Healthy planet, healthy people

The innovative pharmaceutical industry's contribution to the Kunming-Montreal Global Biodiversity Framework

IFPMA

Introduction

Human health and nature are deeply interconnected. Land-use change, climate change, and pollution drive biodiversity loss and reshape the environmental conditions on which human well-being depends.[1] Land-use change disrupts ecosystems and increases the risk of zoonotic spillover and emerging infectious diseases. Climate change alters the distribution of vector- and waterborne diseases[2] and places growing stress on threatened species. Pollution adds directly to the human disease burden through contaminated air and water while accelerating habitat degradation. Beyond these direct effects on disease, the same pressures erode the regulating function[3] of ecosystems, weakening nature's capacity to deliver the clean water, clean air, healthy soils, and resilient food systems that underpin public health.[4]

The pharmaceutical industry plays a central role in protecting human health and increasingly recognizes that fulfilling its mission requires a healthy and biodiverse planet. At the same time, the industry's own operations interact with nature in important ways. At a sector-level, manufacturing consumes water and energy, while production processes create solid waste and wastewater. Pharmaceutical supply chains, like most sectors of the modern economy, depends on nature while also placing pressure upon it.

That recognition has driven action. For decades, through both company-level initiatives and decades of pre-competitive collaboration, innovative pharmaceutical companies are working to reduce environmental impact and contribute positively to a healthy and biodiverse planet.

The Kunming-Montreal Global Biodiversity Framework (GBF)[5], adopted under the Convention on Biological Diversity in December 2022, lays out the most ambitious global biodiversity agenda to date, including targets for governments on ecosystem restoration, pollution reduction, sustainable use of wild species, and corporate disclosure of nature-related impacts and dependencies across all sectors of the economy.[6]

This report examines how the pharmaceutical industry, through its sourcing practices, manufacturing standards, climate strategies, and governance systems, contributes to advancing GBF targets adopted by governments. The analysis draws on publicly available information disclosed by IFPMA member companies,[7] including corporate reports, industry initiatives, as well as scientific and policy literature. It does not aggregate company data into industry-wide totals, as reporting frameworks, baselines, methodologies, and disclosure obligations differ substantially across companies and jurisdictions.[8]

The role of the innovative pharmaceutical industry in this discussion

The International Federation of Pharmaceutical Manufacturers and Associations (IFPMA) represents the innovative pharmaceutical industry globally, with a membership that spans multinational companies, both publicly traded and privately owned, and national and regional industry associations with operations across more than 150 countries. IFPMA member companies discover, develop, manufacture, and distribute medicines and vaccines that reach people worldwide, accounting for the majority of global pharmaceutical research and development investment. The scope of IFPMA membership, in terms of geographic reach, therapeutic diversity, and operational scale, means the practices documented in this report span the full range of pharmaceutical value chains: from compound discovery and clinical development through to global manufacturing and distribution.[9]

The industry's contribution to the GBF at a glance

Across four operational domains explored in this report (responsible value chains, environmental footprint reduction, climate action, and governance and disclosure), IFPMA member companies contribute to 18 of the 23 GBF targets. This contribution is achieved through both company-level programs and practices and pre-competitive industry-collective initiatives, several of which have been operating for decades (see Figure 1 below).

While some companies have projects and initiatives that touch on the remaining five targets – spatial planning (T1), invasive species management (T6), urban green spaces (T12), harmful subsidy reform (T18), and gender equality in biodiversity action (T23) – the extent of industry impact in these areas is either limited or impractical for broad sector engagement. The report therefore focuses on documenting the industry's contributions to 18 core targets. See Appendix 3 for details on the scope, limitations, and methodology of this report.

Figure 1:
Major industry initiatives related to GBF targets

2006

Pharmaceutical Supply Chain Initiative (PSCI)

Shared environmental principles across pharmaceutical supply chains, including biodiversity conservation and climate change[10]

2012

Pharmaceuticals in the Environment (PiE)

Evidence-based framework on eco-pharmaco-stewardship addressing pharmaceutical ingredients in the environment[11]

2016

AMR Industry Alliance (AMRIA)

Coalition driving sustainable solutions, including manufacturing standards to reduce antimicrobial resistance (AMR) in the environment[12]

Alongside industry initiatives in Figure 1, IFPMA member companies have been contributing to, adopting, and complying with a broader set of nature and sustainability frameworks, embedding nature-related accountability into their governance and reporting at a pace that has accelerated since the GBF's adoption. These include the Taskforce on Nature-related Financial Disclosures (TNFD),[16] the EU's Corporate Sustainability Reporting Directive (CSRD),[17] the Science Based Targets initiative (SBTi),[18] the Science Based Targets Network (SBTN), the Carbon Disclosure Project (CDP),[19] and the Nagoya Protocol on Access and Benefit-Sharing.[20]

In the next sections, we will explore the four main domains where IFPMA companies are making contributions to the GBF targets.

2020

Sustainable Markets Initiative Health Systems Task Force (SMI HSTF)

Public-private strategic partnership focusing on health systems supply chain and patient pathway decarbonization[13]

2024

Circularity in Primary Pharmaceutical Packaging Accelerator (CiPPPA)

Collaborative initiative connecting stakeholders to develop and deploy solutions for recycling of primary pharmaceutical packaging[14]

2025

World Business Council for Sustainable Development (WBCSD) Roadmap to Nature Positive for the Pharmaceutical Sector

Sector-specific approach to assessing nature-related impacts across the pharmaceutical value chain[15]

1

Strengthening responsible value chains for nature

Pharmaceutical supply chains span the natural world in the land used to produce botanical inputs, agricultural commodities, and extracted mineral components; the water consumed and discharged during manufacturing; the packaging materials derived from forest and agricultural systems; and the ecological health of the regions where production and sourcing occur.

Nature-derived inputs remain part of the pharmaceutical development toolkit, and the industry's relationship with wild species, including its ongoing transition away from species-dependent manufacturing inputs, is part of this story (see Spotlights 1 and 2). Responsible value chain management is not only about securing critical pharmaceutical inputs sustainably, but also about meeting the shared responsibility of conserving nature and biodiversity, and what that means for the communities and ecosystems along global pharmaceutical supply chains.

Focus areas

Sustainable sourcing of key ingredients, excipients, and packaging materials

Agricultural, marine, and forestry-derived raw materials and excipients, mineral components, and packaging materials derived from agricultural commodities connect pharmaceutical production to land use and biodiversity. IFPMA member companies have embraced sustainable supply programs, and many have adopted certified-sustainable sourcing practices specifically for high-risk commodities, including palm oil derivatives, wood pulp, and plant-based excipients, and engaged with certification and standard-setting bodies including the Roundtable on Sustainable Palm Oil (RSPO)[21] and the Forest Stewardship Council (FSC).[22]

Example: Merck KGaA

Merck KGaA's SMASH packaging program has driven its share of deforestation-free fiber-based packaging from 66% in 2020 to 81.9% by 2025, against a 100% target by 2030. The program converts all wood fiber packaging to recycled, certified, or verified deforestation-free sources. Merck KGaA's Supplier Code of Conduct includes a dedicated deforestation chapter and enhanced biodiversity requirements along the supply chain.[23]

Deforestation-free supply chains and EUDR readiness

The EU Deforestation Regulation (EUDR)[24] has accelerated due-diligence requirements across supply chains that touch forest-risk commodities. IFPMA member companies are implementing traceability systems, supplier mapping, and risk assessments to meet EUDR obligations, with some members extending these requirements beyond regulatory minimums to broader natural-habitat commitments.

Example: Almirall

Almirall's Sustainable Procurement Program strengthens responsible sourcing through supplier sustainability assessments, contractual sustainability requirements, on-site audits, and high-risk materials evaluations. As part of these efforts, the company also completed an EUDR readiness assessment, confirming limited exposure and identifying targeted improvements in traceability and supplier data management.[25]

Sensitive species utilization and alternatives

Pharmaceutical manufacturing has historically relied on biological materials. Scientific advances have enabled a more sustainable approach to their utilization, contributing to biodiversity conservation (see Spotlight 1). The transition from horseshoe crab-derived Factor C to recombinant Factor C (rFC) is the most prominent example of the industry's move toward synthetic and recombinant alternatives to sensitive species utilization, representing a direct reduction in pressure on wild populations and contributing to biodiversity preservation (see Spotlight 2).

Example: Eli Lilly

Eli Lilly is a leader in the use in recombinant Factor C (rFC) testing since 2016, having converted 80% of its medicines testing from the horseshoe-crab-derived LAL assay to rFC across all injectable manufacturing facilities. Regulatory approvals for rFC-tested batch releases have been secured globally[26], contributing to the health of millions of people while helping protect a vulnerable species[27] with a critical role in the food web of shore birds and the coastal ecosystem at large.[28]

Site-level Biodiversity Action Plans

IFPMA member companies have introduced Biodiversity Action Plans (BAPs) at manufacturing and research sites, assessing the ecological value of site land and implementing habitat enhancement, native planting, and land management practices. These plans increasingly follow structured assessment frameworks, including those developed under TNFD guidance.

Example: Pfizer

While constructing its new clinical manufacturing facility in Ringaskiddy, Ireland, a LEED® Gold certified project, the company protected and restored a crucial Cork Harbour Common Tern nesting site. Across Pfizer's global network, site-specific biodiversity teams implement habitat enhancement tailored to local ecosystems, from native species planting to pesticide alternatives, supported by a cross-site Biodiversity Community of Practice. Large capital projects are explicitly required to consider biodiversity impact.[29]

Supplier biodiversity standards

Through adherence to Pharmaceutical Supply Chain Initiative (PSCI)[30] principles, development of robust corporate supplier programs, and the utilization of tools such as EcoVadis assessment[31], IFPMA member companies extend biodiversity and environmental expectations into their supplier base, embedding standards on land use, water, waste, and pollution into commercial relationships and audit frameworks that reach thousands of suppliers globally.

Example: Sanofi

Under its Planet Care program, Sanofi addresses biodiversity through how it sources raw materials, striving to ensure sustainable and deforestation-free sources. Sanofi also engages its value chain partners, suppliers, and contractors to adopt environmental policies in line with its ambitions. Its sustainability requirements are embedded across procurement processes, spanning supplier onboarding, tenders, and continuous monitoring through audits and assessments.[32]

The PSCI, founded in 2006, has 85 members (74% of IFPMA companies are PSCI members) and reaches more than 2,000 suppliers through its shared audit platform and capability-building tools. Its responsible supply chain principles include environmental expectations related to climate change and biodiversity conservation.[33]

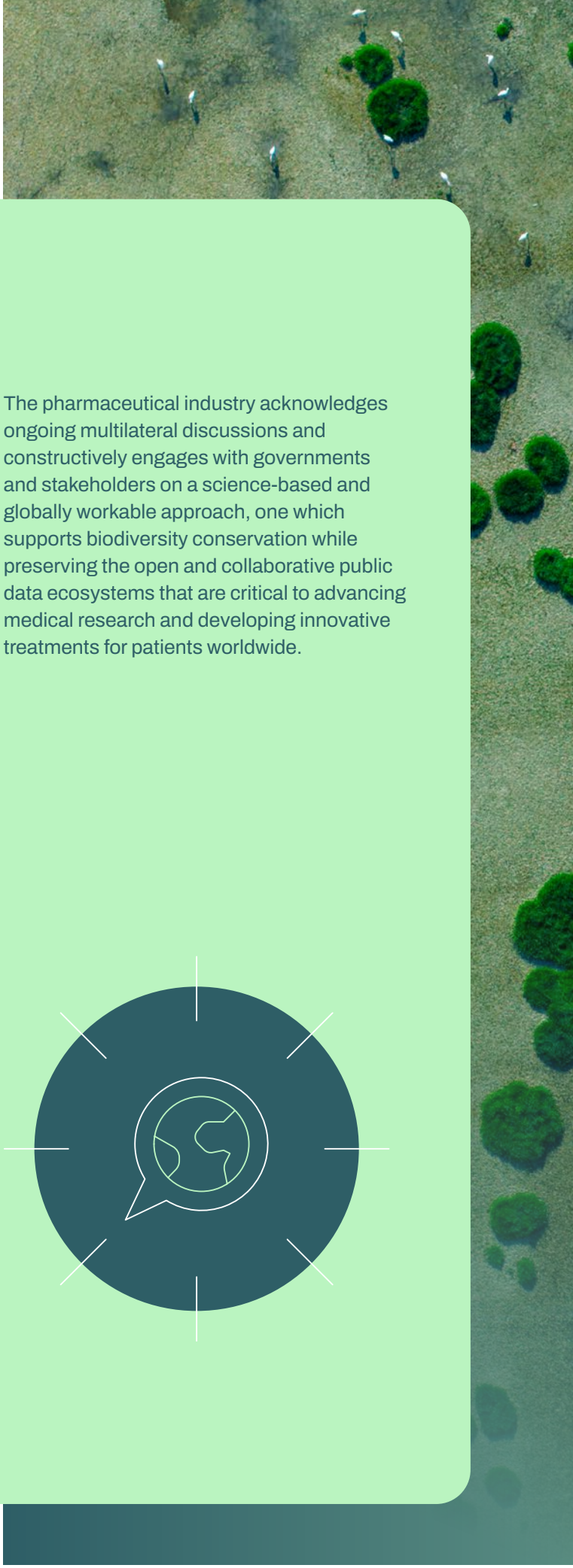
Contributions to GBF targets

The innovative pharmaceutical industry efforts to strengthen value chains for nature supports multiple GBF targets. The below table summarizes where industry efforts most contribute toward such targets.

GBF targets:

Strengthening responsible value chains for nature

4	Halt species extinction, protect genetic diversity, and manage human-wildlife conflicts
5	Ensure sustainable, safe, and legal harvesting and trade of wild species
9	Manage wild species sustainably to benefit people
10	Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry
13	Increase the sharing of benefits from genetic resources, digital sequence information, and traditional knowledge (see text box on T13)
17	Strengthen biosafety and distribute the benefits of biotechnology



T13: Access and benefit-sharing: Industry contributions and open questions

Access and benefit-sharing (ABS) pertaining the use of biodiversity is one of the three core objectives of the Convention on Biological Diversity. As described in this paper, the pharmaceutical industry has a long-standing record of contributing to biodiversity conservation and sustainable use including through monetary and non-monetary benefit-sharing, such as research collaborations, capacity building, the responsible use of genetic resources, and the development of life-saving and life-enhancing medical innovation. As scientific innovation increasingly generates and leverages digital sequence information (DSI), establishing a science-based, workable, proportionate framework for benefit-sharing pertaining the use of biodiversity that protects nature without hindering health R&D and medical innovation is an important shared objective.

However, at present, an accurate and reliable assessment of benefit-sharing of DSI of biodiversity is not feasible. A meaningful evaluation will depend on the progressive establishment of fundamental elements for a functioning multilateral mechanism, including an agreed scope and definition of DSI, and appropriate methodologies for attributing value and establishing baselines. In the absence of these foundational prerequisites, any assessment of benefit-sharing of biodiversity-related DSI is premature and should be interpreted with caution, given the significant methodological, economic, and legal limitations.

The pharmaceutical industry acknowledges ongoing multilateral discussions and constructively engages with governments and stakeholders on a science-based and globally workable approach, one which supports biodiversity conservation while preserving the open and collaborative public data ecosystems that are critical to advancing medical research and developing innovative treatments for patients worldwide.

Spotlight 1

Medicines and nature

From forest floor to digital frontier: The evolving medicine-nature relationship

For most of human history, medicine was derived from our natural ecosystem and was the result of careful observation, over millennia. Every early medical tradition was a botanical and ecological one, a system for reading the biochemistry of local ecosystems. The 5,000-year-old Iceman, Ötzi, carried birch polypore fungus likely for its antibiotic properties on his final journey across the Alps.[34] The Egyptian Ebers Papyrus cataloged aloe, opium poppy, and castor.[35] The Amazon's Indigenous pharmacopeias mapped a living chemistry library that modern science only begun to decode.

The 20th century rewrote that relationship in phases: isolation and synthesis, then rational drug design, then high-throughput screening of synthetic libraries. Later advances in genomics enabled the use of DSI as a replacement or complement to physical samples. With each phase, the laboratory moved further from the forest floor. This shift has not only represented a new era for pharmacology, but also good news for decreasing dependency and pressure on sensitive species and biodiversity.

Infectious disease research is the exception. The fight against viruses, bacteria, and fungi cannot be conducted away from its subject. These organisms evolve in real time, demanding continuous dialogue with the pathogen. Whether such microorganisms constitute "biodiversity worth preserving" is ultimately a philosophical question, and not one that finds much traction among those who have lost someone to influenza, tuberculosis, or COVID-19.

Today, in silico discovery is rewriting the relationship once more. AI models can generate and virtually screen unprecedented numbers of candidate molecules and support the design new compounds, ushering in a new era in pharmaceutical chemistry. The direct line from biological sample to medicine has grown longer still.

And yet, no matter how much, or how little, pharmaceutical innovation depends on nature for its compounds, human health remains profoundly, inescapably dependent on the natural world. Intact ecosystems buffer zoonotic spillover, while their degradation raises the risk of outbreaks that overwhelm health systems. Polluted waterways and degraded soils accelerate the spread of AMR genes through environmental microbiomes. Pollinators and crop genetic diversity underpin the nutritional foundations of human health. Clean water, clean air, mental health,[36] child development:[37] the evidence connecting each to functioning ecosystems is now substantial and growing.

The relationship between medicines and nature has not disappeared. It has shifted from the compound to the condition, from the molecule to the world that makes human health possible at all.

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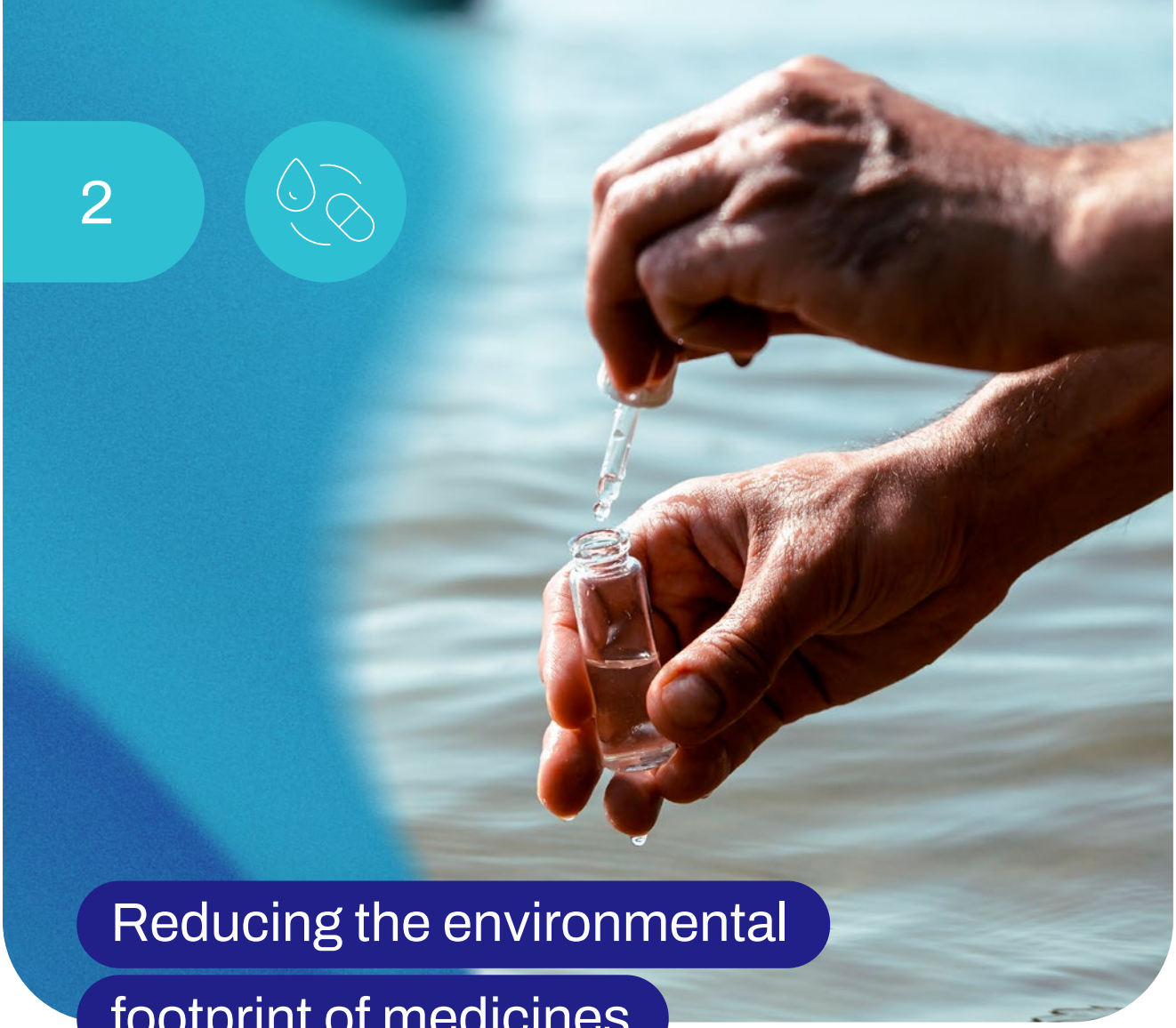


Reducing the environmental footprint of medicines

Active pharmaceutical ingredients (APIs), when not properly managed, can enter waterways through manufacturing discharge, patient excretion, and improper medicines disposal, creating ecological exposures whose consequences range from aquatic toxicity to the acceleration of AMR in environmental microbiome.[38] AMR is simultaneously a public health emergency and a biodiversity threat: resistance genes that emerge in contaminated environments do not stay there.[39]

Reducing the pharmaceutical industry's environmental footprint is inseparable from its health mission. The industry's response, through manufacturing discharge standards beyond compliance, pre-competitive science programs, packaging circularity initiatives, and green chemistry, addresses the pollution-AMR-biodiversity-health nexus at each of its links.

Focus areas

Water stewardship and pharmaceuticals in the environment

Reducing the presence of pharmaceutical residues in aquatic environments has been a focus of pre-competitive industry efforts for decades and led to the establishment of the Pharmaceuticals in the Environment (PiE) initiative in 2012.[40]

The iPiE project (2015–2019), an EFPIA[41]-supported consortium with academic and regulatory partners, developed an improved methodology for the environmental risk assessment of human medicines.[42] The PREMIER database makes API environmental risk data publicly accessible.[43] The MedsDisposal campaign, operating across multiple European markets, addresses the downstream route: patients returning unused medicines through take-back schemes.[44] At the corporate level, IFPMA member companies also operate water stewardship programs that address consumption reduction, recycling, and discharge quality (see Spotlight 3).

Example: Johnson & Johnson

Johnson & Johnson has conducted Environmental Risk Assessments (ERAs) of all small molecule APIs prior to market approval since 2006[45] as well as completed ERAs for the majority of its legacy APIs that received marketing authorization before ERA test methodologies were standardized and adopted by regulatory authorities. Johnson & Johnson was a founding industrial member of the Water and Environmental Technology (WET) Center, supporting development of targeted wastewater treatment for emerging contaminants, and is a partner in the IMI iPiE and PREMIER Project.[46]

AMR and responsible antibiotic manufacturing

The link between manufacturing discharge of antibiotics and the emergence of AMR in environmental settings is scientifically established. The Antibiotic Manufacturing Standard,[47] developed through AMRIA with BSI certification[48], sets discharge limits based on Predicted No Effect Concentrations (PNECs), the concentrations at or below which no environmental harm is predicted. In May 2025, the Standard was updated to further align with the WHO's 2024 Guidance for Responsible and Sustainable Manufacturing of Antibiotics,[49] incorporating stricter API discharge limits and greater supply chain transparency, with BSI certification under the revised Standard commencing in early 2026.[50]

Example: Shionogi

Shionogi's responsible manufacturing practices include careful control and annual publication of site-level antibiotic effluent concentrations at its Kanegasaki facility, benchmarked against PNEC limits under AMRIA standards.[51] Beyond manufacturing, Shionogi signed the 2016 Davos Declaration, which gave rise to AMRIA, and was a founding contributor to the AMR Action Fund, a nearly USD 1 billion industry commitment to bridge the antibiotic commercialization gap and help address the growing crisis of AMR.

Plastics, packaging, and circular economy

Pharmaceutical production generates waste, including packaging-related waste, some of which sits outside mainstream consumer recycling processes due to complex material compositions and regulatory restrictions. Through initiatives such as the SMI HSTF and Circularity in Primary Pharmaceutical Packaging Accelerator (CiPPPA)[52], pharmaceutical companies are helping advance ambitious goals to reduce waste, increase circularity, and advance the use of sustainable plastic sourcing, substituting fossil-based plastics with lower emissions alternatives such as certified bio-based plastics.[53]

Example: GSK

GSK is a founding member of SMI's Health Systems Task Force and has committed to a 25% environmental impact reduction for their products and packaging by 2030. To date, 42% of the products in scope, which include products in the anti-infectives and respiratory portfolios, have environmental impact reduction plans in place. In addition, from 2024 onwards, all newly developed or acquired medicines have Sustainable Design Plans, which include environmental considerations at every step of the product decision-making process, from design to disposal.[54]

Green chemistry and manufacturing efficiency

Process chemistry innovation reduces pharmaceutical manufacturing's environmental footprint through solvent substitution, solvent recovery and recycling, reaction efficiency improvements, and waste minimization at source.[55] Green chemistry metrics, including process mass intensity (PMI) and E-factor, are increasingly embedded in pharmaceutical R&D and manufacturing workflows across the industry.[56,57]

Example: BMS

Bristol Myers Squibb tracks Process Mass Intensity (PMI), the total mass of materials used per unit of API produced, throughout drug development to identify environmental improvement opportunities at each stage. PMI campaigns in 2024–2025 achieved an average 39% reduction, eliminating more than 6,500 metric tons of chemical waste. In 2025, BMS researchers, in collaboration with the Scripps Research Keary Engle lab, received the ACS Green Challenge Award for developing air-stable Nickel(0) catalysts, enabling more sustainable drug substance manufacturing.[58]

AMRIA, established in 2016, brings together over 90 companies and associations. More than 60 antibiotic products have been independently certified to AMRIA's Antibiotic Manufacturing Standard across 15 geographies, with BSI-certified discharge limits based on PNECs for environmental protection.[59]

Contributions to GBF targets

The innovative pharmaceutical industry efforts to reduce the environmental impact of medicines supports multiple GBF targets. The below table summarizes where industry efforts most contribute toward such targets.

GBF targets:

Reducing the footprint of medicines in nature

7	Reduce pollution to levels that are not harmful to biodiversity
11	Restore, maintain, and enhance nature's contributions to people
16	Enable sustainable consumption choices to reduce waste and overconsumption
20	Strengthen capacity-building, technology transfer, and scientific and technical cooperation for biodiversity
21	Ensure that knowledge is available and accessible to guide biodiversity action

3

Aligning climate action with nature outcomes

Climate change and biodiversity loss are not parallel crises. They are mutually reinforcing ones.[60] Habitat degradation reduces the carbon sequestration capacity of natural systems; climate disruption accelerates species extinction and ecosystem collapse; and the loss of functional ecosystems amplifies climate vulnerability for the communities that depend on those systems.

The pharmaceutical industry's environmental action increasingly reflects this interrelation. Greenhouse gas emission reductions set under the SBTi[61] are being paired with biodiversity commitments to halt and reverse biodiversity loss; nature-based solutions are deployed alongside renewable energy programs; and efforts through the SMI HSTF[62] connect corporate climate action to the decarbonization of health systems globally.

Focus areas

Greenhouse gas (GHG) emissions reduction

IFPMA member companies have set Scope 1, 2, and 3 emissions reduction targets at scale, with 82% of members aligned to the SBTi 1.5°C-compatible pathways. SBTi alignment provides validation external to the company, with targets assessed against SBTi's standardized criteria and approved methodologies.[63] Scope 3 target-setting captures value chain emissions across upstream and downstream activities, from raw material extraction through to product use and disposal. It is mandatory to report these emissions under SBTi where value chain emissions exceed 40% of a company's total footprint, a threshold routinely met in pharmaceutical manufacturing given the emissions intensity of active ingredient supply chains.

Example: MSD (Merck & Co)

MSD has committed to reaching net-zero GHG emissions by 2045 across Scopes 1, 2, and 3, aligned with the guidelines of SBTi. Partnership engagements with suppliers, in support of MSD's efforts to reduce GHG emissions, numbered more than 400 and represented approximately 60% of MSD's Scope 3 emissions in 2023. MSD has also committed to sourcing 100% of its purchased electricity from renewable energy by 2025 through virtual and standard power purchase agreements, on-site renewable generation, and vendor-supplied renewable energy.[64]

Renewable and alternative energy

Transition to renewable electricity is one of the most advanced operational decarbonization levers across the industry. Multiple IFPMA member companies have achieved or committed to 100% renewable electricity for their own operations,[65] through a combination of power purchase agreements, on-site generation, and renewable energy certificates. Electrification of thermal processes, including the installation of industrial heat pumps and electrically generated steam systems, is also advancing across manufacturing sites. Beyond electrification, several members are investing in renewable fuels, including biomethane, biogas, and sustainable biomass, to decarbonize the high-temperature process heat that is difficult to electrify.

Example: Amgen

Amgen reached 90% renewable electricity across its global operations in 2024, achieving a 46% reduction in Scope 1 and 2 absolute carbon emissions against a 2019 baseline. Its Ohio biomanufacturing facility, Amgen's first fully electric site, incorporates an on-site solar array sized to generate 2,038 MWh annually. Amgen's target is carbon neutrality in Scope 1 and 2 emissions from its owned and operated facilities by 2027.[66]

Operations and infrastructure decarbonization

Building energy management programs, fleet electrification, and refrigerant transition to low global warming potential alternatives is a key site-level operational decarbonization workstream across the industry. Green building certification, including ISO 50001[67] energy management standards and internationally recognized sustainability ratings, provides an accountability framework for facility-level performance. These workstreams address Scope 1 emissions directly and translate the energy procurement strategies and target commitments described above into measurable site-level change.

Example: Takeda

Takeda's Singapore manufacturing support building has earned Green Mark Platinum Positive Energy certification, the first award of this kind for a biopharmaceutical facility in Singapore. On-site photovoltaic panels generate more energy than the building consumes. At its Vienna site, it is developing an industry-first high-temperature heat pump for steam generation, which will replace natural gas with heat pumps operating on 100% natural refrigerants. Together, site-level interventions contributed to a 55% reduction in Scope 1 and 2 emissions against Takeda's 2016 baseline.[68]

Nature-based solutions

Nature-based solutions, encompassing reforestation and ecosystem restoration, are an active and growing area of investment across the industry. These approaches generate compound environmental returns: sequestering carbon while simultaneously restoring habitat, protecting watersheds, and supporting local communities. IFPMA member companies are increasingly treating nature-based investment not as an offset mechanism but as a substantive component of integrated climate and biodiversity strategies, reflecting the scientific consensus that these crises share drivers and must be addressed together.

Example: AstraZeneca

AZ Forest is a global reforestation and biodiversity program that aims to plant more than 100 million trees by 2030, restore forests, mitigate the effects of climate change, protect biodiversity, strengthen natural ecosystems, and support sustainable livelihoods. Projects are co-designed with ecological experts and local communities. Diverse, locally appropriate tree species are planted to maximize climate resilience and biodiversity benefits while reducing risks from pests and diseases. Local farmers, landowners, and indigenous knowledge holders are integral to projects designed to address socioeconomic needs and positively impact communities and livelihoods.[69]

Partnership-based nature investments

IFPMA member companies are investing in ecosystem restoration through partnerships with local and global conservation organizations. Partners ensure verified carbon removal and biodiversity outcomes that complement companies' direct emissions reduction strategies and other site-related biodiversity actions. The restoration projects are geographically targeted, often connected to regions of biodiversity significance or to watersheds linked to company operations.

Example: Novo Nordisk

Novo Nordisk's Nature Roadmap commits the company to halting nature loss by 2033 and reaching nature positive by 2045. As an early adopter of the TNFD, the company submitted its SBTN impact and priority assessment for independent validation in 2025. Its restoration investments span two continents: a partnership with Re.green to restore 500 hectares of Amazon rainforest in Brazil, projected to capture over 87,000 tonnes of CO_2 over the project's 20-year lifetime, and with Conservation International to restore 170 hectares of forest in the Tianjin water basin in China.[70]

97% of IFPMA member companies have decarbonization programs in place, with 82% having targets aligned with the SBTi on a 1.5°C-compatible pathway.

Contributions to GBF targets

The innovative pharmaceutical industry efforts to help mitigate climate change's impact on people and nature supports multiple GBF targets. The below table summarizes where industry efforts most contribute toward such targets.

GBF targets:

Aligning climate action with nature outcomes

2	Restore 30% of all degraded ecosystems
3	Conserve 30% of land, waters, and seas
8	Minimize the impacts of climate change on biodiversity and build resilience
11	Restore, maintain, and enhance nature's contributions to people
19	Mobilize $200 billion per year for biodiversity from all sources, including $30 billion through international finance
22	Ensure participation in decision-making and access to justice and information related to biodiversity for all

Spotlight 2

Medicines and critical species

Horseshoe crab and human health: The importance of a critical species

Horseshoe crabs have survived for more than 450 million years, through major periods of animal extinction, while remaining essential to coastal ecosystems.[71] Four species exist today: one along the US East Coast and three across South and Southeast Asia and Japan.[72] All four now face mounting environmental pressures. In the United States, Delaware Bay serves as the species' most important spawning ground, where annual spring migrations provide a critical food source for millions of migratory shorebirds, including the red knot and sanderling, during their transcontinental journeys.

The American horseshoe crab is classified as Vulnerable by the IUCN, while the three Asian species are listed as Endangered or Data Deficient,[73] with populations in decline due to overharvesting by commercial fishing, habitat destruction, and climate change. Pharmaceutical manufacturing has added to this pressure through reliance on Limulus Amoebocyte Lysate (LAL), derived from American horseshoe crabs, and Tachypleus Amoebocyte Lysate (TAL), sourced from Asian species. These compounds remain the global standard for bacterial endotoxin testing in injectable medicines. Approximately 500,000 horseshoe crabs are harvested annually in the United States alone, with blood extraction procedures removing up to 30% of blood volume[74] and post-release mortality estimates ranging broadly between 3% to 30%.

A viable alternative now exists. Recombinant Factor C (rFC), first developed in the late 1990s, was commercially introduced in 2003, replicating the endotoxin-detecting function of both LAL and TAL without using animal-derived material. Recent regulatory acceptance has accelerated adoption: the European Pharmacopoeia incorporated rFC in 2021,[75] followed by the US Pharmacopeia in 2024,[76] with implementation beginning in 2025. Transitioning fully, however, requires manufacturers to validate new testing methods product by product to meet stringent regulatory and quality standards for injectable medicines.

The pharmaceutical industry has begun making measurable progress. Eli Lilly has converted 80% of its injectable medicines testing from LAL to rFC since 2016. Bristol Myers Squibb has reduced horseshoe crab-derived extract use by 99% at its New Brunswick facility, while GSK has cut LAL use by 60% since 2020. While reducing pharmaceutical demand is one of the most direct conservation actions available to industry, long-term protection will also require coordinated efforts from fisheries, governments, and conservation organizations to preserve and restore critical spawning habitats worldwide.

Spotlight 3

Water, nature, and health

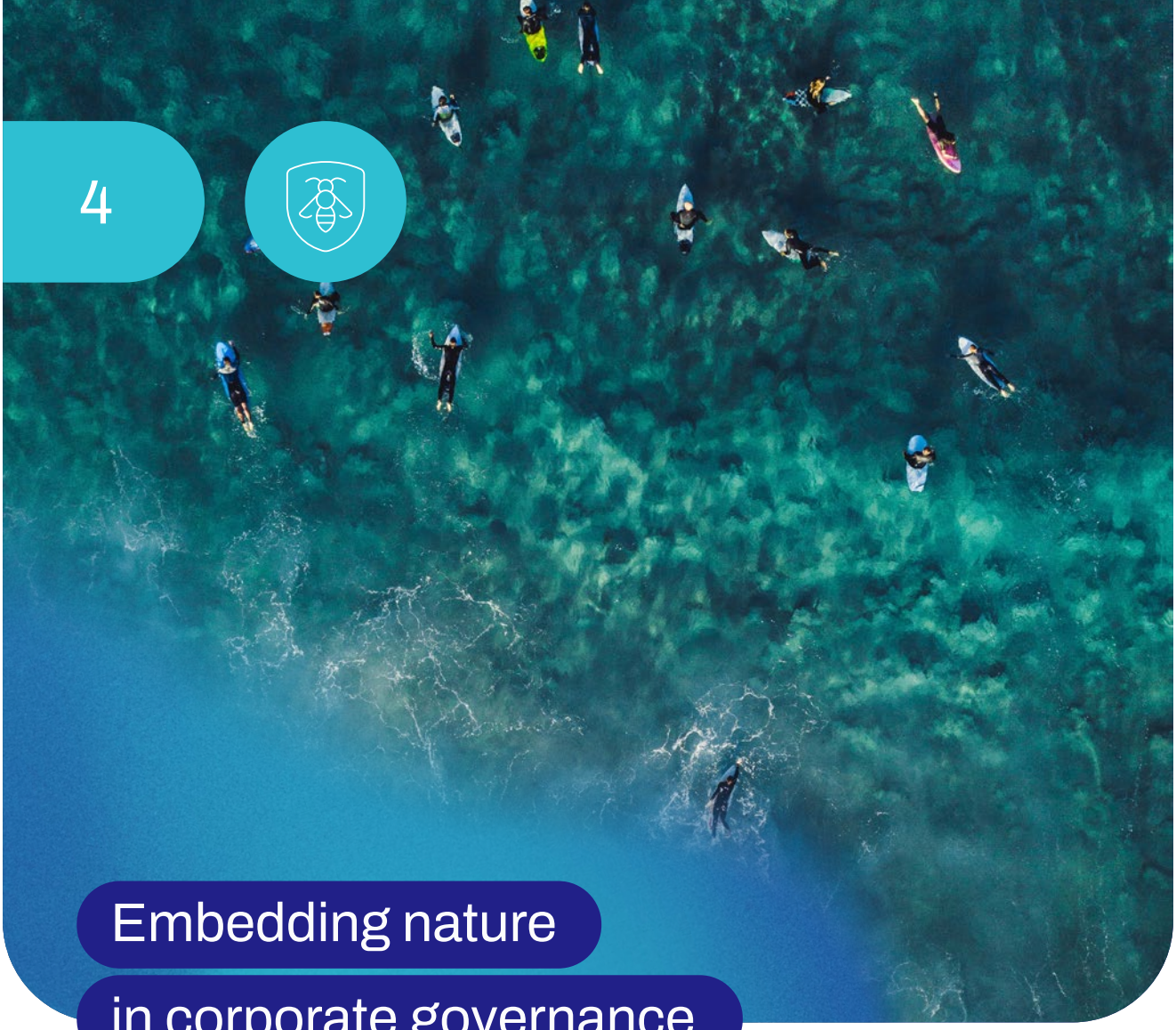
Water: A shared resource connecting human and nature health

Water is the connective tissue permeating human health and the health of nature. Healthy freshwater ecosystems filter contaminants, regulate disease vectors, sustain food systems, and support biodiversity. When water systems are degraded by overextraction or pollution, the consequences are felt across the entire web of life they sustain. Water is foundational to the health of people and nature.

Pharmaceutical manufacturing consumes water at scale, and IFPMA member companies have responded with formal commitments to reduce that demand. GSK achieved its goal of 100% of sites practicing good water stewardship, aligned to the Alliance for Water Stewardship[77] standard, reaching the milestone in 2023. Gilead has committed to achieving water neutrality across all its water-stressed manufacturing sites by 2030, with progress tracked annually. Bristol Myers Squibb targets a 20% reduction in freshwater withdrawal by 2033, and Otsuka has made water neutrality a company-wide goal, underpinned by standardized risk assessments at every manufacturing site. Chiesi assesses utilization in water-stressed areas, integrating consumption data into its environmental management program. These commitments reflect an industry increasingly treating water as a shared resource that require careful management.

The presence of pharmaceutical residues in waterways requires a multi-pronged approach. An estimated 88% of APIs detected in surface waters arrive via patient excretion,[78] an inevitable consequence of medicines doing what they are designed to do in human bodies. Unlike conventional industrial pollution, this cannot be solved at the factory gate alone, and the industry is investing substantially in addressing its own discharges while contributing to broader solutions for patient-related API release in the environment. UCB has deployed real-time biological monitoring and API discharge-measurement campaigns at its manufacturing sites to detect and manage micro-pollutants and complex pollutant combinations beyond regulatory requirements. Sanofi reached 100% environmental-risk-assessment coverage of its top 100 medicines in 2025, up from 85% in 2024.

Nature-based solutions are emerging as a complementary approach, extending water-quality efforts beyond the factory and into the surrounding environment. In Spain, AstraZeneca is funding the design and construction of a wetland to treat effluent from the Rubí wastewater treatment plant near Barcelona, using living ecosystems to purify discharged water while supporting habitat recovery and biodiversity. Taken together, these efforts reflect an industry working to safeguard water across its full cycle, managing its own demand and discharges while contributing to the broader restoration of the freshwater systems on which both people and nature depend.



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Embedding nature in corporate governance

When environmental commitments are anchored in a company's governance architecture, they become durable and provide a clear foundation from which each new generation of leaders can build upon. Board-level oversight, executive incentive structures, enterprise risk management frameworks, and externally-assured public disclosure help transform nature commitments from aspiration to long-term corporate commitments.

The industry's governance and disclosure landscape for nature has evolved since the GBF's adoption, building on a strong foundation of the industry's climate-related commitments. Voluntary frameworks such as the TNFD final recommendations (2023) and the WBCSD Roadmap to Nature Positive for the Pharmaceutical Sector (2025), alongside mandatory requirements such as the EU CSRD, are together consolidating a framework architecture for reporting on the broader nature-related programs of the industry. IFPMA member companies are actively contributing to this evolving landscape.

Focus areas

Corporate biodiversity strategy and governance

Across IFPMA member companies, the depth of nature-related governance embedding varies, but the direction of travel is consistent. Several members have fully institutionalized biodiversity across governance pillars, with board committee mandates covering nature-related matters, enterprise risk frameworks that include biodiversity, and executive incentive structures tied to environmental sustainability performance. Another set of the membership has established a meaningful governance foothold through formal biodiversity roadmaps, TNFD-aligned risk assessments, or board-level ESG oversight that encompasses nature. Some member companies explicitly link executive remuneration with nature targets. Approximately 40% of IFPMA's membership has governance processes involving nature-related goals.

Example: Roche

Roche's Corporate Governance and Sustainability Committee of the Board of Directors provides formal oversight of climate, water, and biodiversity within a governance structure that runs from board level through executive ownership to divisional implementation. Roche's Sustainability strategy is rooted in internationally recognized frameworks and methods to assess the healthcare sector's dependencies, impacts, risks, and opportunities on natural systems. Companies' targets range from local measures, implementing water stewardship projects at own and key suppliers, to sustainable sourcing of key natural commodities, and a commitment to incorporate the true cost of water and natural commodities into business decision-making by 2045.[79]

Sector-collective frameworks

The WBCSD Roadmap to Nature Positive: Foundations for the Pharmaceutical Sector, published in 2025, is the first sector-specific pathway for pharmaceutical companies to align with a nature-positive trajectory. Developed in partnership by a working group of leading pharmaceutical companies and as part of a wider collaboration with Business for Nature and the World Economic Forum, it takes a value-chain approach spanning impacts and dependencies, priority actions, governance, and disclosure, and is aligned to the TNFD and the SBTN. Where the TNFD provides the framework for assessing and reporting nature-related risks and dependencies, the WBCSD Roadmap offers sector-specific guidance on the priority actions pharmaceutical companies should take. The two are complementary, and several IFPMA member companies that helped develop the Roadmap are also TNFD adopters.

Example: Novartis

Novartis works through alliances such as WBCSD, SMI, PEG, and PSCI to address shared climate and nature challenges and support scalable approaches across the value chain. Using the TNFD LEAP (Locate, Evaluate, Assess, and Prepare) approach, Novartis has assessed nature-related impacts, risks, and opportunities across its operations and supply chain. Its nature strategy focuses on water use and quality, waste and plastics reduction, biodiversity plans for sites near sensitive areas, and sustainable sourcing. By 2030, Novartis aims to implement water use reductions for own and supplier sites based in water stressed basins and will set site-specific targets. Sites are identified through the TNFD framework and guidance by the SBTN.[80]

Disclosure, reporting frameworks, and external assurance

IFPMA member companies are deepening engagement with the nature-related disclosure landscape. TNFD has become the organizing framework for nature-specific disclosure, with a number of members formally registered as TNFD adopters or applying its LEAP methodology across their operations and value chains. Members are also building capability toward the CSRD's European Sustainability Reporting Standards (ESRS) Biodiversity and Ecosystems (E4)[81] standard, which introduces double materiality assessment and biodiversity-specific reporting into required corporate practice. Many members also report in parallel against established frameworks including the GRI,[82] the TCFD recommendations (now consolidated under the ISSB), SASB,[83] and CDP, with several holding leadership-level CDP scores that reflect years of systematic environmental data management. The SBTN represents a new ambition, with a growing group of companies applying its methodology in preparation for formal validation. Beyond mandatory assurance under regimes such as CSRD, several members voluntarily seek external assurance signaling evolving governance maturity.

Example: AbbVie

AbbVie obtains limited third-party assurance on many of its KPIs,[84] including key environmental metrics, with each assured figure individually flagged and remaining KPIs reviewed by internal audit. This sits within a double materiality assessment completed in 2024 aligned with the CSRD's standards, reporting prepared with reference to the SASB Biotechnology and Pharmaceuticals standard, and nature and biodiversity reported as an explicit area alongside climate and water.[85]

Six IFPMA members co-developed the WBCSD Roadmap to Nature Positive for the Pharmaceutical Sector in 2025, the first sector-specific nature-positive pathway in the industry. Fifteen are now engaged with TNFD-aligned disclosure – seven as formal registered adopters – and 14 hold CDP leadership-level scores on climate or water.[86]

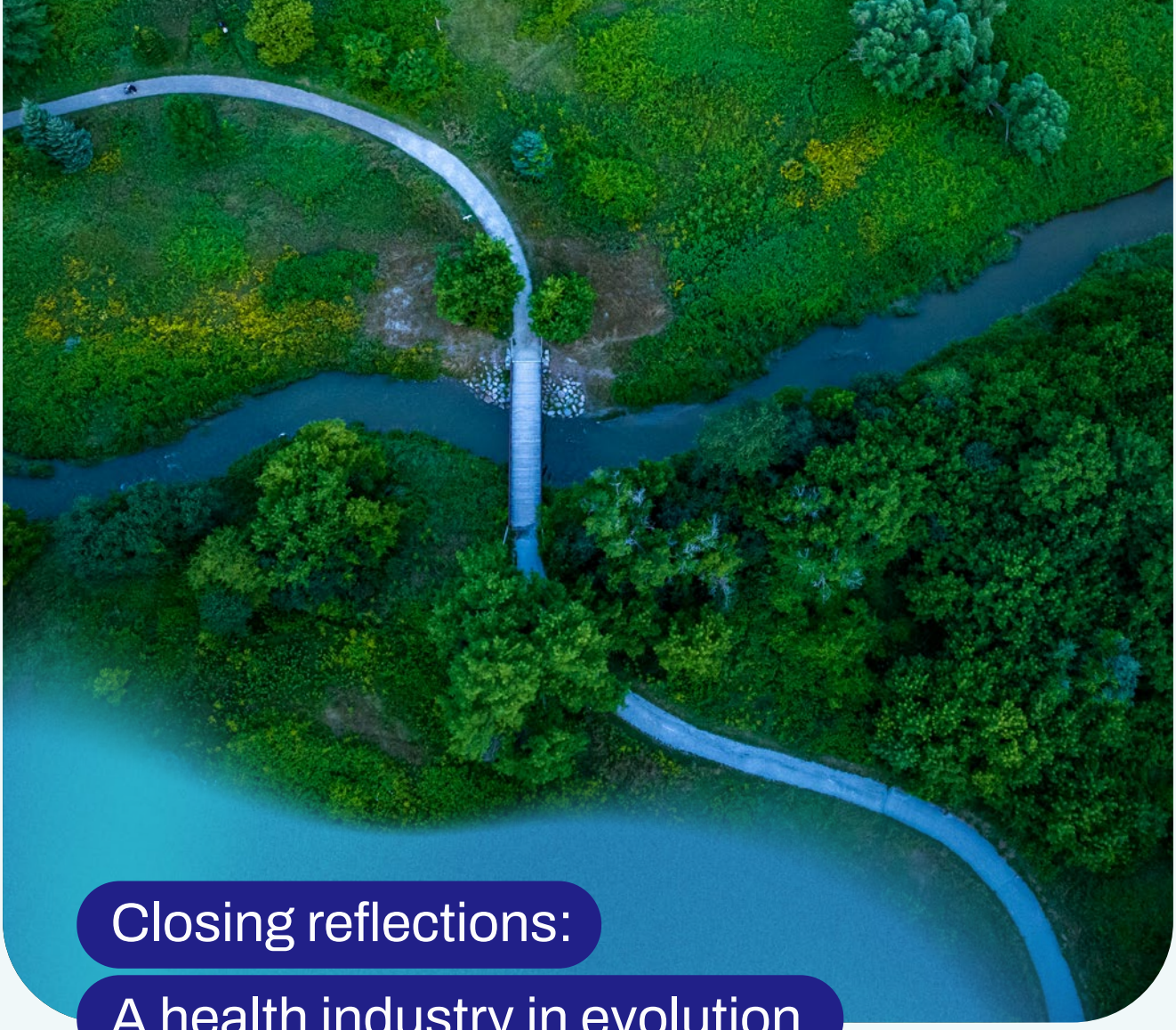
Contributions to GBF targets

The innovative pharmaceutical industry's commitment to nature is increasingly embedded into their corporate governance, helping support the GBF targets below:

GBF targets:

Embedding nature in corporate governance

14	Integrate biodiversity in decision-making at every level
15	Businesses assess, disclose and reduce biodiversity-related risks and negative impacts
19	Mobilize $200 billion per year for biodiversity from all sources, including $30 billion through international finance
21	Ensure that knowledge is available and accessible to guide biodiversity action



Closing reflections:
A health industry in evolution

The evidence is increasingly clear that a healthy and biodiverse planet is fundamental to human health. Taken together, environmental challenges, including biodiversity loss, are reshaping the conditions in which humanity exists, health systems function, and medicines are developed, manufactured, and used. The innovative pharmaceutical industry acknowledges this critical challenge.

The industry's contributions to advancing the Kunming-Montreal GBF across the 18 targets described in this document are evidence of a sector in evolution, one that is increasingly incorporating biodiversity considerations across its entire value chain. In this journey, the innovative pharmaceutical industry remains committed to collaborating with governments, multilateral organizations, scientific and research institutions, and indigenous peoples and local communities to achieve the Kunming-Montreal GBF targets and a shared vision of a world living in harmony with nature.

Appendix 1

Kunming-Montreal Global Biodiversity Framework: Brief descriptions

1. Plan and manage all areas to reduce biodiversity loss
2. Restore 30% of all degraded ecosystems
3. Conserve 30% of land, waters, and seas
4. Halt species extinction, protect genetic diversity, and manage human-wildlife conflicts
5. Ensure sustainable, safe, and legal harvesting and trade of wild species
6. Reduce the introduction of invasive alien species by 50% and minimize their impact
7. Reduce pollution to levels that are not harmful to biodiversity
8. Minimize the impacts of climate change on biodiversity and build resilience
9. Manage wild species sustainably to benefit people
10. Enhance biodiversity and sustainability in agriculture, aquaculture, fisheries, and forestry
11. Restore, maintain, and enhance nature's contributions to people
12. Enhance green spaces and urban planning for human well-being and biodiversity
13. Increase the sharing of benefits from genetic resources, digital sequence information, and traditional knowledge
14. Integrate biodiversity in decision-making at every level
15. Businesses assess, disclose, and reduce biodiversity-related risks, and negative impacts
16. Enable sustainable consumption choices to reduce waste and overconsumption
17. Strengthen biosafety and distribute the benefits of biotechnology
18. Reduce harmful incentives by at least $500 billion per year, and scale up positive incentives for biodiversity
19. Mobilize $200 billion per year for biodiversity from all sources, including $30 billion through international finance
20. Strengthen capacity-building, technology transfer, and scientific and technical cooperation for biodiversity
21. Ensure that knowledge is available and accessible to guide biodiversity action
22. Ensure participation in decision-making and access to justice and information related to biodiversity for all
23. Ensure gender equality and a gender-responsive approach for biodiversity action

Appendix 2
IFPMA Member Companies: 38 global corporations

Company	Headquarters
AbbVie	United States
Almirall	Spain
Amgen	United States
Astellas Pharma	Japan
AstraZeneca	United Kingdom
Bayer	Germany
Biogen	United States
Boehringer Ingelheim	Germany
Bristol Myers Squibb	United States
Chiesi Farmaceutici	Italy
Chugai Pharmaceutical	Japan
CSL	Australia
Daiichi Sankyo	Japan
Eisai	Japan
Eli Lilly	United States
F. Hoffmann-La Roche (Roche)	Switzerland
Gilead Sciences	United States
Grünenthal	Germany
GSK	United Kingdom
Incyte	United States
Ipsen	France
Johnson & Johnson	United States
Lundbeck	Denmark
Menarini Group	Italy
Merck KGaA	Germany
Moderna	United States
MSD (Merck & Co.)	United States
Novartis	Switzerland
Novavax	United States
Novo Nordisk	Denmark
Otsuka Pharmaceutical	Japan
Pfizer	United States
Sanofi	France
Servier	France
Shionogi	Japan
Takeda Pharmaceutical	Japan
Teva Pharmaceutical Industries	Israel
UCB	Belgium

Appendix 3
Methodology and limitations

Methodology

This report draws exclusively on publicly available information disclosed by IFPMA member companies, including corporate sustainability and annual reports, company websites, and disclosures to recognized reporting frameworks, supplemented by industry-initiative documentation and relevant scientific and policy literature. Company examples were selected to illustrate the range and depth of practices across the membership, and it is not intended to rank or benchmark individual companies.

Limitations

Company examples contained in this document are illustrative and not exhaustive: the absence of a given company from any example reflects space limitations of this report rather than an absence of activity. Because reporting frameworks, baselines, measurement methodologies, and disclosure obligations differ substantially across companies and jurisdictions, this report does not aggregate company data into industry-wide totals, and figures drawn from individual disclosures reflect each company's own reporting basis and reporting period. The assessments and examples in this document are intended to characterize the direction, scale, and diversity of the industry's contributions to the GBF and not the total sum of industry's contribution. The analysis is limited to information in the public domain and current as of the date of writing.

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