks to long-term food production\textsuperscript{ix}. Other HHPs, such as organophosphates like glyphosate, have been associated with steep declines in soil biodiversity, which compromises soil fertility and productivity\textsuperscript{x}.

In the UK alone, bees exposed to neonicotinoids have reduced reproduction by 44 per cent\textsuperscript{xii}. Pesticides like glyphosate compromise soil health by destroying soil microorganisms.\textsuperscript{xii}

\textsuperscript{4} We determine HHPs according to \textbf{Pesticide Action Network (PAN) International’s list}. This list collates all pesticides that have been deemed hazardous by the World Health Organisation, the European Chemicals Agency, the International Agency for Research on Cancer and the US Environmental Protection Agency.
Pesticide use and export by country
Pesticide use and export by country

Pesticides are applied in mass volumes and are used worldwide. Most, if not all, countries use pesticides for food production, although some countries use far more pesticides than others (Figure 2). In 2020, China used over half a million tonnes – the most of any country. The USA, Brazil and Argentina also used high volumes, with other countries trailing far behind. The United States, the second largest user of pesticides behind China, used more pesticides in 2021 than Russia, France, Canada, Australia, India and Italy (all major agricultural producers) combined.

Figure 2. Pesticide use by country in 2020.

2020 data retrieved from the UN Food and Agriculture Organization (FAO) service FAOSTAT, the most recent year of available data\(^\text{lxiii}\). This data includes the major pesticide groups, including insecticides, herbicides and fungicides, and relevant chemical families. Volume refers to metric tonnes of pesticide active ingredients used in or sold to the agricultural sector.
Countries with high pesticide use are also the leading producers of major commodity crops – basic agricultural products produced in mass quantities, such as soya, wheat and maize (Figure 3). Indeed, many pesticides are created specifically for these crops due to their high production volume and importance in global commodity markets. Countries with both high commodity production and pesticide use indicate agriculture’s reliance on chemical inputs to produce the world’s leading commodity crops, many of which are low-nutrient foods used for manufacturing highly processed food products, biofuels and livestock feed.

Figure 3: Top 20 countries by production of key agricultural commodities in 2021 compared to pesticide use.

Commodities measured include soya beans, wheat, maize, sugar cane, rice, cotton, sugar beet, barley and oil palm fruit. These are the most produced crops by volume globally. Data on crop production and pesticide use was retrieved from FAOSTAT.

<table>
<thead>
<tr>
<th>Commodity Production (millions of tonnes)</th>
<th>Pesticides Use (thousands of tonnes)</th>
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<tbody>
<tr>
<td>Brazil</td>
<td>China</td>
</tr>
<tr>
<td>India</td>
<td>USA</td>
</tr>
<tr>
<td>Indonesia</td>
<td>Argentina</td>
</tr>
<tr>
<td>Pakistan</td>
<td>Russia</td>
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<tr>
<td>Thailand</td>
<td>France</td>
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<tr>
<td>Ukraine</td>
<td>Malaysia</td>
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<tr>
<td>Mexico</td>
<td>Australia</td>
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<tr>
<td>Bangladesh</td>
<td>Vietnam</td>
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<td>Philippines</td>
<td>Canada</td>
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<tr>
<td>South Africa</td>
<td>Myanmar</td>
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</tbody>
</table>
Although some countries use far more pesticides than others, where these pesticides are used within the country matters. Biodiversity loss from pesticide use is site-specific. For example, if pesticides are used within or near areas of biodiversity importance, they are likely to have more severe effects on biodiversity. Without precise location-level data on where pesticides are being used, it is difficult to accurately assess the impact of pesticides on biodiversity within a country or region. Pesticide companies must begin to disclose location-level data for more accurate insight into how and where pesticides are driving biodiversity loss.

The countries and companies that supply these pesticides often do not feel the location-level impacts of pesticides. The leading pesticide exporters, such as Europe, the United States and China, are located far from highly biodiverse countries, such as Brazil and Argentina, that use large volumes of pesticides and may experience severe site-specific impacts. European countries regularly export pesticides that are banned for use within the EU, including high volumes of HHPs, to these and dozens of other countries. In 2018 alone, EU countries exported 81,000 tonnes of HHPs to countries outside Europe, nearly the same volume of pesticides that France used that year (Figure 4).
Figure 4. Banned pesticides notified for export from the EU (2018).

Unearthed/Public Eye analysis of 2018 export notifications received from the European Chemicals Agency or French/German/Belgian regulators. Only pesticides banned as “plant protection products” and identified as exported for crop protection are included here. In most cases, figures used here are for mixtures containing banned chemicals, not the banned chemicals alone. Figures given in export notifications are estimated issues before the first annual export takes place. Some states and companies indicated that actual volumes shipped were lower or higher than planned, or that certain exports did not ultimately take place that year. Most declined to provide full data, citing confidentiality concerns.
Regulation of pesticide companies and their investors
Regulation of pesticide companies and their investors

As policymakers become more aware of the damage to biodiversity and human health caused by pesticides, they are developing regulations and policies to hold stakeholders to account. This changing policy landscape has already started to restrict pesticide production and use, such as the EU’s strict authorisation processes and bans on certain pesticides. Financial regulation is also growing, which will hold investors and companies accountable for their role in pesticide-related biodiversity loss. Non-compliance with these policies will create risks, such as fines or reputational damage, for both companies and their investors.

The Kunming-Montreal Global Biodiversity Framework is one such effort from global policymakers to tackle pesticide-related biodiversity loss and shape national policies. The Framework’s Target 7 calls for “reducing the overall risk from pesticides and highly hazardous chemicals by at least half”. While vague in its current form, it is hoped that implementation of this target through National Biodiversity Strategies and Action Plans (NBSAPs) will be more explicit about what reducing risk by half means. The Framework also emphasises that all actors, including businesses and financial institutions, must play a role in achieving these goals. Countries that enact these goals will likely hold the business and finance community accountable for their role in pesticide production. Target 15 of the Framework (which will also be embedded in national policies) calls on the business and finance community to assess and disclose impacts and dependencies on biodiversity, including those that result from pesticide production and use.

In addition to global policy, many jurisdictions are developing their own strategies and frameworks to address pesticide use. This includes the EU biodiversity strategy for 2030 and the UK Environment Act, which provide the foundations for addressing pesticide use as a key driver of biodiversity loss. Europe’s Farm to Fork Strategy, which draws on the EU’s biodiversity strategy for 2030 and is a core component of Europe’s Green Deal, calls for a 50 per cent reduction in the use and risk of pesticides and the use of HHPs by 2030, an increase in biological pesticides and a ban on the use of pesticides in sensitive areas, like in parks and gardens and near ecologically important areas.

Regulation that will impact companies and financial institutions is also growing. Numerous jurisdictions are developing strong pesticide-related regulations that will increase scrutiny of companies in this industry, such as restricting which pesticides can be sold and used (Table 1). Many are also developing financial regulations that require financial institutions to assess and disclose their investment impacts on biodiversity; in many cases, this could be linked to pesticide use and/or the key drivers of biodiversity loss associated with pesticide use, especially pollution (Table 2).
Table 1. A non-exhaustive list of existing regulation relevant to pesticide companies.

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Legislation</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>Directive on Sustainable Use of Pesticides (SUDP)</td>
<td>Established</td>
<td>Calls on member states to reduce pesticide use and minimise the risks they pose to human and environmental health, which may force companies to phase out or reduce the production of some products.</td>
</tr>
<tr>
<td>EU</td>
<td>EU Prior Informed Consent (PIC) Regulation</td>
<td>Established</td>
<td>Companies must annually notify the European Commission when exporting certain hazardous chemicals that are banned or restricted in the EU, including pesticides.</td>
</tr>
<tr>
<td>France</td>
<td>Decision no. 2019-823 QPC</td>
<td>Established</td>
<td>Prohibits companies within France from producing, storing and transporting active ingredients, such as those in pesticides, that have not been approved for use within the European Union.</td>
</tr>
<tr>
<td>Thailand</td>
<td>Ban on the use of select pesticides by the National Hazardous Substances Committee</td>
<td>Established</td>
<td>Reduces market access for pesticide companies by prohibiting the use of select pesticides, including HHPs glyphosate, paraquat and chlorpyrifos, and the import of foodstuffs grown with these pesticides.</td>
</tr>
</tbody>
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Table 2. A non-exhaustive list of established and emerging financial regulation relevant to pesticides.

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Legislation</th>
<th>Status</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>EU Green Taxonomy</td>
<td>Established</td>
<td>Defines economic activities considered sustainable. While it does not explicitly mention pesticides, the Taxonomy highlights that chemical pollution is contrary to sustainable economic activity.</td>
</tr>
<tr>
<td>EU</td>
<td>Sustainable Finance Disclosure Regulation (SFDR)</td>
<td>Established</td>
<td>Financial institutions must report their share of investments in chemical-producing companies, including pesticide companies.</td>
</tr>
<tr>
<td>South Africa</td>
<td>Green Finance Taxonomy</td>
<td>Established</td>
<td>Taxonomy-aligned investment must minimise excessive use of pesticides and associated pesticide pollution.</td>
</tr>
<tr>
<td>Colombia</td>
<td>Taxonomía Verde de Colombia (Colombian Green Taxonomy)</td>
<td>Established</td>
<td>The Taxonomy identifies natural resource pollution from pesticides as contrary to sustainable economic activity.</td>
</tr>
<tr>
<td>UK</td>
<td>Sustainability Disclosure Requirements (SDR)</td>
<td>Emerging</td>
<td>Will establish expectations for financial actors to disclose their environmental impacts and dependencies. While it does not explicitly mention pesticides, it includes objectives relating to natural resource pollution.</td>
</tr>
</tbody>
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5 Since UK seceded from the EU, the UK has compiled with most pre-Brexit EU pesticide policy. The Retained EU Law Bill, currently in progress, will determine which European pesticide regulation will be retained in UK policy. Some new regulation has already been introduced that reverses EU standards. For example, the UK government has repeatedly authorised the temporary use of neonicotinoids – a pesticide class banned in the EU in 2018 for its detrimental effects on bees – to support the beet sugar industry, against expert advice. While the EU is developing new ambitious and progressive pesticide regulations, the UK will no longer be subject to this regulation.
There is more regulation on pesticides in Europe than in other regions of the world. Europe has numerous regulations that apply to pesticides, including legislation that governs which pesticides can be used, what information companies must report and how financial institutions will be held to account for their investments in the industry. The disparity between Europe and other regions is growing as the EU develops ambitious pesticide reduction goals, such as the Farm to Fork Strategy’s target of reducing pesticide use, and risks created by pesticides, by half by 2030.

Europe still falls short by allowing the export of pesticides which are banned for use in the region. The European Commission recently faltered on an earlier commitment to restrict these exports, although France stepped up to introduce regulation that halts the export of these products. This has reduced export volumes from France dramatically, but the country continues to export some banned pesticides, exposing pesticide companies and their investors to financial risk from non-compliance. Multiple groups have been working to delay or water down ambitious EU regulation due to threats to the pesticide industry and fears from constituent countries and interest groups about food security and farmer job security.

The lobbying of pesticide companies is a strong factor in delays in European regulation and weak regulation elsewhere. Seeking to dilute and limit industry regulation on pesticides, these companies hinder policy development through several mechanisms, including making individual donations to policymakers, threatening legal action against policymakers, funding biased economic and environmental impact studies, and holding positions in government. Many leading pesticide companies are members of CropLife International, a lobbying group that influences policy internationally, regionally and nationally. In 2021, the group’s members spent over EUR€12 million on lobbying activities in Europe, targeting policies related to agriculture, sustainability, biodiversity, chemicals and sustainable investment. The group has immense political influence in other jurisdictions, including in countries with large agriculture sectors like South Africa, Brazil and the United States, where it continues to block regulation that could reduce the severe impacts of pesticide use on biodiversity and human health.
The global pesticides market
The global pesticides market

**Six companies dominate 70 per cent of the global pesticide market.** With several mergers and acquisitions in the last decade, these six companies now generate around US$47 billion worth of sales in the industry’s US$65 billion market (Figure 5). Because of this market concentration, reform within these companies will result in significant progress towards halting and reversing biodiversity loss from pesticide use.

**Figure 5. Top six companies in the pesticides industry by percentage of market share.**

Pesticide sales data was collected from 2021 company reports and compared to S&P Global’s estimated 2021 market valuation of US$65 billion. The “Other” category includes pesticide sales not attributed to the six identified companies.

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6 The pesticide sales of the top six pesticide companies were collected through company financial reports, while the market value has been estimated by S&P Global. Both methods have assessed value through pesticide sales, which include herbicides, fungicides, insecticides and other kinds of pesticides.
Performance on biodiversity is poor among these dominant companies. While some companies have broad strategies to address biodiversity loss, these plans do not include robust governance frameworks, identification of risks, opportunities, dependencies and impacts on biodiversity, ambitious target-setting, or thorough reporting practices. Engagement with biodiversity initiatives is also lacking. Only two of the companies are members of the Science-Based Targets Network’s Corporate Engagement Program, a crucial initiative for companies to join to establish science-based targets and metrics on biodiversity.

In addition, all of these companies produce HHPs, including many that have had high-profile environmental and human health impacts. Five of the six companies produce neonicotinoids, which negatively impact numerous species but most notably bees and other pollinators. All but one company produce glyphosate, which has been identified as a probable carcinogen by the World Health Organization and highly toxic to aquatic organisms. Producing these highly hazardous substances has already exposed pesticide companies to lawsuits, leading to reputational and financial risk for companies and their investors. For example, the lawsuits against Bayer regarding the company’s glyphosate-based products resulted in significant public backlash against the company, a decline in product sales and a drop in the company’s market capitalisation by 50 per cent since the company acquired Monsanto in 2018.

Shareholders can play a key role by influencing the strategies of the dominant pesticide companies. Five of the six dominant companies are publicly listed, meaning they have an extensive base of shareholders who invest in the company’s continued operations and growth. Figure 6 shows that 2,140 investors hold shares (of at least US$10K) in at least one of the industry’s five largest public companies, with 89 of those investors holding shares in all five. Many of these investors hold well over US$1 billion worth of investments in these companies (Table 3). The industry’s largest company, Syngenta, has been privately owned since its acquisition by Chinese state-owned company ChemChina in 2017, yet receives financing from debt investors (Figure 7).

7 Market cap decline based in Eikon financial data in 2018 compared to 2023.
Figure 6. Number of investors with holdings in at least one of the five largest public pesticide companies based on January 2023 shareholder data.
Data on shareholders was retrieved from Eikon. The analysis investigated the shareholders in the five largest publicly traded pesticide companies, including Bayer, BASF, Corteva, FMC Corporation and UPL.

Table 3. Ranking of the top 10 investors who invest in all five companies by share value.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Investor</th>
<th>Rank</th>
<th>Investor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BlackRock (US$12 billion)</td>
<td>6</td>
<td>Fidelity International (US$1.3 billion)</td>
</tr>
<tr>
<td>2</td>
<td>State Street Global Advisors (US$3.1 billion)</td>
<td>7</td>
<td>Amundi (US$1.2 billion)</td>
</tr>
<tr>
<td>3</td>
<td>Norges Bank Investment Management (US$3 billion)</td>
<td>8</td>
<td>Wellington Management International (US$1.1 billion)</td>
</tr>
<tr>
<td>4</td>
<td>DWS International (US$1.8 billion)</td>
<td>9</td>
<td>Dimensional Fund Advisors (US$1 billion)</td>
</tr>
<tr>
<td>5</td>
<td>Geode Capital Management (US$1.6 billion)</td>
<td>10</td>
<td>Northern Trust (US$970 million)</td>
</tr>
</tbody>
</table>
All companies in the industry are financed through debt, with net debt totalling US$63.5 billion between the six companies. Some companies, such as Syngenta and Bayer, have a significant portion of their total capital composed of debt – 58 per cent and 50 per cent respectively (Figure 7). Because of this, debt investors, including banks and asset managers, play a key role in providing capital for these companies and can help transform their business operations. By setting ambitious lending policies and requirements for debt financing activities, including facilitating bond issuances and providing loans, debt investors can create significant incentives for companies to change.

Figure 7. Debt financing of the largest pesticide companies compared to total capital.

Financial data was retrieved from 2021 company financial reports. Net financial debt is compared with the company’s total capital, which includes net financial debt and the book value of equity. Corteva’s debt is negative as the company has minimal debt and its liquid assets exceed this debt.
What can investors do?
What can investors do?

To push for improved biodiversity performance by pesticide companies, investors must understand how pesticide use leads to biodiversity loss and which companies dominate the market. They also need to understand the evolving policy landscape that will hold companies and financial institutions responsible for their involvement. Understanding this context will help financial institutions assess their contributions to biodiversity loss, develop appropriate stewardship strategies and policies, and engage proactively with companies in the industry.

As owners and financers of companies in the pesticides industry, the financial sector’s role in driving change cannot be underestimated. Financial institutions should act now to adopt policies and practices to address biodiversity loss due to pesticides, drive the transformation of pesticide companies and contribute to the development of a more sustainable food system.

Recommendations for investors

1. In line with Target 15 of the Global Biodiversity Framework, investors should develop or expand current assessment practices to understand how their investments in the pesticides industry impact biodiversity and develop a strategy to address these impacts. This should include assessing and disclosing location-specific impacts, dependencies, risks and opportunities on biodiversity from investments in the pesticides industry. These assessments should use science-based impact assessment approaches in line with the Taskforce on Nature-related Financial Disclosures (TNFD) or a similar framework, be conducted at the fund and company level, and consider reputational and regulatory risks. Identified impacts, dependencies, risks and opportunities should be addressed through industry-specific investment and stewardship policies, company engagement and capital allocation choices.

2. Investors should engage proactively with policymakers, either individually or through collaborative engagements, to advocate for improved regulation of pesticide companies as part of a wider strategy to drive the development of biodiversity-related regulation.

3. Investors should develop or expand existing biodiversity strategies and stewardship policies to include robust engagement with pesticide companies in their portfolio. Investors should build escalation policies into these strategies and disclose all engagement outcomes, including voting, in their annual sustainability reports. This should complement wider stewardship practices across the food and agriculture sector to drive systemic change, ultimately enabling the pesticides industry to transition faster.
Investors can use the following questions to start engaging meaningfully with pesticide companies. They can also measure company performance and the success of their engagements based on the company’s progress against the outcomes provided:

**Biodiversity assessment and reporting**

1. **In line with Target 15 of the Global Biodiversity Framework, does the pesticide company conduct assessments of their biodiversity risks, opportunities, impacts and dependencies, and have these assessments been disclosed?**

Tracking outcome: Using science-based biodiversity measurement approaches, the company conducts location-specific assessments to analyse biodiversity risks, opportunities, impacts and dependencies of its pesticide products based on data collected on the areas affected by their use, including both on and off-farm environments within their value chains. The company publicly discloses these assessments. Ideally, the company uses the TNFD or a similar framework to guide this process.

2. **Does the company collect and disclose precise location-level data on where its products are used?**

Tracking outcome: The company collects and publicly discloses location-level data on where their pesticide products are used throughout its value chain, such as the location of farms. The company actively engages with retailers and distributors of their pesticide products and requests location-level data disclosures on where their pesticide products are sold and used. Pesticide companies should also disclose location-level data for each country, including where all pesticide products are exported to. As the impacts of pesticides on biodiversity are site-specific, this data is essential for accurately assessing their impact.

3. **Does the company plan to align their biodiversity strategy, including target-setting and measurement approaches, with emerging industry standards on biodiversity metrics and targets, including guidance from the Science-Based Targets Network (SBTN)?**

Tracking outcome: The company is actively engaged in SBTN, including piloting existing recommendations and frameworks. The company is also involved in other biodiversity-related working groups and collaborative initiatives on measurement, such as the Align project, and integrates relevant recommendations from these initiatives.

4. **Does the company have a credible plan to integrate biodiversity concerns into strategies to address climate change and broader transition plans?**

Tracking outcome: The company has a credible plan to integrate biodiversity in climate strategies and broader transition frameworks to achieve net zero. This plan includes fully integrating biodiversity into all climate strategies beyond offsetting, including biodiversity-related target-setting, action plans, impact assessment practices, and policy and governance frameworks. The company also integrates climate considerations into biodiversity strategies.
Pesticide production, sales and lobbying practices

5 In line with Target 7 of the Global Biodiversity Framework and the EU’s Farm to Fork Strategy to reduce risks generated by pesticide use, does the company have a credible plan to reduce the risk of pesticides on biodiversity by half by 2030?

Tracking outcome: The company has a credible plan to measure the risks pesticides pose to biodiversity and to reduce this risk by half by 2030. The EU Farm to Fork Strategy targets indicate that reducing pesticide use is essential for lowering this risk: companies must adopt this principle when aligning with the Global Biodiversity Framework’s Target 7. The company should have a credible plan to measure risk using science-based metrics and to reduce this risk by decreasing pesticide production and offering low-impact sustainable solutions, where the threat to biodiversity is also measured for these solutions. The company does not propose solutions for reducing risk that include equally harmful biological pesticides or other alternatives, such as new synthetic pesticides.

6 Does the company have a credible plan to completely phase out the production and sales of Highly Hazardous Pesticides (HHPs) by 2030 as identified by the World Health Organisation, European Chemicals Agency, the International Agency for Research on Cancer and the US Environmental Protection Agency?

Tracking outcome: The company has a credible plan to phase out the production and sales of HHPs and the products they appear in, which does not include the production of new pesticides that are equally as harmful. For companies based in the EU, this includes phasing out production and export of all pesticides banned for use in Europe.

7 Does the company have a credible plan to cease pesticide sales to farms near areas of biodiversity importance and to ensure the company’s retailers and distributors stop selling pesticides to farms near these areas, including World Heritage sites, Ramsar sites, Key Biodiversity Areas and nationally designated protected areas?

Tracking outcome: The company has a credible plan to phase out pesticide sales to farms near areas of biodiversity importance, and to ensure that retailers and distributors also phase out sales of the company’s products to farms nears these areas. The company assesses and publicly discloses data on pesticide sales to farms near these areas. This is essential for protecting areas that are particularly vulnerable to the impacts of biodiversity loss.

8 Will the company commit to disclosing all political donations and activities in all jurisdictions, including financial or other support to policymakers, policy-specific lobbying, and position holding in government, including the company’s rationale for these activities?

Tracking outcome: The company discloses all political lobbying activities, including those conducted as an independent company and as a member of industry organisations like CropLife International. The company discloses its motive behind these activities. The company’s lobbying activities align with other goals and targets of reducing pesticide production and impacts on biodiversity.
Potential target companies

ShareAction has compiled a list of potential target companies based on their annual pesticide sales compared to other companies in the industry (Table 4). The annual pesticide sales of these companies far exceed that of other industry players and comprise 70 per cent of the total market (see Figure 5). With the exception of UPL, all these companies are also members of CropLife International, a powerful lobbying group that negatively influences policy in numerous jurisdictions. The history of these companies highlights the mergers and acquisitions that have led to a highly concentrated industry. Due to this concentration, the transformation of these six companies will drastically reduce the overall impact of the pesticide industry on biodiversity.

Table 4. Potential target companies.

<table>
<thead>
<tr>
<th>Company</th>
<th>Country</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASF SE</td>
<td>Germany</td>
<td>In 2016, BASF acquired some agricultural assets from Bayer (for Bayer’s acquisition of Monsanto to receive regulatory approval).</td>
</tr>
<tr>
<td>Bayer AG</td>
<td>Germany</td>
<td>In 2016, Bayer acquired Monsanto, a pesticides and seed company, and the Monsanto brand was dissolved.</td>
</tr>
<tr>
<td>Corteva Agriscience</td>
<td>USA</td>
<td>In 2019, the agricultural unit of then-merged chemical companies Dow and DuPont (known as DowDuPont) was spun off to create Corteva.</td>
</tr>
<tr>
<td>FMC Corporation</td>
<td>USA</td>
<td>In 2017, FMC acquired part of DuPont’s crop protection business.</td>
</tr>
<tr>
<td>Syngenta AG</td>
<td>Switzerland</td>
<td>In 2017, Syngenta was acquired by ChemChina, a Chinese state-owned chemicals business which merged with Sinochem in 2021. ChemChina also acquired Israeli pesticides company Adama in 2016, which now operates as a subsidiary of Syngenta.</td>
</tr>
<tr>
<td>UPL Limited</td>
<td>India</td>
<td>In 2019, UPL acquired American crop protection company Arysta, which now operates as a subsidiary of UPL.</td>
</tr>
</tbody>
</table>

What can investors do?
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ShareAction is a NGO working globally to define the highest standards for responsible investment and drive change until these standards are adopted worldwide. We mobilise investors to take action to improve labour standards, tackle climate change and address pressing global health issues. Over 15 years, ShareAction has used its powerful toolkit of research, corporate campaigns, policy advocacy and public mobilisation to drive responsibility into the heart of mainstream investment. Our vision is a world where the financial system serves our planet and its people.

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