Nature Impact

Contributing to a Nature Positive future

Our Commitment to be Land Positive has enabled Croda to develop sector-leading understanding of our impacts on nature and we have already commenced the work required to reduce them.

Our long history of using bio-based raw materials means we have a great responsibility to address issues around nature, biodiversity and dependencies on ecosystems. We continue to take action to reduce our impacts on land, water, and other natural resources, promoting a positive restorative approach beyond “doing less harm”.

Taking action now on nature: a global sense of urgency

The Global Biodiversity Framework (GBF) was adopted by 196 countries at COP15: ’the Paris Agreement for Nature’ in 2022. Since then, significant progress has been made to develop guidance and support for businesses to assess and disclose impacts and dependencies on nature.

At New York Climate Week in September 2023, the World Business Council for Sustainable Development (WBCSD) released guidance[1] on how companies can contribute to halt and reverse nature loss by 2030. This approach was further developed by the World Economic Forum (WEF) with the Sector Transitions to Nature Positive project. Croda contributed to one of their first reports, “Nature Positive: Role of the Household and Personal Care Products”.

Building on Land Positive to contribute to a Nature Positive world

Achieving a Net Zero and Nature Positive future is essential for the health, wellbeing and prosperity of everyone. We are already Land Positive and are on track to meet our 2024 land saved milestone, through the use of our crop and seed technologies.

We announced our aspiration to become Net Nature Positive in 2022 and, since then, have recognised this is a global ambition, defined by the Nature Positive Initiative[2], in which we have an important contribution to make.

We aim to build on the progress we have already made in the sourcing of bio-based raw materials, reducing deforestation and water impacts, preserving ecosystems, and creating technologies for regenerative agriculture alongside suppliers, customers, partners and industry organisations.

Science Based Targets for Nature (SBT for N)

In the last three years, through our participation in the SBT for N Corporate Engagement Programme, reinforced by our membership of WBCSD, we are maturing our approach. Following the SBT for N methodology, we have made significant progress on our assessment and prioritisation of our impacts on nature, upstream of Croda in our supply chains as well as our direct operations.

In 2023 Croda was selected for the WBCSD Science-Based Target for Nature Preparer Group, a project due to complete later in 2024. We are working with like-minded peers across various industries, nature experts and WBCSD to test the SBT for N methodology and agree on best practices in corporate-driven action.

1. “The Roadmaps to Nature Positive: Foundations for all businesses”, WBCSD September 2023.
2. “Definition of Nature Positive”, Nature Positive Initiative, November 2023.

Nature Impact continued

Our biggest impacts – land use and water

Sustainable sourcing

We continue to strengthen our demands on suppliers to provide ingredient transparency and raw material traceability. These insights help us create more sustainable supply chains by identifying and taking action on potential risks linked to carbon, water, land use change, and human rights. Suppliers are required to share origin detail at the sub-national level for raw materials, helping us to better understand risks linked to each commodity.

Extensive transparency for our palm oil derivative raw materials

Our use of palm-derived raw materials is supported by RSPO supply chain mapping, certification and transparency. In 2023 88.4% of our global palm derivatives consumption was RSPO physically certified by Mass Balance, >99.9% in Europe and the Americas. We continue to face challenges completing the conversion, primarily due to slow market progress in Asia.

We are a founder member of Action for Sustainable Derivatives (ASD)[1] an industry consortium focused on transforming palm derivative supply chains by increasing transparency, monitoring risks, and generating on-the-ground impacts (see page 7, ASD Impact Fund). Working with ASD, our 2022 supply chain mapping covered 99.4% of our total 2022 volumes of palm-derived raw materials. Supply chain transparency saw continued increases in our levels of transparency: 97.7% of these volumes could be traced to the refineries, 95.4% to the mills and 33.5% as far as the plantations (see charts).

1. https://sustainablederivatives.org/

We will continue our strong focus on this important supply chain reflected by our CDP score for Forests (Palm Oil) reaching A- (2022: B) and will work to improve our approach in response to changing regulations, for example, the EU Deforestation Regulation (2023) and wider stakeholder expectations.

Sustainably sourcing other bio-based raw materials

Beyond palm, we also seek third-party certification to validate the sustainability of suppliers and their bio-based raw materials. We have accreditations with the International Sustainability and Carbon Certification (ISCC), USDA BioPreferred®, Union for Ethical BioTrade (UEBT), and Sustainable Castor Oil Association (SuCCESS) and are working with suppliers to ensure they can provide the required supply chain transparency and certification to meet our targets.

Environmental stewardship: water is fundamental

The use of water in our own operations is crucial in the production of our ingredients, yet has the potential to negatively impact nature in the local watersheds. Croda has been managing water use carefully for decades aligned with chemical industry best practices, and was externally recognized in 2023 by CDP as we improved our Water report score to A- (2022: B). Globally, by the end of 2023, water saving initiatives across our manufacturing sites contributed to reducing water usage volumes by 35% since 2018 within our direct operations. Our focus now is on reducing the water impact of our operations in water-stressed regions around the world.

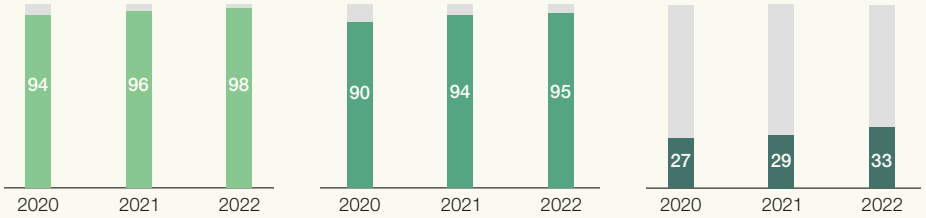
The importance of local roadmaps to reduce water impact

Our Commitment has challenged us to think more holistically about water impact, now aligned with our Nature Positive aspirations, seeking to ensure the more sustainable and responsible use of water resources. We have developed a bespoke Water Use Impact Tool that accounts for local water stress, water displacement effects and water quality in addition to withdrawal volumes, to better assess local environmental impacts associated with our water management practices. To maximise benefit, our water impact target of a 50% reduction in impact by 2030 (from a 2018 baseline) focuses initially on the six Croda locations in recognised water stressed areas of the world. Work continues to enable us to meet our intermediate milestone of a 25% reduction in water impact at these locations by the end of 2024. 4 out of our 6 sites in water-stressed zones are on track to deliver against our water impact target for 2024; the remaining two sites will be further supported in 2024 to maximise our ability to meet the milestone.

Understanding and reducing our 'water footprint'

Through our work on nature and cradle-to-grave LCA, we have recognised that a significant proportion of our impact on freshwater, like climate, is embedded in our raw materials, bio-based in particular. As we have done for carbon, we are working towards developing a better understanding of our total water footprint and the actions we can take to reduce impacts on nature through freshwater demands that occur throughout our value chains. Over the last four years our LCAs also help to quantify the water impacts through the use and disposal of our products by proactively identifying water-intensive stages, materials and processes. Our total avoided water use in 2023 linked to the sales of ingredients from these case studies is approaching 292 million m^3 and enable us to support our customers.

Traceability levels across our palm derivative supply chain



Sustainable Palm Index (SPI): leaders in our field

The SPI is a self-disclosure assessment with independent verification based on desk research for suppliers of palm-based derivatives, aimed at assessing the level of commitments, processes and achievements in terms of sustainable sourcing practices, based on NDPE (No Deforestation, No Peat, No Exploitation) principles. Our 2022 Sustainable Palm Index (SPI) evaluation scored 99/100, a 'best-in-class'[2] rating for the third year running and the highest scoring participant in the category.

2. Best-in-class practices are the highest category for suppliers with a score above 80/100, noting the average SPI score for category in 2022 was 49/100.

Nature Impact continued

Delivering crop science and regenerative agriculture solutions

Through our crop and seed businesses, we support the transition to more sustainable agricultural practices – to help build resilience to climate change and nature loss, reduce the negative impact of land cultivation and support food security.

Our technologies enable farmers to use less land

Our crop technologies and seed treatments help our customers' products improve crop yields, in turn reducing the land area required to grow one tonne of crop. We express this as land saved, a key element of our ambition to become Land Positive by 2030. In 2023, combining the yield benefits from our seed coatings, crop adjuvants and bio-stimulants, the total land saved was 151,038 hectares, equivalent to 211,537 football pitches (2022: 161,431 hectares), and 58,815 hectares above our 2019 baseline. 69% of our land saved in 2023 is in Asia and Latin America, maintaining our focus on areas most pressured for food productivity and those facing the greatest threat of deforestation. Our 2024 milestone, while challenging to deliver, remains our focus this year.

Crop science breakthrough innovations directed towards more sustainable agriculture

With a strong record of crop science innovation, the pace of breakthrough launches has accelerated as we close in on our 2024 milestone, with nine breakthrough innovations launched since 2020, including four in 2023 (see opposite). A new whitepaper 'Formulating Biologicals for agriculture' was released, discussing the opportunities that biologicals provide in crop protection, alongside the formulation and delivery challenges.

Beyond Land Positive, our businesses have also engaged with customers to increase transparency in support of their own environmental assessments. Our focus has been on Life Cycle Assessments and biodegradability.

Life Cycle Assessments helping customer transition to more sustainable product portfolios

Our bespoke LCA tool analyses the environmental impacts of ingredients, from raw material source to end of life in our customers' products. In 2023 we have completed two full 'cradle-to-grave' product LCAs and 33 'cradle-to-gate' LCAs in response to customer demand.

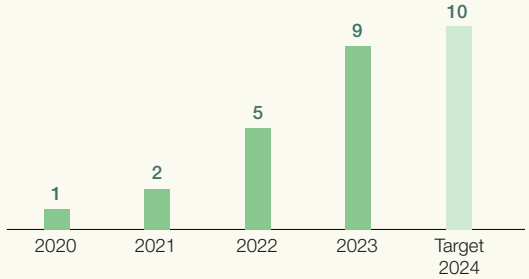
A pathway to circularity: understanding biodegradability

We have assessed the end-of-life impacts of many of our ingredients as we recognise our responsibility for what may be impacting nature through wastewater containing our ingredients. Understanding biodegradability, a substance's decomposition potential, furthers our circular approach for Croda ingredients, with manufacturers, consumers and regulatory authorities increasingly expecting biodegradability information. Our Consumer Care business has prioritised biodegradability transparency information for its customers, generating new data on hundreds of its ingredients and opening the Iberchem Biodegradability Investigation (IB-BI) laboratory, a new internal testing facility to determine the biodegradability of fragrances, in line with OECD test method guidelines.

A new source of natural rubber for more sustainable mobility

Incotec has been collaborating with a major customer to bring a new crop to market to produce natural rubber, so replacing extraction from rubber trees in tropical forests. Incotec completed the development of seed priming and coating for Guayule, which requires far less water than traditional crops and can be grown in desert-like climates in the US, Mexico and other locations.

Breakthrough technologies brought to market since 2020



2020 & 2021:

- Microplastic-free seed coatings

2022:

- Drought resistant seed coating
- Symiro biostimulant to promote crop growth and yields in soybean
- Potato seed priming/pelleting[1]

2023:

- Tree seed production
- Seed priming/coating for Guayule alternative rubber crop
- Seed treatment for commercial fibre production
- Atlox BS-50 delivery system supporting the move to biopesticides

1. 3rd breakthrough technology for 2022 identified during 2023 and added to metric.

Nature Impact in action

Bringing more sustainable sourcing to pharma supply chains

In 2023 we continued our efforts to help the pharmaceutical industry to move towards more sustainable and ecologically-friendly supply chains for vaccine adjuvants. This included partnering with Botanical Solutions Inc (BSI) to produce pharmaceutical grade QS-21, enabling production of next-generation adjuvant systems for new vaccine development. Until now, QS-21 has been produced by harvesting mature soap trees and extracting it from their bark. By contrast, BSI's adjuvant is derived from plant tissue culture, through an innovative process of in-lab growing and extraction. In October 2023, BSI and QS-21 won the Most Sustainable Product or Service award at the Southern Sustainability Partnership's Big Sustainability Expo 2023 in the UK.

Replacing soft wood with regenerative growth

In 2023, Incotec completed its first commercial seed treatment for a project that seeks to develop a new crop for commercial fibre production, replacing the consumption of soft woods. This new crop species was identified as a 'permanent perennial' with benefits including 'regenerative' growth to enable multiple cuttings over a 25-year life span, providing high quality fibre suitable to replace soft woods, and preventing deforestation by providing an alternative source. This project also demonstrates high water use efficiency.

Speed up reforestation vital in an era of ecological decline

In 2023, our Incotec business signed a Memorandum of Understanding with tech-driven reforestation company Land Life to work on a pioneering project to integrate smart coating technologies on tree seeds. In a world of ecological decline, this aims to help scale-up reforestation globally: Incotec 'smart tree seeds' help to simplify logistics, expand the scale of operations and reduce costs. The first coated seeds will be introduced in Colorado, USA, Victoria, Australia and Northern Spain. In September 2023, Incotec won the 2023 Sustainability Award for this project at the 8th edition of the Plantum Sustainability Awards. The jury praised it as a concrete restorative initiative that plays a crucial role in addressing a global issue.

Supporting the shift to more sustainable biopesticides: Atlox™ BS-50

Microbes can have beneficial effects throughout agriculture, with biopesticides probably the most well-known example. These are used to control insects (bioinsecticides) or pathogens (biofungicides) – Croda produces neither. Atlox BS-50 is a new Croda solution that supports a wider-scale transition to bio-based pesticides, so helping to reduce negative environmental impacts. A ready-to-use wettable powder (WP) delivery system with solid microorganisms, bacterial and fungal spores, Atlox BS-50 is designed to improve wettability and dispersibility without affecting viability.

Nature Impact continued

Land Positive

Key

- Target achieved
- Target on track
- Target requires additional focus
- Target challenging to achieve
- Fundamentals (F)

Objective and targets	Status	Milestones and metrics	Status	2023 progress
Land use • Throughout this decade, the land saved through the application of our crop protection and seed technologies will exceed any increase in land used to grow our raw materials by at least a factor of two, and by 2030, we will save at least 200,000 hectares per year more than in 2019		• By the end of 2024, the land area saved through use of our technologies will be at least 80,000 hectares per year more than in 2019		• We saved 58,815 hectares per year more than our 2019 baseline year, in total saving 151,038 hectares of land • Land used to grow our raw materials in 2023 was 44,397 hectares
Crop science innovation • Through to 2030 we will bring an average of two crop technological breakthroughs to market each year that are in alignment with our SBTs and which help our customers mitigate the impact of climate change and land degradation • By 2030, we will have established three new partnerships to contribute to the recovery of compromised farmland and protect biodiversity. We will work with customers, universities and business councils to achieve this		• By the end of 2024, we will have brought 10 qualifying technological breakthroughs to market		• We brought four technological breakthroughs to market in 2023, which protect biodiversity and mitigate the impact of changing climate and land degradation, bringing our total breakthrough technologies launched since 2020 to nine
F				
Environmental stewardship • Reduce our water use impact by 50% from our 2018 baseline		• Reduce our water use impact by 25% from 2018 baseline by the end of 2024 • Eliminate process waste to landfill across our operations by the end of 2024		• Water use decreased by 35% versus 2018 reference. 4 out of our 6[1] sites in water stressed zones are on track to deliver against our water impact target for 2024; the remaining two sites will be further supported in 2024 to maximise our ability to meet the milestone. • Process waste to landfill has reduced by more than 58% since our 2018 baseline, with only 3 sites contributing >90% of remaining waste to landfill in 2023
Product Stewardship • Full life cycle assessments (LCAs) for our top 100 ingredients		• Complete 40 LCAs by the end of 2024		• 2 further full LCAs were completed in 2023 bringing the total to 7 • Focus in 2023 has been on completing 'cradle to gate' LCAs as required by our customers, where we completed 33

1. The number of Croda sites in water stressed areas has reduced from 7 to 6 during 2023, following the announcement that our site in Cikarang, Indonesia will close.