Vaccine science

> “We are part of a critical industry during the COVID-19 pandemic and our smart science is found in many items needed to help prevent, control and treat COVID-19.”

Watch
Smart science in action
www.croda.com

In our response to COVID-19 we lived up to our Purpose of using Smart science to improve lives™ providing ingredients for life-saving technologies that prevent, control and treat the virus.

The development of a COVID-19 vaccine required intense collaboration across the pharmaceutical supply chain. Throughout the pandemic we worked closely with companies and universities developing vaccines, supporting them throughout the development phase as well as during clinical trials and scale-up processes. To play our part we shared our science, including new and extended data sets, with research institutions as they worked to understand how a vaccine for the virus might be developed. We also gifted our leading saponin vaccine adjuvants and other components to teams working on vaccine development across the world.

Our speciality excipients, lipids and adjuvants have now been formulated as critical components in COVID-19 vaccines that have been approved for use by regulatory authorities. This support and the new technologies required for some of these vaccines were developed through exceptional collaboration between the vaccine development teams, our Health Care acquisitions of Biosector (now Croda Denmark) and Avanti and sites across Croda. These cross-functional teams, with our partners, worked at high speed to refine the complex processes involved in achieving the volumes and purity required for the vaccines as they became approved for use.

These successes will help us reach our target for supporting the immunisation agenda of the World Health Organization (WHO), where we want to contribute to the successful development and commercialisation of at least 25% of the pipeline vaccines listed by the WHO.

In addition to much needed vaccines, the outbreak of COVID-19 resulted in huge demand for hand sanitiser, used to minimise the spread of the virus. Glycerine became a much sought-after ingredient as it helps to protect hands from the drying effects of other sanitiser ingredients, such as alcohol. With hand sanitiser in short supply, we supported our customers in their manufacture of this critical item by gifting enough glycerine to manufacture five million* bottles.

* Five million bottles assumes 250ml bottles with a 2% glycerine content.

GRI **Standard Number:**
102-15

People Positive

We will apply our innovation to increase our positive impact on society. We are improving the lives of our own employees and people around the world by developing ingredients to improve health and wellbeing as well as encouraging and promoting diversity.

Highlights

50 million

equivalent doses* of our excipient components provided to support the roll out of the Pfizer-BioNTech COVID-19 vaccine (p22)

Entekno

investment and commercial partnership signed in 2020, bringing novel sunscreens to market to help protect more people from skin cancer

Croda Foundation

formally incorporated as a legal entity

£200,000

gifted in Acts of Kindness

People Positive by 2030

Objectives	Targets	Milestones	2020 progress	SDGs
Health & Wellbeing: We will use our smart science to promote healthy lives and wellbeing through the development and application of our ingredients and technologies.	• By 2030, we will contribute to the successful development and commercialisation of 25% of WHO-listed pipeline vaccines • By 2030, we will protect at least 60 million people annually from potentially developing skin cancer from harmful UV rays, through the use of our sun care ingredients	• By the end of 2024 our technology will be part of at least 10 clinical phase III trials across at least 25% of the WHO-listed pipeline vaccines • By the end of 2024 we will protect one million lives from skin cancer through the use of novel sun protection technologies	• Further engagement with project teams around the world developing vaccines • Roadmap to deliver our 2030 objective developed • Two technology partnerships formed with Entekno and Anomera	SDG 3.3 SDG 3.4
Gender Balance: We will achieve gender balance in our business by focusing on recruitment and development opportunities to increase the number of women in leadership positions.	• By 2030, we will achieve gender balance across the leadership roles in our organisation	• We are rolling out gender-balanced shortlisting recruitment across Croda, with a target of having 80% of shortlists gender balanced by the end of 2023	• 19% increase in the number of women in leadership roles • 40% increase in the number of women in direct production roles since 2018, with our first female production operators recruited in North America	SDG 5.5
Improving More Lives: We will promote our smart science and help improve more lives using our technologies within relevant communities, where our science can make a positive difference. We aim to create STEM educational opportunities and provide basic necessities through the use and application of our ingredients.	• We will establish and fund a Croda Foundation to help improve one million lives in relevant communities	• Intermediate milestones for the Croda Foundation to be set during 2021	• Croda Foundation formally incorporated as a legal entity • Recruitment of an independent, experienced, Director for the foundation completed	

* According to Pfizer, November 20 2020.

Health & Wellbeing

SDG Targets:
3.3 and 3.4

Preventing skin cancer

Skin cancer is the world's most common cancer. Over the last decade the annual cases of melanoma, the deadliest form of skin cancer, have increased by nearly 50% to over 287,000; there are more than 60,000 melanoma related deaths each year.[1] Adding these figures to the current incidence and mortality rates for non-melanoma skin cancers, we can see why dermatologists believe skin cancer should now be seen as a global epidemic.

During 2020, our Beauty Effects business developed a roadmap for achieving our 2030 target – to help 60 million people annually protect themselves from skin cancer, see figure 2.

Throughout 2020 many activities were progressed to align to this roadmap. These have included:

- A focus on sensory properties, textural and visual, for example non-whitening
- Creating actives and formulations that are suitable for all skin tones, and formulation textures that are acceptable globally
- Broad spectrum protection, looking beyond UV and sunscreens with pollution protection
- Clean solar protection. This is part of the clean beauty movement, products that consider both human and environmental health, and mostly contain naturally derived mineral sunscreens

Figure 2: Solar protection roadmap to 2030

To protect 60m people from the risk of skin cancer due to over exposure to UV light, through the use of our solar protection ingredients.

Note the colour intensity across each bar: some drivers are expected to contribute from the beginning of the period while some will take time to develop

September 2020 saw our Personal Care team host our first Digital Sustainability Conference (see case study). This opportunity saw us aligning our People Positive Commitment with our customers and the wider personal care industry by educating and informing attendees about solar protection, and the growing need for its inclusion in personal care products.

During 2020 we also started Life Cycle Assessments of our inorganic sunscreen technologies. This work is providing a focus for our new product innovation and technology partnerships, helping us identify gaps in our current product offering. From this work we have already entered partnerships with Entekno (see case study) and Anomera. Anomera offer novel, patented, cellulose technology developed from the by-products of the Canadian forestry industry that provides a biodegradable alternative to current sun protection technologies.

Entekno

During 2020 we entered a new Smart Partnership with Entekno Materials, an innovative Turkish company that invented MicNo™ . Entekno was founded in 2008 by the technology inventor, Professor Ender Suvaci, in the university town of Eskisehir in north-western Turkey.

Zinc oxide's solar protection properties are well understood, but its use is limited in some applications due to the issue of 'whitening'. MicNo provides zinc oxide's outstanding protection offered with greatly reduced whitening effects, opening up new possibilities for personal care applications.

As part of our Smart Partnership, during 2020 we became a minority investor in the company as well as their exclusive route to market for this new technology for the personal care industry. We are also sharing our smart science as Entekno's research and development partner.

Ender and his capable team have grown the business to commercial scale. Through our partnership and R&D support, we can provide better access to customers around the world and help protect more lives.

Digital Sustainability Conference by Personal Care

Partnerships are key to ensuring we meet our stretching sustainability commitment. As part of this collaboration, we were joined by specialists from across the personal care industry at our Digital Sustainability Conference, holding conversations on steps and changes needed to implement, execute, and accelerate a shared commitment to a more sustainable future for the industry.

Several topic areas were covered throughout the conference, including **Sustainability at the Core**, where we explored the difference our Life Cycle Assessment work has on the ingredients we make and the end products containing them, aligned with the UN Sustainable Development Goals. Using current examples as well as discussing anticipated sustainability trends, we focused on the **sustainability-based consumer demands** that are driving industry innovations, such as clean beauty and waterless formulations.

Regulatory compliance is critical to maintain consumer confidence in the performance and safety of personal care products, so we invited industry experts to explain how to navigate the current regulatory landscape, as well as how certifications can enhance consumer appeal and offer novel opportunities for sustainable innovation.

"Clean Sunscreens" were highlighted with our formulators from around the world leading discussions on **sustainable formulating strategies.** This included minimising INCI lists and optimising product performance. We also covered **sustainable sourcing,** an essential area for the personal care industry to make a truly positive impact, through ingredient transparency and ethical sourcing.

An on-demand version of the conference is available at www.crodapersonalcare.com/sustainability-conference.

1. 2020 Melanoma Skin Cancer Report, The Global Coalition for Melanoma Patient Advocacy and Euromelanoma.

GRI **Standard Number:**
102-15

Smart science in vaccine developments

Much of the world's vaccine expertise was focused on COVID-19 during 2020, and we knew early on that our smart science could help accelerate vaccine development. Our novel drug delivery excipients, which leverage the expertise of the Avanti business we acquired in August, are a critical component of the mRNA vaccine produced by Pfizer-BioNTech, the first COVID-19 vaccine to get regulatory approval. Ensuring we meet the demands of this amazing work, 2020 has seen significant and rapid investments at manufacturing sites so we can meet the scale and delivery requirements of these important components.

Alongside this work, we have continued to increase engagement with teams researching many of the WHO-listed pipeline vaccines including HIV and malaria (see OptiMalVax case study). Our adjuvant technology is included in several vaccine candidates that are in clinical trials in 2020 (phases I to III). These trials are across several of the priority WHO-listed diseases, taking us a step closer to our target of supporting vaccine development for 25% of WHO listed pipeline vaccines.

Our target milestone for 2024 is to ensure our technology will be part of at least 10 clinical phase III trials for at least 25% of the WHO listed pipeline vaccines. Despite the acceleration of the vaccine development cycle driven by the critical requirements to develop a vaccine for COVID-19, the ongoing 'baseline' for current clinical trials across the WHO priority diseases is currently in low single figures. For our products to be included in 10 clinical trials during 2024 sets us a significant challenge for the next few years.

OptiMalVax, preventing half a million deaths each year from malaria

The OptiMalVax programme is a vaccine project focused on malaria funded by the European Union as part of its Horizon 2020 Programme. Coordinated by the Jenner Institute at the University of Oxford, the objective of the programme is to develop a highly efficacious malaria vaccine, targeting the disease-causing parasite *plasmodium falciparum*. It is estimated that this vaccine could help prevent around 500,000 deaths annually.

Through our longstanding relationship and collaboration with the Vaccine Formulation Research Institute, we were able to supply adjuvants for the initial vaccine screening programmes. These adjuvants were selected as the preferred option for the project. As part of this vital work, we have supplied samples for formulation development and are eagerly awaiting progression to clinical trials.

Our work with the Vaccine Formulation Research Institute has given us the opportunity to collaborate on a number of vaccine projects, offering scientific consultancy on adjuvants as well as delivery of samples.

Avanti acquisition

In August we acquired Avanti Polar Lipids Inc., an industry leader in drug delivery technologies based in Alabama, North America. Avanti creates and makes proprietary polar lipids. These lipids are fats, oils and waxes that are common in many biological systems. They are increasingly used as drug delivery systems as they provide the targeted, controlled and extended release of active pharmaceutical ingredients.

"We are delighted to be playing a critical role in the scale-up of the Pfizer-BioNTech COVID-19 vaccine. It's an exciting moment in the development of lipid drug delivery systems for next generation pharmaceuticals. It's also a great example of the benefits of Avanti and Croda coming together."

Steve Burgess
Chief Scientific Officer, Avanti Polar Lipids

Gender Balance

SDG Target:
5.5

Our target to achieve gender balance across our leadership roles by 2030 is at the heart of our values at Croda. One of our key actions in achieving gender balance is to have balanced shortlists in internal and external recruitment. Our area of greatest gender imbalance is the number of women working in direct manufacturing operations. Through balanced shortlists, and an improved focus on how we recruit in these areas, we have already seen progress; in the last two years we have increased the number of women in direct production roles by 40% with the first female operators being welcomed at both our Mill Hall and Atlas Point manufacturing sites, in North America. In addition, since the end of 2019, we have increased the number of women in leadership roles by 19%, supporting our target of doubling the number of women leaders by 2025.

Race diversity
2020 has been the year where Diversity and Inclusion (D&I) discussions have been at forefront across the world and within Croda. The issue of racism was highlighted earlier this year when disturbing events in North America reverberated around the world. Responding to this, our D&I Steering Committee asked everyone to complete an online unconscious bias training course. In addition, Farahdia Edouard, North American regional representative for the D&I Steering Committee, was welcomed by Steve Foots, Chief Executive and our D&I Steering Committee to present on the importance of race diversity in organisations.

In North America, Farahdia has been raising awareness of global D&I initiatives and engaging with employees on important issues within D&I. As part of this, Farahdia recorded a podcast with Richard Butler, Managing Director, Beauty Formulations, on the subject of "Privilege", available globally. Through the newly formed North American regional Diversity, Equality & Inclusion (DE&I) team, she is also helping to identify and address the gaps in the region when it comes to DE&I.

> "We all have a role to play in ensuring that diversity, equality, and inclusion are firmly embedded within Croda, not only because it is essential to our bottom line and the long term sustainability of the Company, but also because it is the right thing to do if we truly want to be committed to being People Positive."

Farahdia Edouard
North American regional representative for the D&I Steering Committee

Diversity and inclusion
During 2020 we have been focusing activity on a number of specific areas. This has included establishing regional subsets of our existing Diversity and Inclusion (D&I) Committee to ensure a focus on D&I activity that is relevant and specific to each region.

To further D&I understanding across Croda, during 2020 we developed a specific D&I intranet site. This rich source of information gives employees access to D&I topics including Company policies, access to training and awareness programmes, as well as providing updates on Company activity. In addition, members of the D&I Committee and other leaders from around the business have recorded a series of podcasts on a range of related topics aimed at raising the level of debate and increasing the number of discussions about D&I.

Training has also been an important part of raising awareness of this topic and this year we launched online unconscious bias training, completed by over 2,500 employees during 2020. We also created a playlist of other online D&I programmes, many translated into a variety of languages; so far over 3,200 of these modules have been completed.

Throughout the year we welcomed external guest speakers to help further knowledge and understanding of this topic, these included:

- Interactive, live webinars focusing on the power of inclusion and how organisations can create or remove barriers to inclusion (see case study).
- Masterclasses led by John Amaechi OBE an organisational psychologist, author and public speaker. These webinars provided our Board and Executive Committee the chance to learn about the nature of prejudice, understanding expressions of institutional and individual racism, bridging the gap between 'not racist' and 'anti-racist', as well as providing the opportunity to reflect on their role as leaders in bringing about change.

In September, we published Flexible Working guidance aimed at making our workplaces more inclusive and to help everyone give their best. During 2021, this guidance will be implemented as policy in each country and provides a framework to expand flexible working including home working, flexible start and finish times, and implementing a 'dress for your day' policy.

Finally, we are working to ensure we have sufficient data to make good decisions about D&I and to track progress. We have created people dashboards that are published quarterly to our Executive Committee, Board and regional leaders, providing trend data in a range of areas including balanced shortlists, turnover, gender balance by grade and region, as well as a summary of wellbeing and inclusion activities.

D&I Webinar
In August, our European region ran a live, interactive webinar discussing the power of inclusion, and how organisations can create or remove barriers to inclusion. Attendees heard from our guest speaker about the many ways individuals can be excluded. The webinar provoked many questions and discussions that continued long after the webinar had concluded. In fact, there were so many questions on the day, that two follow-up question and answer sessions were hosted.

Christopher Bannister-Bailey, Croda Diversity and Inclusion Manager said after the event:

"Diversity as a topic is very broad and can be quite complex. Our webinar sparked great conversations and enabled our employees to explore their own experiences and their own understanding of the experiences of others. It is this sharing of lived experiences that really unlocks inclusivity within teams: a key part of our values to work together and have open communication."

GRI **Standard Numbers:**
102-15 and 405-1,2

Improving More Lives

Helping our local communities

We are committed to supporting and engaging with the communities in which we operate. In 2020 our employees donated 1,392 hours of 1% Club time volunteering within their local communities, with 24% of this spent on STEM activities, encouraging the next generation to consider roles in science, engineering, technology and mathematics (see case study p28).

Acts of Kindness

During 2020, we supported the communities located close to our major sites that were facing hardship as a result of the pandemic. To do this, we launched our Acts of Kindness initiative, giving £10,000 to each of our largest manufacturing sites globally to support their local communities. By giving the money at site level, we wanted to involve as many of our employees as possible, giving them a chance to 'feel good about doing good'.

The money was spent in a variety of different ways. Some locations donated hand sanitiser and cleaning items for local hospitals and care homes. PPE was provided to local hospitals, first responders, and care homes. Medical equipment was also donated, including, in one case, a heart monitor.

Some communities were given food and care packages, and contributions were made to food banks. Tablet PCs were provided to care homes to enable residents to keep in touch with family and craft items and flowers were given to bring cheer to residents. Donations of toys and play equipment were also made to nurseries who were looking after the children of key workers. Our Hull site even supported a local educational aquarium, closed to visitors due to lockdown, by donating fish food.

Through our Acts of Kindness initiative, we supported communities close to our manufacturing sites during COVID-19.

Croda India Kamothe school adoption project

From our manufacturing site in Thane near Mumbai, Croda India has operated a community support team, "Prayas", for many years. The team is made up of volunteers who contribute to various community projects. One of the team's most significant recent projects has been the "adoption" of Kamothe state school. Through this established link with the school the team has contributed to a number of projects in 2020 including:

Access to drinking water

Due to its location, the school has struggled with continual access to drinking water. Our Croda team has helped re-develop the sports ground to include rainwater harvesting, with underground irrigation technology purifying and then diverting the rainwater to a well located at the school.

Infrastructure upgrade

Over the year we have helped with the development of washrooms, kitchen, classrooms, a modern science lab and library as well as general painting. With the effort of our team at Croda India, there has been significant improvement in the school. This improvement has led to the school being awarded "Best school" among 5,000 schools in the Raigad District by the Education Committee of Maharashtra state.

Croda Foundation

We feel that to maximise our contribution to the SDGs we need to do even more with our smart science and have set ourselves the target of establishing and funding a Croda Foundation, to act as a philanthropic enterprise to support projects in relevant communities.

The foundation will be an independent charitable trust, based in the UK but with a global reach, run and administered by an independent Board of Trustees. It will be solely funded by Croda and have a small number of dedicated employees.

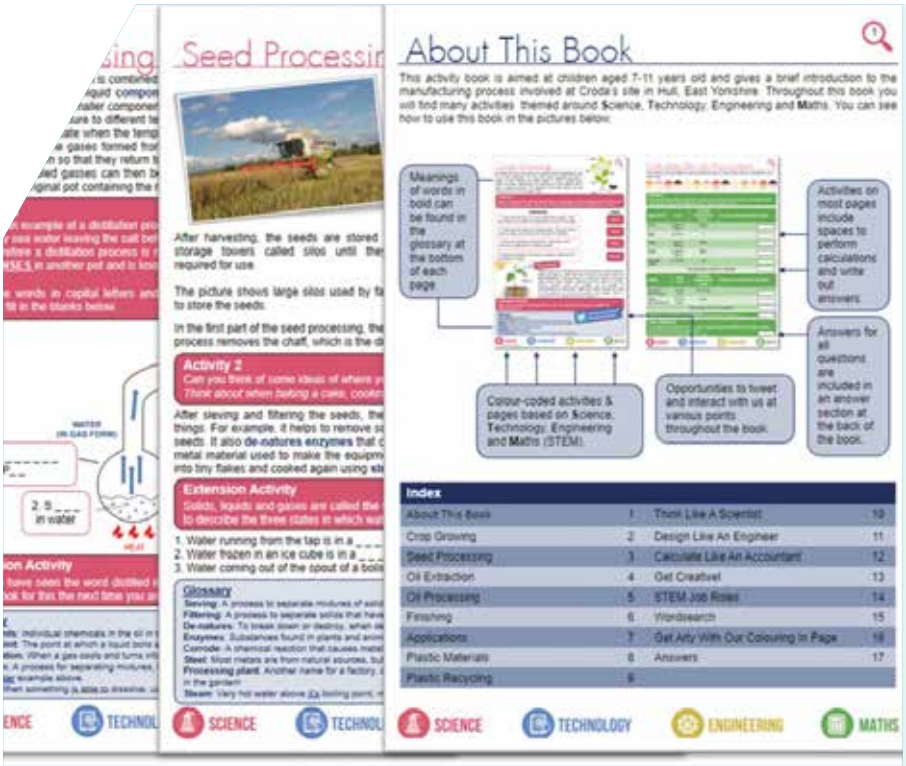
A group of our future business leaders were tasked with defining what the Croda Foundation will look like and clarifying the project selection criteria. This work has been finalised and, in 2020, the Croda Foundation was formally incorporated as a legal entity with approved articles of association.

During the year we also identified the goal of the foundation: to improve at least one million lives by 2030, through the support of meaningful projects. These projects will be submitted and sponsored by our colleagues, prioritising opportunities in relevant communities where we operate and will promote our smart science and help improve more lives. Importantly, the Croda Foundation is additional to, and separate from, our existing community work such as 1% Club, Acts of Kindness and STEM activities. These will continue to be supported locally and run alongside the foundation.

We are very pleased that, in addition to the Croda Foundation being formally incorporated as a legal entity, during 2020 Nigel Turner, formerly a Non-Executive Director at Croda, agreed to chair the foundation Board of Trustees. We have also recruited Rommel Moseley as independent Executive Director for the Croda Foundation, bringing a wealth of experience in running independent charitable foundations.

During 2021 we plan to fully launch the foundation – finalising governance by completing the Board of Trustees; organising funding, which will be solely from Croda; gaining charitable status from the UK Charities Commission; engaging our employees to encourage submission and sponsorship of project ideas; and then commencing our first funded projects.

> “During the year we also identified the goal of the foundation: to improve at least one million lives by 2030.”



We believe that supporting STEM for school-aged children is vital to encourage the scientists of tomorrow.

STEM goes digital

As many countries went into lockdown due to the COVID-19 pandemic, schools across the world closed and children began learning in new ways. During this time, our UK STEM team used social media platforms such as Twitter, LinkedIn and YouTube to engage with schools and parents, providing STEM learning resources to support schools and families during this difficult time. Content was also posted internally on Yammer to support Croda colleagues with home schooling.

Members of the STEM team, and others from around the business, contributed to ideas for short STEM activities and worksheets. These focused on the science of some of our key business areas including Energy Technologies, Health Care and sun care. The team created videos to show how easy and fun STEM experiments can be done using items from around the home.

GRI **Standard Numbers:**
102-15 and 413-1