



DÜMMEN
ORANGE®

Growing Together

Environmental, Social,
and Governance Report 2022





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"Our responsibility for people and the environment drives us to push beyond our limits and strive for continuous improvement."

Hugo Noordhoek Hegt, Chief Executive Officer

Prioritizing people, communities, and the planet

"We are pleased to present our 2022 Environmental, Social, and Governance (ESG) report, which offers a comprehensive overview of our sustainability journey while increasing transparency and accountability.

Sustainability is a vital part of our business. We have placed it at the core of our strategy to deliver strong performance and sustainable growth, and lead the way together with our industry partners toward a greener, more beautiful world.

Our approach prioritizes minimizing our environmental footprint and supporting the well-being of our people. Moreover, we continue focusing on developing and commercializing disease-resistant genetics, producing more resilient flowers and plants, and enabling growers to reduce agrochemical use and become more sustainable.

Motivated by our deep commitment to the success of our customers and partners, we embrace our responsibility to prioritize the well-being of people, communities, and the planet. This drives us to consistently push beyond our limits and strive for continuous improvement.

Notwithstanding considerable macroeconomic challenges in 2022, such as the Russia-Ukraine war, the intensification of climate change, and other issues affecting our communities and business — we are proud of our perseverance. I'd like to thank all our colleagues, partner organizations, and customers for their invaluable contributions despite such challenges.

Looking ahead, we will push the execution of our ambitions and goals to minimize our environmental footprint, support the well-being of our people and the communities in which we operate, and invest in research and technology that supports sustainable floriculture across the value chain. We acknowledge that achieving these goals requires continuous evaluation of our impact on the environment, employees, and those with whom we work closely — and vice versa.

Our 2022 report reflects our company mission to be a leading global floriculture company. We hope you enjoy reading about our sustainability initiatives, and we highly value your feedback."

Hugo Noordhoek Hegt, Chief Executive Officer



Committed
Focused
Passionate
Responsible

Creating a better,
more beautiful world

Dümmen Orange is a leading global breeder and propagator of ornamental flowers and plants, offering an impressive portfolio of cut flowers, pot plants, bedding plants, perennials, tropical plants, bulbs, and tubers to growers, wholesalers, and retailers around the world. Our headquarters are based in the Netherlands, and we employ over 7,500 people worldwide.

What do we do?

We develop stronger, healthier flowers and plants and enhance their appeal. Supported by research, our breeders improve characteristics such as color, fragrance, shape, and less noticeable traits, like resistance to diseases, yield capacity, and growth habits. Our Breeding Technology Centre in the Netherlands is the largest breeding laboratory in the world for ornamental crops and a high-tech home for international pioneering scientists, breeders, and specialists to set new standards in flower and plant genetics.

In locations across Africa, South and Central America, and Asia, we have over 330 hectares of production space. Here, we set up our mother stock plants and propagate starting material, such as cuttings and tissue culture material.

What do we value?

Our mission is to spark inspiration among people and contribute to creating a better, more beautiful world. As a leading breeder in floriculture, we strive to furnish our customers with innovative products and services that generate sustainable value.

We are driven by a set of core values that are integral to our operations. Our values are more than mere components of our name, logo, or history; they encapsulate the essence of our identity as a group of passionate professionals united by a shared vision. Our four fundamental values form the bedrock of our work ethic:

- Committed to the success of our customers and partners**
- Focused on continuous improvement**
- Passionate about unlimited possibilities**
- Responsible for people, communities, and the planet**

Code of Conduct

Our Code of Conduct guides us in embodying these four core values. When our actions are based on our values, we act for ourselves, each other, our industry, our environment, and the shared success of all. Our Supplier Code of Conduct drives our values throughout the value chain.



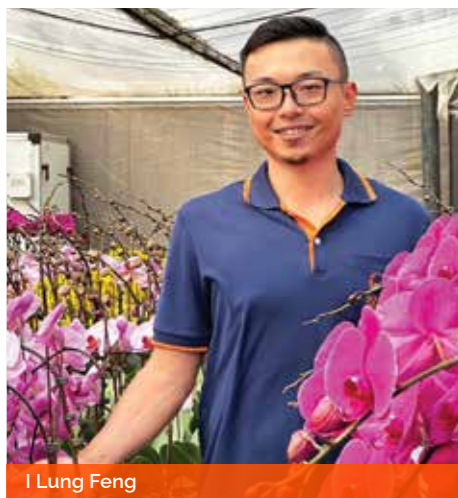
Ellen Mackenbach-Lakeman



Vincent Ausems



Carolien Luijt



I Lung Feng



Jeanette Groenewegen



Anita de Haan



Carl Kroon



Manuela van Leeuwen



Willem Meijers



Anita Muthaura



Theo Aanhane



Kelly Nicholas

Governance

Effective governance is key to sustainable success

Dümmen Orange recognizes the critical role that strong governance plays in achieving its sustainability goals. For us, sustainability is not a separate issue to be addressed but an integral part of our overarching company strategy and business. It is a core component of our Shared Vision and is, therefore, a strategic priority throughout our organization - it is our license to operate.

We identify two forms of governance: internal and external

Internally, we have implemented a solid management structure representing all functions and regions within our global organization. This ESG team meets twice a month and is led by Ellen Mackenbach-Lakeman, our Executive Committee (ExCo) member. Every quarter, an update is provided to our ExCo to ensure full alignment at the highest level.

Besides the aforementioned structure, we have internal audits to ensure our sustainability programs, such as IPM (Integrated Pest Management), are consistently executed.

Externally, we are fully committed to complying with current and upcoming EU (European Union) regulations, industry norms (FSI — Floriculture Sustainable Initiative), and certifications (MPS, KFC, Fairtrade, EHPEA). Annual audits take place to ensure we adhere to the agreed norms.

Our global ESG team

Ellen Mackenbach-Lakeman	ExCo sponsor and Global Lead
Theo Aanhane	Commercial Director, Hobaho by Dümmen Orange
Vincent Ausems	Group Procurement & Logistics Director
I-Lung (Allen) Feng	Management Trainee, Taiwan
Jeannette Groenewegen	Group Controller
Anita de Haan	Breeding Director
Carl Kroon	Regional Head Supply Chain Central & North America
Manuela van Leeuwen	Phytosanitary Manager
Carolien Luijt	Head of Legal
Willem Meijers	Manager Corporate Communications & Branding
Anita Muthaura	HR Manager, Embu, Kenya
Kelly Nicholas	Technical Support, US
Erick Marroquin	Greencare Certifications Leader

Our approach to sustainability

Our approach to sustainability is centered around embedding sustainable practices into every aspect of our operations.

Our ESG profile

At Dümme Orange, we recognize that our activities as a leading breeder and propagator impact people, communities, and the environment both locally and globally. As such, we believe it is our responsibility to take a leadership role in advancing sustainability and promoting responsible business practices. Our commitment to ESG is embedded in our culture, and accountability is a key company value that underpins everything we do in our commitment to ESG.

We believe it is crucial to regularly assess our activities to improve sustainability and further develop our products, ensuring they are as sustainable and resistant as possible, leading to longevity. Our ESG activities and initiatives are documented within the pages of this report, demonstrating our drive for transparency and accountability. We recognize the impact of our activities and respect the resources and relationships within our ecosystems, highlighting our commitment and dedication toward future generations.

By prioritizing ESG in our operations, we believe we can create shared value for all our stakeholders while contributing to a sustainable future for our planet.

How we conduct ESG activities

We conduct our ESG activities through a rigorous and comprehensive approach that involves assessing our ESG profile about our company operations, resulting in ambitions and goals. At the basis lies global, market, and stakeholder trends and feedback research. The input obtained from this (desk) research is included in our materiality matrix.

Internal assesment

Dümme Orange shares the ambitions of the United Nations Sustainable Development Goals (SDGs) agreed upon by 193 United Nations (UN) member states in 2015.

These goals are a universal call to action to end poverty, protect the planet, and improve the lives and prospects of everyone everywhere. In 2021, we conducted an internal stakeholder assessment with our Global Leadership Team (approximately 90 participants from across the globe), based on the SDGs. To ensure that we can make a significant impact, we have aligned our sustainability goals with five priority SDGs. To guide our efforts, we conducted a stakeholder survey in 2023, benchmarking the outcomes against our previously selected SDGs, and found they remain relevant to our sustainability goals.



From there, we revised our materiality matrix and objectives accordingly. The SDG focus areas are translated into our sustainability ambitions and goals that in itself are aligned with ESG topics.

External research

1. In 2022, we conducted rigorous (desk) research. We started with an overview at a global level by the WEF, where we see a clear transition over the past ten years from economic risks to environmental and social risks.
2. Drilling down, we explored the upcoming EU regulations (to be implemented as of 2025) that provide clear guidelines on how our systems and measurements should be set up.
3. Thereafter, we examined the industry level, exploring renowned industry-wide certification standards. In particular, our membership with FSI has equipped us with explicit norms that require our compliance.
4. Subsequently, we looked at research conducted at the end-consumer level to obtain a better understanding of consumer behavior, perceptions, and expectations.
5. Lastly, we conducted a survey to determine the most relevant ESG topics according to our key external stakeholders (customers, suppliers, investors) to better align our sustainability strategy with their needs and concerns and obtain input for our sustainability goals. The outcomes of the survey, with a 38% response rate, provided valuable input both at a consolidated level and by stakeholder group.



Our ambitions and goals

Financial materiality

Dual materiality

Environmental & social materiality

Global warming	Drying rivers may necessitate relocating our farms or investment in new water sources.	Reduce water consumption.	Reduced impact on water supply for communities. Potentially higher energy usage due to running the equipment.
Global warming	Impact of extreme weather on production in open soil and/or damage to greenhouses.	Explore more controlled production environments.	Shifted labor leads to loss of employment, as well as higher energy consumption in the new location.
Carbon footprint	Carbon restrictions may lead to relocating farms nearer to customers/markets or higher transportation expenses.	Minimize carbon footprint from farm to customer.	Minimize pollution of the direct environment and negative impact on carbon footprint across the globe.
Energy consumption	Rising energy prices force greenhouse closures, drive up production costs, and reduce market size due to unaffordable consumer prices.	Minimize energy consumption and increase use of renewable energy sources.	Relocation of some crops to other climates results in shifting labor to the new region. Carbon impact of production of solar panels, etc.
Chemical usage	Limiting pesticides leads to lower product quality and increased disease risk.	Investment in Integrated Pest Management, and develop resistant products.	Chemical use pollutes the environment and poses health risks. Reduce chemical usage to mitigate pollution.
Packaging	Restrictions on use of non-recyclable packaging may lead to increased investment in new technologies.	Minimize packaging and where possible use recyclable packaging.	Non-recyclable packaging damages the local environment, wildlife and communities.
Bio diversity	Reduced biodiversity leads to restricting environment to develop innovative resistant products. Therefore, may lead to a reduced gene pool.	Maintaining our gene pool for 80% of our crops.	Contribute to sustaining bio diversity of our crops.
Employee well-being	Health challenges require increased focus on employee well-being to prevent lock-down impact and higher cost.	Be an employer of choice providing a safe and enjoyable work environment.	Enabling economic growth and well-being for employees and communities.
Living wage	Increased salary cost.	Implement and monitor Living Wage and equal pay guidelines.	Attract talents and provide equal development /growth opportunities. Reduced risk of burnout, mistakes and safety incidents.

Materiality assessment – what matters to our stakeholders

The extensive desk research in combination with the external stakeholders survey result in our dual materiality matrix. The dual materiality matrix identifies:

Financial materiality — the financial impact of the climate and environment on our organization;
Environmental/social materiality — the impact of the organization on the environment.

The combined Financial and Environmental/Social Materiality results in Dual Materiality — the interconnectedness of our financial and non-financial performance and their impact on each other.

Moreover, the dual materiality matrix, together with the outcome of our internal materiality matrix (based on the SDGs), results in our ESG strategy, ambitions, and goals.

How we talk about ESG matters

Effective communication is crucial in articulating our ESG profile and building stakeholder trust. At Dümme Orange, we understand the importance of open and transparent communication, and we are committed to continuously improving our engagement with stakeholders.

Through our annual sustainability reporting and active participation in industry organizations and initiatives, we strive to provide our stakeholders with a clear and comprehensive understanding of our approach to ESG and how it aligns with our business strategy. We value the input and perspectives of our stakeholders and engage with them to ensure that we meet their expectations and address their concerns. We believe we can achieve our sustainability goals by fostering a culture of open communication and collaboration while creating long-term value for our stakeholders.

Our sustainability strategy

Dümme Orange's strategy for sustainability is set out to deliver strong performance and sustainable growth and lead with our industry partners towards a greener, more beautiful world.

Based on the insights garnered, we reconfirmed that we have strong ambitions to minimize our environmental footprint, support the well-being of our people and the communities in which we operate, and invest in research and technology that supports sustainable floriculture across the value chain.

Our reporting focuses on three key sustainability areas — elements for which we have set goals that are specifically being measured, evaluated, and improved:

1. Environment
2. Social
3. Technological development

Within the three key areas, we defined metrics (Key Performance Indicators or KPIs) for each sustainability initiative. By continuously monitoring our progress we stay action-oriented and accountable. The latter pages of this report also cover these three elements, where our colleagues share first-hand accounts of local sustainability initiatives.

In 2022, a slight recalibration has taken place in our ambition and goals as a result of the aforementioned process. We added two brand new KPIs for Technological Development. In addition, we changed our social KPI for human rights — previously, we aimed to ensure that 100% of our farms were certified by external bodies; we have requalified this ambition as a pre-requisite for being compliant. Instead, we replaced this ambition with a living wage goal in line with the industry norm of FSI. This shows our dedication to prioritizing the well-being of our people and putting them at the forefront of our efforts.

Our focus, ambitions, and goals

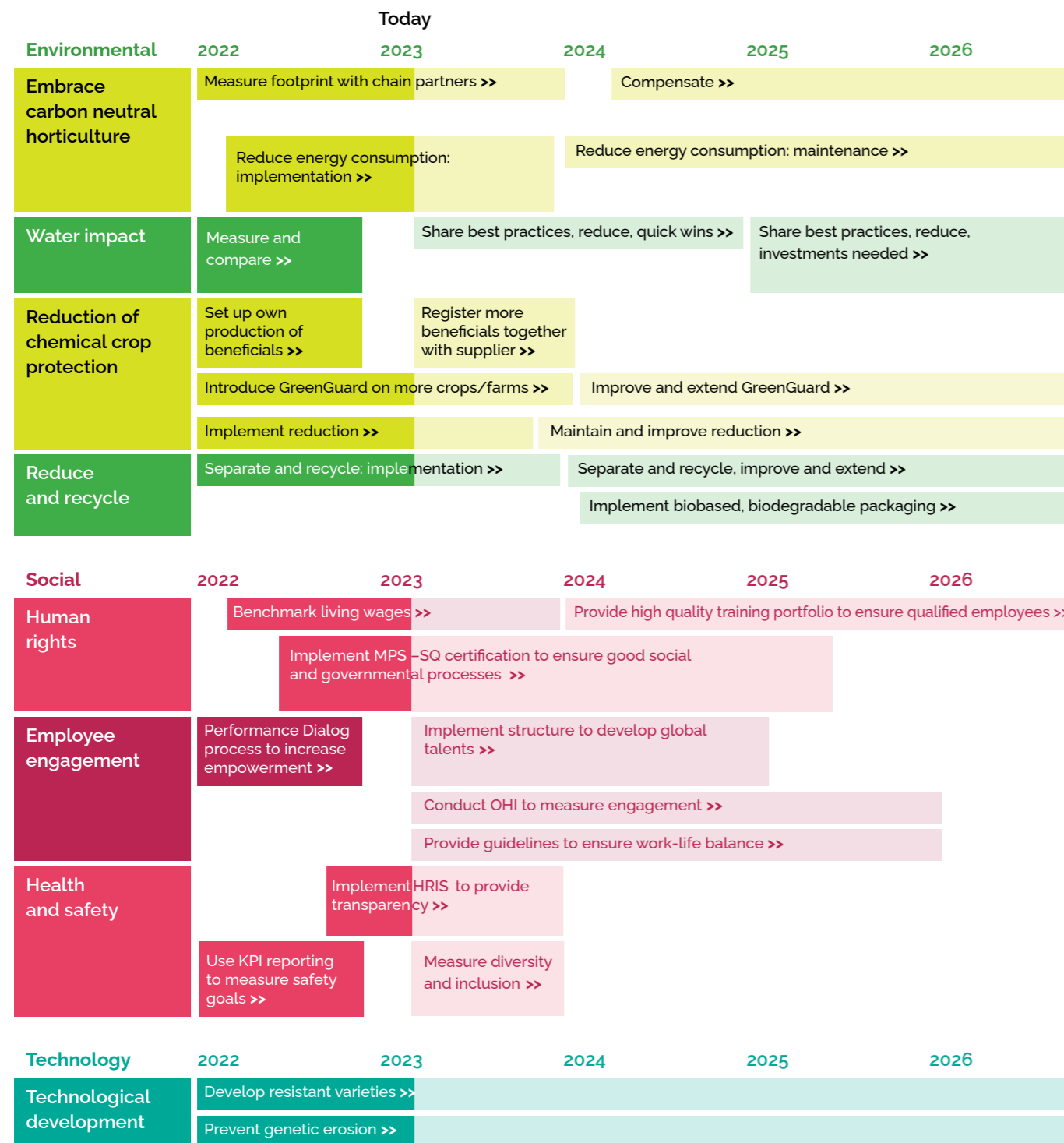
Our focus	Our ambition	Our goals	Environment
Embrace carbon neutral horticulture	Strive for carbon neutral production and distribution of our products	50% Reduction of our CO2 footprint by 2030	
Reduction of chemical crop protection	Minimize the use of chemical crop protection	80% Of our production area under GreenGuard by 2030	
Water impact	Be a leader in water efficiency	20% Less water consumption by 2030 (2021-22)	
Reduce and recycle	Strive for zero waste in landfill, and zero hazardous materials	90% Reduction of waste and usage of non-recyclable packaging by 2030	

			Social
Human rights	Be recognized as a leader in labor and human rights	100% Meet median living wage benchmarks by 2030	
Employee engagement	Offer the best work experience at all locations	>70% Global engagement score	
Health and safety	Be a safe workplace with zero Lost Time Accidents	<1% For employees and contractors	

			Technological Development
Convert product portfolio to resistant genetics	Develop and commercialize resistant genetics	100% Of the portfolios of major crops hold varieties resistant to pests and diseases by 2030	
Prevent genetic erosion	Maintain diversity of crops and varieties with the wild species connected to our crops	80% Maintained biodiversity by 2030	

Our sustainability road map

In pursuit of our abovementioned sustainability focus areas and goals, we continue to follow our five-year roadmap that outlines clear guidance on achieving our ambitions and goals. We are well on our way to achieving our sustainability targets as we continue to prioritize and invest in sustainable practices across our operations.



Compliance and measurement are key

At Dümme Orange, we recognize the importance of reporting in measuring, monitoring, and communicating our ESG performance to stakeholders. Our reporting is shaped by global, governmental, industry, end-consumer, and stakeholder regulations. We uphold relevant EU regulations, certifications, and company-specific standards and hold industry certifications to monitor our sustainability performance. We follow various regulations and frameworks to ensure the comprehensiveness, reliability, and relevance of our sustainability reporting, enabling us to benchmark our performance against peers and industry best practices. By complying with these regulations and frameworks, we promote transparency and accountability in disclosing ESG information and support a sustainable future for all.

External regulations to which we aim to conform are outlined below:

Corporate Sustainability Reporting Directive (CSRD)

We acknowledge the new European Corporate Sustainability Reporting Directive for sustainability reporting, which will amend the current EU Directive (2014/95/EU) with implications such as the increased scope of reporting requirements and the number of companies required to report. The new directive covers all relevant ESG elements, and Dümme Orange falls within the scope of companies required to report. For this reason, we are working with our ESG Team to ensure we include all required information in our forthcoming annual reports.

The Sustainable Finance Disclosure Regulation (SFDR)

The SFDR is an EU regulation that increases transparency in sustainable finance by requiring financial market participants to disclose information on the sustainability of investments and products. This includes disclosing how ESG factors are integrated into investment decisions, the adverse impacts of investment decisions on sustainability, and categorizing sustainable investment products based on their level of sustainability. The SFDR is part of the EU's sustainable finance agenda to mobilize capital towards sustainable investments and support a transition to a more sustainable economy.

The Pay Transparency Regulation

The Pay Transparency Regulation is a proposed EU legislation that addresses the gender pay gap by requiring companies to provide more transparency around pay and benefits. Companies with 250 or more employees must disclose information on the gender pay gap, conduct pay audits, and take action to close any unjustified gender pay gaps. This regulation is part of the EU's broader efforts to promote gender equality in the workplace and is expected to contribute to greater social cohesion in the EU.

The Agreement for International Responsible Business Conduct (IRBC)

Added to the above regulations and frameworks, we were a board member of The Agreement for International Responsible Business Conduct (IRBC), the group responsible for creating policies and procedures for the execution of FSI and for addressing human rights and environmental risks in the value chain to create more sustainable production and trade in ornamental plants. This group was abolished after reaching its objectives in September 2022.

A man with a shaved head, wearing a blue polo shirt and a lanyard, is smiling broadly in a greenhouse. He is surrounded by lush green rose bushes, with a large, pale yellow rose in the foreground. The greenhouse structure is visible in the background.

"I believe that Dümme Orange is committed to promoting sustainable practices in the flower and plant industry, ensuring that customers can make responsible choices that do not harm people or the environment."

Jeroen Oudheusden
Executive Officer, Floriculture Sustainability Initiative

The Floriculture Sustainability Initiative (FSI)

To follow through on our commitment to becoming more sustainable through our focus on our people and the planet, we actively participate as front-runner and member of FSI 2025. This initiative sets out to improve corporate social responsibility and due diligence and promotes good environmental practice in the complete flower supply chain, with specific objectives to achieve by 2025.

FSI was established in 2013 by companies wanting to set the agenda on sustainability proactively in the floriculture industry. The organization now has 85 members covering the entire supply chain, and they recognize benchmarked certification schemes that meet good agricultural, environmental, and social practices. Additionally, FSI collaborates with its members to prepare for upcoming legislation, works on living wages and carbon footprinting and the reporting thereof, and ensures compliance with FSI standards, all while encouraging members to produce and source sustainably.

In 2022, FSI members in the Netherlands created a responsible business conduct agreement focusing on due diligence, living wages, and responsible agrochemical management. At Dümme Orange, we adopted the Code of Conduct to further support our commitment to responsible environmental, social, and technological development. Soon, we will incorporate the MPS HortiFootprint Calculator into our sustainability efforts, a new tool designed to help us track our carbon footprint reduction while adhering to EU calculation rules and improving our overall ability to measure sustainability efforts.

Obtaining FSI certification for all production sites worldwide

"Dümme Orange is committed to sustainability and has worked with FSI on sustainability projects since 2015. In 2022, our organizations collaborated to improve sustainability across all Dümme Orange's farms worldwide.

Their commitment to sustainability is reflected in their goal to obtain FSI certification for all their production sites worldwide using MPS (Milieu Programma Sierteelt) certifications in line with the FSI Basket of Standards by January 1, 2025. Many farms are already certified — Guatemala, Germany, Netherlands, El Salvador, Taiwan, Kenya, Ethiopia, Tanzania, Uganda, Spain, and Italy. In 2022 specifically, five sites in four countries were fully certified. The company also received the MPS-Socially Qualified (SQ) certificate (demonstrating that they meet national and international requirements in the field of health and safety) for their Rheinberg site at the recent IPM conference in Essen, Germany.

I believe that Dümme Orange is committed to promoting sustainable practices in the flower and plant industry, ensuring that customers, now and in the future, always make a great choice when buying flowers and plants — symbols of happiness and beauty. Through our work, we strive to ensure that our flowers and plants are produced sustainably without causing harm to people or nature. Collaborative partnerships, such as this, that aim to achieve shared sustainability goals, represent a promising path forward."

Jeroen Oudheusden
Executive Officer, Floriculture Sustainability Initiative

Internal regulations and frameworks

Hereunder, we provide insight into the internal approach we undertake and the sustainability regulations and frameworks we have established within our own organization:

Our Greencare philosophy

Dümmen Orange is committed to providing pest — and disease — free cuttings. We aim to achieve this through Integrated Pest Management (IPM), with 50% of our locations already implementing IPM in 2022. By 2030, we aim to have at least 80% of our farms worldwide applying IPM. However, we acknowledge challenges in some countries due to the limited availability of biological products or beneficial insects.

Our hygiene protocols and audits

As a part of our commitment to implementing IPM practices, we have developed the comprehensive Greencare program. This program focuses on delivering clean, healthy cuttings and plants by utilizing a combination of biological controls, hygiene protocols, and audits to minimize the use of chemicals, prevent the spread of pests and diseases, and maintain high-quality plant materials. At all our locations, we have implemented Greencare phytosanitary and crop protection policies that outline stringent hygiene protocols, tests, and pest management guidelines. Also, we follow Good Experiment Practices (GreenGEP) to ensure the reliability of trial data with results that various registration authorities can use.

Within our Greencare program, GreenGuard is a specialized IPM protocol we've designed to effectively manage pests and diseases in plant production while minimizing the use of pesticides. This unique approach aligns with our commitment to sustainable and responsible plant production practices.

To ensure we stay on track with our protocols, we conduct regular audits through our global Greencare team of phytosanitary and crop protection specialists and cross audits where auditors from one location visit another. This helps improve our performance and provides training opportunities for employees.

Our tropical lab in Taiwan now certified

"I'm excited to share that our lab in Neipu, Taiwan, successfully obtained Greencare certification in 2022. Our team takes pride in ensuring all materials are virus-free. Our commitment to Greencare protocols allows us to uphold strict measures to ensure the safety and health of our plants, mitigating any potential threats. We maintain high standards of cleanliness and control within our lab, and this certification is a testament to this."

At Dümmen Orange, we specialize in breeding new plant varieties; we revel in the diverse shapes, colors, and leaf patterns we've developed. Our main focus is propagating seedlings from carefully selected plants, and we do so in an in vitro environment, which means hygiene is a top priority for us.

Our meticulous approach is unique in that we've implemented dedicated space and time for disinfection and quarantine, drawing lessons from the recent COVID-19 pandemic. Like lockdowns and quarantines, we've defined different working areas in our lab with specific protocols for each. We've marked areas with varying risk levels of plant viruses on our lab layout and redesigned people and material flows with one-way flows and locked doors for verified and disinfected materials. Our lab also features entity control measures like electric torque door locks to ensure one-way movement, air showers, and filter fan units for purifying air.

Educating our people on the Greencare standard is fundamental. We use short videos to provide instructions on how to enter the lab and follow the designated flow. We have visual signs with symbols that are easy to understand. Through regular education and training sessions, our colleagues quickly grasp the concept of Greencare and comply with the regulations.

These scrupulous steps are a way of life for us, and the system fosters teamwork, as we all need to be on the same page. We've seen our hard work pay off, and in 2022 we had no known plant viruses in Taiwan reported by our customers — a testament to our commitment to maintaining high standards. Greencare is worth the effort, and its implementation results in a safe and controlled environment for our plants to thrive. I am grateful for the opportunity to be part of a team that values and upholds this system."

Tim Chen
Assistant Manager, Taiwan



"We've seen our hard work pay off, and in 2022 we had no known plant viruses in Taiwan reported by our customers."

Tim Chen
Assistant Manager, Taiwan



"We strive to reduce our environmental impact and promote accountability towards the planet."

Environment

Driving impactful change:
our purpose for the present
and future

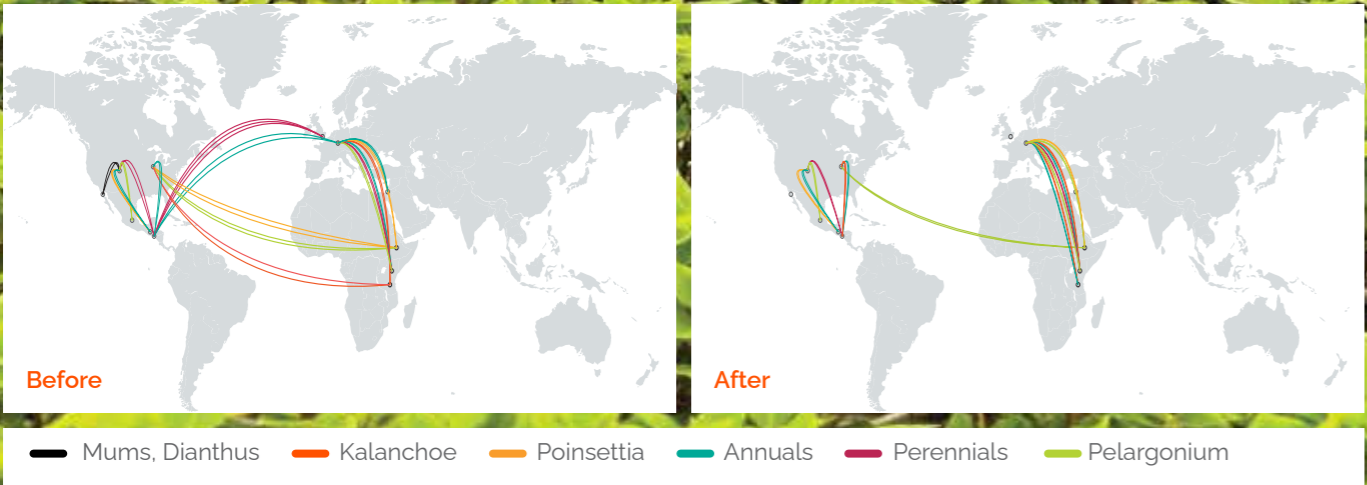
We are proud of our commitment to the earth. We prioritize sustainability by reducing our environmental impact and promoting accountability towards the planet and people.

This environmental responsibility is evident in our company-wide initiatives, such as our Footprint Project, natural and non-toxic pesticides like orange oil, water conservation efforts, and new cutting specifications for Pelargoniums.



"Our Footprint Project is a remarkable sustainability undertaking, unmatched in the flower industry."

Benjamin Goepferich
Regional Director Production Africa, Ethiopia



Embracing carbon-neutral horticulture: Footprint Project

"In 2020, we started the Footprint Project, a major operation to optimize our supply chain footprint and to reduce environmental impact. The Footprint Project is a remarkable sustainability undertaking unmatched in the flower industry. To our knowledge, no one has ever embarked on such an enormous move of individual crops in such a short period. Three hundred varieties were moved simultaneously, bringing production and markets closer and reducing carbon emissions.

Simplifying 'spaghetti' freight routes

During ideation sessions in 2020, we assessed our supply chain and noticed that our freight routes looked like a messy bowl of spaghetti when visualized. Clearly, we needed to act urgently in a more sustainable and quality-driven manner to streamline these routes. That was the birth of our Footprint Project. After that, we began relocating mother plants from Central America to Africa. This helped simplify routes from south to north, with Africa supplying Europe, Central America supplying North America, and the APAC region partially supplying itself. Shorter transport times, an improvement in the cold chain, and a strengthening of the quality of our products were the benefits of these efforts. Despite not yet having a standardized method for measuring our savings regarding CO₂ emissions, we've made some estimations. We'll obtain a more accurate picture of our chemical consumption and CO₂ impact in the future, having recently registered for the MPS HortiFootprint Calculator.

Estimated CO₂ savings

The main part of the Footprint Project was moving approximately 57 million cuttings of production volumes from El Salvador and Guatemala to Kenya. We also moved 26 million cuttings of perennials from Guatemala to Kenya and other crops, such as PVC (Petunia, Verbena, Calibrachoa) production from Israel to Spain for the European market and Kalanchoe from Tanzania to Guatemala for North America. For every crop we relocated from Central America to East Africa, we saved approximately 3,000 kilometers per flight. This is a noteworthy accomplishment, as the direct flight path from Central America to Europe is approximately 9,000 kilometers. In comparison, the distance from East Africa to Europe is only about 6,000 kilometers, resulting in savings of around 3,000 kilometers per flight. On the other hand, the transportation of Kalanchoe from Africa to North America covered a distance of approximately 14,000 kilometers, significantly longer than the distance of only 3,000 kilometers between Central and North America. The average box with cuttings creates around 13kg of CO₂ equivalent per 1,000 kilometers, which means we save around 40kg of CO₂ equivalent per box by shipping from Africa instead of Central America. With around 4,200 boxes of new crops in Africa, we estimate a savings of around 170,000kg of CO₂ equivalent.

A foot firmly on the ground

Our farm in Kenya saw a significant impact, growing over 300 new varieties through teamwork, investment, and technical support. As you can imagine, this brought about new challenges, including greenhouse setups and different working methods. It took significant effort and many trials to overcome these hurdles, but by 2022, we successfully brought most of our crops to the market with improved quality. We recently had the first full commercial season in 2023, and we're pleased to say we completely achieved our mission with satisfying results and positive customer feedback.

Zeroing in on freight goals

Our long-term plan is to shift towards sea freight, which emits approximately 50 times less CO₂ than air transport. The cut flower industry is already demonstrating the effectiveness of this approach using temperature and CO₂-controlled containers to extend shelf life. Shipping cuttings is still a challenge, but we anticipate technological advancements will enable us to transport our products by ship more efficiently.

Collaborating for a common goal

Sustainability is a key strategic goal for Dürren Orange, and we have dedicated people working on a range of sustainability topics globally. The success of our Footprint Project demonstrated that such initiatives could be a win-win situation for all involved, benefitting the environment, customers, and employees. This project is even more unique because all ideas were suggested by employees alone and were not top-down, emphasizing our commitment to involve and empower our employees in sustainability efforts."

Benjamin Goepferich
Regional Director Production Africa, Ethiopia



"By using orange oil, a natural and non-toxic pesticide, we lead the way in sustainable agricultural practices and demonstrate our commitment to the health of our crops and the planet."

William Jimenez
Head Grower, Guatemala

The power of Orange Oil to reduce chemical crop protection

"We always look for new and innovative ways to improve our crop yields, protect our plants from pests and diseases, and reduce our use of chemical pesticides. Recently, we discovered the potential benefits of using orange oil as a natural solution for preventing diseases caused by fungi and bacteria within most of our crops. The use of pesticides and other chemicals to control pests and diseases is becoming increasingly restricted due to environmental concerns, and understandably so.

Although orange oil is a common product used in agriculture in the United States, it was a new concept for us. We learned about it from colleagues at our other farms in Kenya, Canada, and Germany, who recommended it to prevent mildew and pests such as mealybugs on our kalanchoe crops. Our team was intrigued by the possibility of using a natural solution like this to protect our crops, so we went ahead and conducted trials in 2022. The results were promising, and we quickly realized that orange oil could be a game-changer.

Towards integrated pest management (IPM)

Orange oil is extracted from the skin or peel of oranges through a natural cold press method. It is a contact biopesticide that works on specific crops, and the manufacturing process ensures it is a fully natural product. This product is a good organic and sustainable alternative because it contains fewer active ingredients than chemical products. It is also effective when used with other sustainable practices, such as IPM, which involves using beneficial organisms and predators to control pests. Another benefit is that the oil does not kill beneficial organisms and is only slightly harmful to these organisms, unlike some chemical products. This makes it easier to combine different strategies and achieve results.

Reducing potentially negative side effects

Moreover, when it comes to the safety of our employees, orange oil has fewer negative side effects on the body than chemical pesticides. It can also positively impact the environment and neighboring communities. Added to this, it reduces the impact of chemicals on bees and other insects. I'm excited to announce that our use of orange oil has resulted in an impressive 80% reduction in pesticide use on our farm in Guatemala. In the future, our goal is to reduce chemical use as far as possible, helping us become an industry leader in sustainable practices and inspire others to adopt similar solutions to create a more sustainable future."

William Jimenez
Head Grower, Guatemala



"We have been vigorously engaged in water reduction for decades and are well on our way to achieving a 20% water reduction at most of our locations."

Jan Nelißen
Managing Director & Location Manager, Germany

Decades of steadfast water management

"At Dümmer Orange, we know that water is an essential resource – particularly in the face of climate change. That's why we take water conservation seriously and actively monitor water usage in our production processes, implementing reductions where feasible. We have been vigorously engaged in such efforts for decades and are well on our way to achieving a 20% water reduction at most locations. Yet we know this goal is ambitious and not always feasible, especially in drier regions with limited water supply.

Closing the loop

At all locations, we collect rainwater and implement water management strategies to optimize water usage, minimize waste, and reduce reliance on boreholes. We have implemented a closed water system at three of our sites – Germany, Ethiopia, and El Salvador – and have been doing so for roughly 20 years. This involves collecting and disinfecting excess water for reuse on our farms. This has multiple benefits, such as a drier greenhouse floor and enhanced control over plant growth by collecting and draining excess water.

Tailored irrigation systems

Added to our closed water systems, we have various farm irrigation practices customized to each unique circumstance. These practices depend on diverse factors, such as a location's access to water bodies and water quality. For example, in Germany, the production location, next to a river, allows for fully utilizing 100% of collected rainwater in all operations.

Tracking our water usage

We manage and track water usage using a specific cultivation system that governs irrigation and fertilization frequency. A computer system monitors water applications, adjusting for factors like radiation and sunlight. Each location has a unique system based on the cultivation type and substrate. This finetuning helps us reuse as much water as possible while ensuring optimal plant nutrient delivery.

Water quality is key

Maintaining a clean water source is crucial for our plants, and water quality is especially important in regions where water is scarce. Added to that, water quality can vary by source.

"Our culture of conservation at all locations is key with our colleagues in Spain and Africa, who are particularly impacted by water scarcity, demonstrating exceptional dedication to this cause. Every location is fully committed, and we know that water is a vital and limited resource that requires careful management and preservation."

Water conservation efforts in 2022

In Spain, we added four hectares of land where rainwater will be collected and stored in a reservoir. In Germany, we use boreholes as a backup during dry seasons, and in 2022, we addressed the issue of deteriorating boreholes by drilling a new one. These moves showcase our commitment to sustainable thinking and environmental preservation.

The way forward with water

Our primary challenge is maintaining the appropriate water balance throughout the year, prompting us to construct more closed water systems in certain locations. Our culture of conservation at all locations is key with our colleagues in Spain and Africa, who are particularly impacted by water scarcity, demonstrating exceptional dedication to this cause. Every location is fully committed, and we know that water is a vital and limited resource that requires careful management and preservation. As global water scarcity concerns grow, we want to be even more mindful of water usage."

Jan Nelißen
Managing Director & Location Manager, Germany



"By creating a more compact version of one of our products, we reduced our greenhouse footprint and freight volumes."

Jan Molenaar
Managing Director, Kenya

New cutting specifications drive sustainability

"We're delighted to announce a new initiative to reduce waste and improve efficiency in our operations. Starting in 2021 and throughout 2022, we worked on developing a more compact version of one of our main products, Pelargonium, in Kenya. This plant is a slow grower, low producing, and has a large carbon surface footprint.

Towards a more sustainable product form

Using our knowledge, we initiated trials for higher-density planting and a new, more compact product form. These trials were extensive; we even embarked on a large-scale project to ensure consistency across our production locations. Our goal was to ensure that the cuttings would always look the same, regardless of origin. During the trials, we also examined the carbon footprint of our operations and looked for ways to improve transport efficiency. We worked closely with selected customers to ensure they were prepared for the new product form, and once we were confident in the results, we implemented the changes on a large scale.

All-round sustainability benefits

We observed several sustainability benefits; a smaller, slightly harder, more uniform cutting is easier to maintain and transport. This positively impacted the entire chain, including a reduced greenhouse footprint of 20% to 30%, a reduction in freight volume due to the higher packing rate, and a reduced footprint in rooting stations with increased propagation density. Consequently, our growers found that they needed less water during propagation, significantly reducing the chances of fungal rot.

"We also examined the carbon footprint of our operations and looked for ways to improve transport efficiency. We worked closely with selected customers to ensure they were prepared for the new product form, and once we were confident in the results, we implemented the changes on a large scale."

The importance of measurement

Overall, I'm happy to say our efforts have led to a more sustainable and efficient production process. We took a bold approach and created a hyper-focused group that fine-tuned definitions, developed Power BI dashboards, and had weekly meetings throughout the season. After the pilot project, we were able to roll out this approach to other crops, creating a level playing field for both the producer and our growers. By measuring each other's work and adjusting activities promptly, we could significantly increase our professionalism and improve operational excellence. This approach improved our entire supply chain, creating a network for our production line.

It's a wonderful way of working whereby all stakeholders positively influence sustainability, greatly benefiting the planet. I'm pleased to say that we won't stop there and have other projects on the go, such as converting our farm into 100% green energy soon."

Jan Molenaar
Managing Director, Kenya



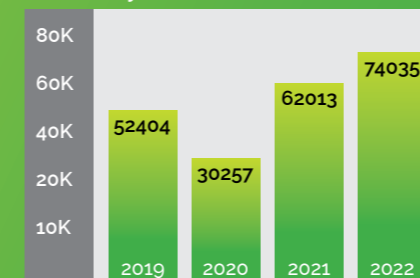
Our environment in a nutshell

The preceding stories demonstrate that we prioritize sustainability by reducing our environmental impact and promoting accountability towards the planet and people. In 2022, we made progress in measuring our carbon footprint and reducing chemical usage through innovative techniques such as IPM.

Additionally, we are committed to responsible water management and promoting a circular economy by reducing waste and encouraging recycling.

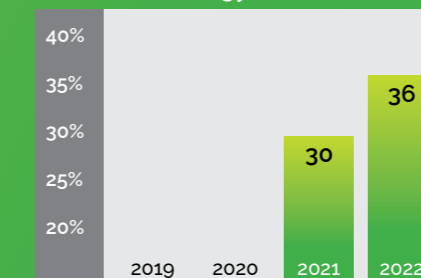
Going forward, we hope to drive such initiatives further, putting people at the core of environmental improvement and helping us reach our sustainability objectives.

Electricity



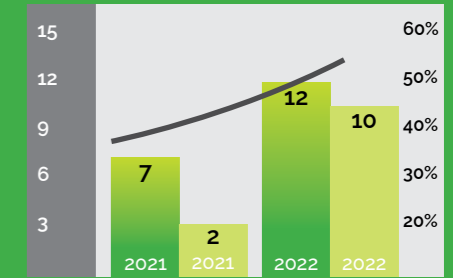
Our electricity usage has slightly gone up when compared to 2019. Note: 2020 numbers did not include all farms due to Covid.

Renewable energy



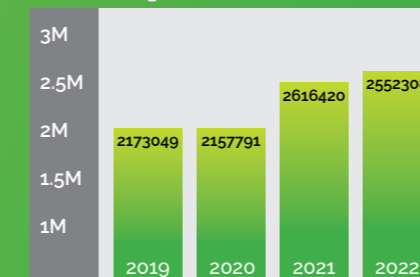
The percentage of renewable energy shows a positive trend.

Certification status



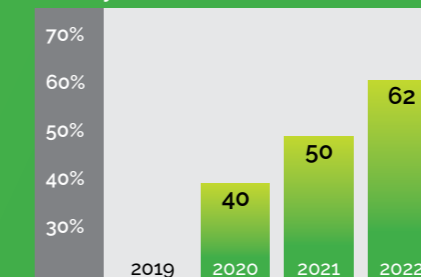
Our certification target has been achieved (50% of farms fully certified). Fully certified means compliant with the FSI basket of standards.

Water usage in Million M3



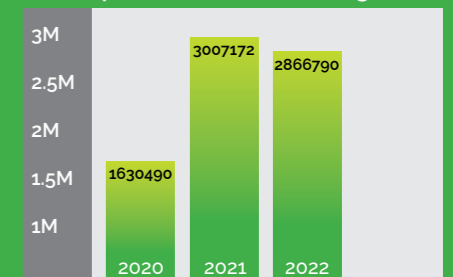
Our water usage has slightly increased due to extra cleaning activities.

% Recycled waste



The percentage of waste recycling has increased substantially.

Waste production in Million Kg.



Our waste production shows a positive trend with a slight decrease.



Social

Our commitment to the well-being of individuals and communities

We highly value social sustainability and prioritize ethical and responsible practices that benefit our employees and communities. Our commitment is evident through our challenging yet achievable KPIs that track our progress toward the SDGs. Employee satisfaction is a top priority, as demonstrated by our global Organizational Health Index (OHI) survey, which 84% of our employees completed in 2022.

We are dedicated to our people, as seen in our Living Wages Project, which guarantees decent living standards and access to basic human rights for our workers and their families. The El Salvador Ministry of Labor and Social Welfare recognized our efforts with the National Award for Decent Work. In Japan, our initiatives have significantly increased employee engagement, motivation, and accountability, essential for our company's success.

Our DEI policy fosters a supportive and inclusive work environment with zero tolerance toward discrimination, bullying, or harassment. Moving forward, we aim to continue prioritizing people in our operations.

Living Wages Project ensures fair and decent wages for workers

"I am proud to be a part of the **Living Wages Project**, an initiative between Dümmer Orange and FSI piloted in 2022. This project aims to ensure our workers and their families can afford a decent standard of living so they can lead a decent life with dignity and access basic human rights. This is not just about providing a salary but also making sure essential needs such as water, food, housing, education, clothing, and health are met.

Establishing a baseline to understand living wages

As part of the Living Wages Project, we established a baseline from where we are to understand living wages — which are typically higher than minimum wages — and the minimum income necessary. This income must be adequate for workers to meet their basic needs and cover essential expenses for themselves and their dependents while also providing savings for unexpected events or emergencies.

Measuring progress and setting benchmarks

Measuring and tracking our progress is crucial to meeting these goals. As such, in 2022, we validated our KPIs for the project and analyzed data to identify trends and significant changes. Moreover, we created a tool and salary matrix in collaboration with FSI. However, we needed accurate and reliable data to do so, and because salaries involve sensitive information, we had first to obtain consent to use these data. Once we received approval, we inputted the data and uploaded it to the matrix. Analyzing the results from the two countries where the pilot was conducted will enable us to understand better where we're at and make any modifications.

The UN has confirmed that we exceed their recommended payment standards. We're also working with FSI to determine benchmark data for our analyzes. Moreover, we are investigating the difference between living wage and collective bargaining agreements to determine the best course of action for each of our locations worldwide.

"We understand that inequality affects not only social responsibility but also our business resilience and growth. Ensuring all employees receive a fair and decent wage contributes to greater quality of life and stronger communities."

A vital initiative for employee well-being and business sustainability

Being part of the Living Wages Project makes me proud of our organization's commitment to sustainability and ensuring our workers can achieve a decent standard of living. The project is a vital initiative that can greatly impact the lives of our employees, their families, the community, and society. We understand that inequality affects not only social responsibility but also our business resilience and growth. Ensuring all employees receive a fair and decent wage contributes to a better quality of life and stronger communities. Achieving this goal can lower turnover rates and strengthen worker commitment, in turn, benefiting our organization.

The Living Wages Project is an incredibly rewarding experience for my team and me as we work towards a social purpose at our business' heart. We aim to expand this initiative to our entire organization and all our locations. We believe in doing a good job and know that doing an exceptional job feels even better. We hope our efforts inspire other organizations to act similarly toward a more equitable world."

Anita Muthaura
HR Manager, Kenya



"The Living Wages Project is an incredibly rewarding experience for my team as we work towards a social purpose at our business' heart."

Anita Muthaura
HR Manager, Kenya

El Salvador farm wins National Award for Decent Work

"I'm thrilled to share that our Las Mercedes farm received the National Award for Decent Work in 2022 from the Ministry of Labor and Social Welfare of El Salvador. This award recognizes our dedication to sustainable practices, compliance with labor laws, and creating quality job opportunities. We are committed to providing a safe and supportive work environment and contributing to community development initiatives.

The award highlights our reputation as a responsible employer that prioritizes the well-being of our people and the communities where we operate. We are proud to be one of only 69 companies out of 1,800 in the country that have received an award for compliance with labor legislation. This certification no doubt interests job seekers wishing to work at our location and reinforces our commitment to upholding the highest ethical standards in all aspects of our operations.

Our main challenge in El Salvador is hiring a large number of people in a short amount of time. More specifically, we require an additional 500 to 800 employees during the high season, but we work hard to ensure that we have the workforce needed to keep things running smoothly. Despite this difficulty, we prioritize motivating our staff by organizing inspiring activities throughout the year.



Giving back starts at home

We believe that giving back starts at home, and we follow through with this. That's why we distribute grocery bags to all workers at the start of the year and organize a gift for their children. By completing a homework assignment related to the farm, the children receive a package containing school supplies to support their learning. Additionally, we take pride in social responsibility and collaborate with a nearby school to provide support and assistance. We recognize that education is crucial in shaping the future of society, and we are committed to providing the necessary resources to improve the quality of education for children in the area. Through our partnership with the school's director, we help address specific issues, such as the lack of windows in some classrooms and water damage during spring.

There's no 'I' in team

As for our HR efforts and initiatives, we love hosting various exciting activities throughout the year, including a football tournament where teams compete for prizes. Football is considered the top sport in El Salvador, and the tournament is a hit with our staff. We also have a team of runners who get together after work, providing a great exercise and team-building opportunity.



"We are proud to be **1 of only 69** companies out of **1,800** in the country that have received an award for compliance with labor legislation."

Iveth Orantes
HR and Office Manager, El Salvador

Our people as priority

We hold an annual celebratory lunch at the end of the high season to thank our staff, which includes a traditional chicken dish and some fun entertainment in the form of a person dressed as a chicken. Our Christmas celebration offers typical seasonal food despite the high season workload. Our on-site clinic offers healthcare programs for pregnant women in compliance with government regulations. We also provide continuous on-site training on topics such as safety and leadership in addition to Dümme Orange's global online or technical training.

Ensuring we conform

As a responsible employer, we comply with local and international regulatory frameworks. We ensure all employees receive legal salaries, payment of overtime and holidays, annual vacations, contributions to social security and pension funds, and adequate occupational health and safety conditions. Our adherence to labor laws includes a complete audit by the Ministry of Labor. In addition, we have a special recognition, internationally supported by the International Labor Organization (ILO) and linked to the United Nations Sustainable Development Goals, with a view to improving the economic growth of companies and the country.

Promoting equal opportunity and employee welfare

As a significant employer in our city, we take pride in providing job opportunities to people who may not have a high level of education. Our commitment to employee welfare and team-building activities helps foster a happy and productive work environment. We employ people of all ages and have a no-discrimination policy that allows us to accept all individuals equally. We also hire differently-abled people to ensure equal opportunities in the workplace. Our compliance with labor laws, commitment to providing equal opportunities, and our no-discrimination policy make us an excellent model for other companies to follow. Our location is a fantastic place to work, as we prioritize the well-being and growth of our people and community."

Iveth Orantes
HR and Office Manager, El Salvador

Japan increases employee engagement

"After I took on the role of Commercial Director for Japan, I noticed that our branch's performance, as measured by the Organizational Health Index (OHI), was very low. I have always believed that people are fundamental to an organization and that good people passionate about their work are even more priceless. So I knew that to move forward, we needed to engage and activate our people.

Going back to basics

During the 2021-2022 financial year, we restructured the team and hired several new employees. Yet I knew hiring new employees was not enough to make a significant change. We had to make positive adjustments to company culture and get everyone on the same page. This could only be done by ensuring all employees understood our shared vision, mission, values, and culture.

To move forward, we explained the new strategy to colleagues and changed the company's name from Japan Agribio to Dümme Orange Japan. We redecorated our offices incorporating company colors and symbols — helping us powerfully visualize our new strategy and bring the vibrant Dümme Orange brand into our work environment. This also meant we needed to translate the overarching global strategy and values into the Japanese language, reaching not only the minds but also the hearts of our employees.

"The focus on a shared vision, clear processes, external orientation, and operational discipline, along with innovative initiatives, helped us greatly improve performance and communication, leading to better OHI results."

Connection and communication as key

Moreover, we implemented a virtual office — a unique concept to Dümme Orange — whereby team members in different regions can interact and collaborate as if they were in the same physical space. This enhanced communication and teamwork and added an interesting and fun dimension to our work. We also began utilizing other online tools to improve collaboration and share our vision, mission, and values.

For example, Onetool has a unique function whereby for each post, we can add one of our special company icons representing the specific company value aligning to a particular story or internal update. So whenever we have an event or update, we visually link it to our values. Also, we set up workshops to reinforce our values and ran entertaining employee activities. I fondly recall our team learning the Haka dance of the All Blacks rugby team and stemming from the Māori people in New Zealand — a symbol of cultural togetherness, solidarity, and support for one another.

Small changes like this have made a huge difference to the team's morale, better connecting them to each other and our shared company vision. The focus on a shared vision, clear processes, external orientation, and operational discipline, along with innovative initiatives, helped us greatly improve performance and communication, leading to better OHI results — in a single year, we increased employee engagement from 64 to 86, work environment from 61 to 83, employee accountability from 58 to 78, and direction (shared vision, strategic clarity, and employee involvement) from 53 to 86.

This shows that investing in our people and having open lines of communication are at the core of our work. With a strong team, I believe you can achieve anything."

Tetsuya Obara

Commercial Director, Japan & South Korea



"In Japan, we increased employee engagement from 64 to a massive 86, which is in the top quartile."

Tetsuya Obara
Commercial Director, Japan & South Korea.

Promoting a supportive and inclusive work environment — Our Diversity, Equality & Inclusion (DEI) policy

At Dümmer Orange, we strongly value diversity, equality, and inclusion and are committed to treating all employees fairly and respectfully.

In 2022, we introduced a formal DEI policy to promote a supportive and inclusive culture among all employees. The DEI policy also includes zero tolerance towards any form of discrimination, bullying, or harassment and encourages employees to report any inappropriate conduct. It is reviewed and monitored annually to ensure that workplace diversity and inclusion are consistently promoted.

Moreover, the policy ensures that all job applicants and employees are given equal opportunities regardless of age, disability, marital status, pregnancy and maternity, ethnicity, nationality, national origin, religion or belief, gender identity, sex, sexual orientation, or any other characteristic not based on the inherent requirements of the position.

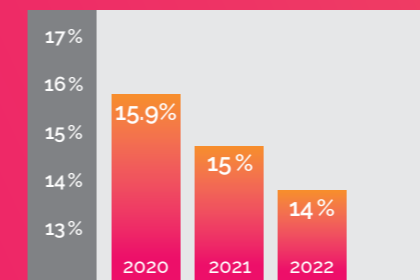
DEI is a serious commitment for Dümmer Orange. We embed it in our daily activities and processes. For example, our succession planning has a strong diversity element; our global communication sessions are a platform for employees from around the globe to share their success stories; and global roles are filled with talents from non-Western countries. We continue to work on further embedding it and living our values.

Furthermore, benchmarking our DEI policy with other companies is high on our list.

Social in a nutshell

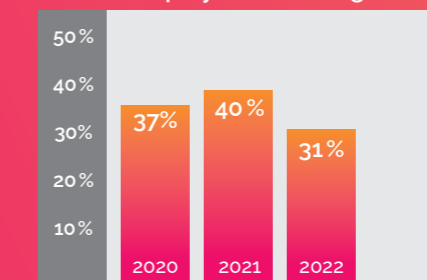
These previous narratives show our drive to prioritize social sustainability and our commitment to the well-being of our employees and communities. We focus on health and safety, human rights, and employee engagement to achieve this. We use challenging yet attainable KPIs to measure our progress towards the Sustainable Development Goals. Our global OHI survey measures employee satisfaction and is essential for tracking our progress.

Turnover rate



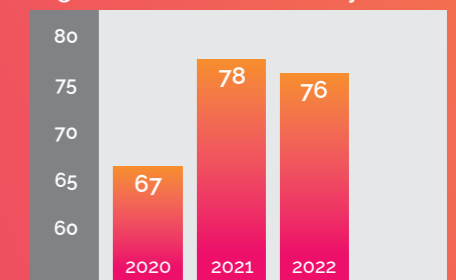
The turnover rate shows a positive downward trend even in a tightening labor market.

Female employees in management



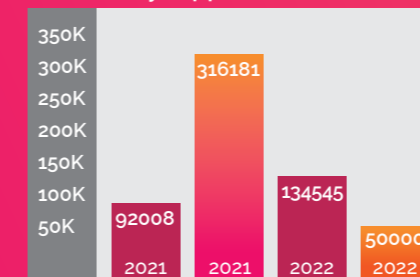
The number of female employees in management positions has slightly decreased last year. In our ExCo we have 15% female.

Organizational Health Survey



Employee satisfaction went down slightly from 78 to 76. The response rate, however, shows an increase indicating that our employees see the value of this survey. In 2021 and 2022, the survey also included all employees.

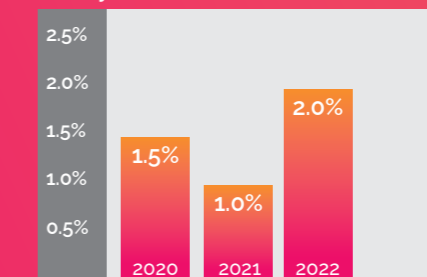
Community support in €



Our community support spending in 2022 was lower compared to 2021 due to the fact that there was a significant one off in 2021. Our recurring spend has increased.

■ = One-offs
□ = Recurring

Safety incident rate



Our safety incident rate increased. This is partly due to a more strict way of measuring incidents. We have increased our efforts in training our employees in (safety) standards and protocols. We should see the impact of this in the coming years.

Technological development

We are dedicated to using technology to create ornamental plant varieties that are resistant to diseases and require fewer chemicals. We understand that our commitment to sustainable and socially responsible practices in the floral industry can contribute to a better world and have set a goal to use as few chemical products as possible by 2030.

Our focus on research and development and our roadmap to guide us in introducing more resilient varieties enabled us to achieve significant milestones in 2022. We are taking measures to prevent genetic erosion by monitoring the genetic variation in our crops and incorporating new genetics from wild relatives into our germplasm. With our efforts, we are confident that we can develop more resilient plants that require less chemical crop protection, contributing to a more sustainable and resilient future.

Our investment in technology has resulted in the creation of Intrinsa, a brand that produces 'plants powered for a greener future' and eliminates plant diseases. Through the combination of advanced hybridization and traditional breeding, we create plants that are not only beautiful but also deliver real-world benefits.

At Dümmen Orange,
we value the importance of
technology in our business





"Our achievements include developing the world's first TMV-resistant Petunia series, the Smartunia Windmill."

Anita de Haan
Breeding Director Bulbs and Tubers, The Netherlands

Our roadmap to cultivating resilient and thriving plants

"I have been working towards a mission to develop a robust portfolio of ornamental plants since I joined Dümme Orange. I've seen our focus shift from beautiful and colorful flowers and new types to growing our plants healthily and sustainably. We believe it's important to have stunning flowers that make people happy and resist pests and diseases.

Embracing chemical-free solutions

We develop disease-resistant ornamental plant varieties and promote sustainable and socially responsible practices in the floral industry for a better world. To do so, we are committed to using as few chemical products as possible by 2030 — as per the promises made by the industry and FSI.

Thoroughly testing plant resistance

We are constantly developing tests to determine the resilience of our plants. We assess whether they can completely block a disease, are resistant with fewer symptoms, or grow faster without being affected by the disease. We develop plant disease resistance tests and systematically screen the gene pool of commercially available plants. However, if no resistant plants are found, we move on to botanical resources like wild plants. Suppose we find promising traits in these wild sources; in that case, we develop them further to make them suitable, ensuring they can be grown in standard conditions, such as greenhouses or outdoor environments, and do not resemble wild plants that grow uncontrollably.

"It's our obligation as a breeding company to prioritize these traits in our breeding programs to ensure resilient and sustainable plants. It's a challenging and detail-oriented process, but it's rewarding to know that our work can positively impact both the environment and the people involved in the industry."

Navigating the path to sustainable crop production

We have developed a roadmap to guide us in developing and introducing more hardy varieties. We are pleased to say that in 2022, our lab achieved significant milestones in our research and development efforts. Our achievements include developing the world's first TMV-resistant Petunia series, the 'Smartunia Windmill.' We also introduced the eco-friendly Senecio hybrid series Mandala, designed to prevent attacks from pests and diseases. Additionally, we successfully obtained powdery mildew resistance for kalanchoe and white rust and fusarium resistance for chrysanthemum. These plants are now more robust, which has huge sustainability benefits, as they last longer and require less crop protection.

Our path to sustainable crop production

Crop	Trait	< 2022	2022	2023	2024	2025	2026
Kalanchoe	PM resistance						
Chrysanthemum	White Rust resistance						
Petunia	TMV resistance						
Chrysanthemum	Fusarium resistance						
Rose	PM resistance						
Poinsettia	White fly resistance						
Carnation	Fusarium resistance						
Rose	Agrobacterium resistance						
Perennials	Insect friendly						
Anthurium	Xanthomonas						

It's an exciting time to be part of Dümme Orange, and I'm passionate about working on projects that positively impact the ornamental industry. I got into this field because of my background in biological sciences. In the Netherlands, there is a thriving industry for crop breeding, including ornamental plants, which is fascinating to be a part of."

Anita de Haan
Breeding Director Bulbs and Tubers, The Netherlands

Safeguarding plant genetic diversity for future generations

"I am proud to be part of an initiative to maintain the genetic diversity of crops and varieties while preserving wild species connected to our crops. Genetic erosion is a real concern when we think about the long-term sustainability of our crops. We are committed to preventing this by actively monitoring the genetic variation in our crops and incorporating new genetics from wild relatives into our germplasm.

Preserving genetic diversity to prevent genetic erosion

One area often overlooked in terms of genetic diversity is ornamental plants. While crops important for food security have received significant attention, only 1.5% of hectares in the EU are dedicated to floriculture, despite 75% of crops being floriculture and two-thirds of the varieties being floriculture crops. We believe preserving the genetic diversity of plants used for ornamental purposes is equally important.

Strategies for preserving and measuring diversity

To achieve our goal of preservation, we have implemented various strategies. We constantly review available wild species for acquisition in all crops, focusing on crops with limited numbers of wild species. We also prioritize plant genetic resources that show good resistance to biotic and abiotic stress. As such, we believe that incorporating such traits into our breeding germplasm will result in more resilient plants.

Measuring diversity can be challenging, but our R&D team has developed a software program that helps us estimate the genetic variation in each of our crops. This technology allows us to monitor how the genetic background changes over time and make informed decisions on when and how to incorporate new genetic diversity.

"We encourage our colleagues at Dümme Orange to think about the bigger picture and the impact of their job. The work we do goes far beyond just creating beautiful flowers; it also involves breeding for traits that make them more resilient to biological and environmental stress in our changing world."

Conservation of wild native species

Conservation of wild native species is a key aspect of our work. We maintain an in-house germplasm bank to conserve genetic diversity and work closely with botanists to rescue rare species. By using cell biological methods to clean them up from viruses that cause degeneration, we can safeguard their genetic diversity for future generations.

Acquisition and incorporation of new plant genetic resources

We aim to obtain new plant genetic resources for at least 80% of our crops and incorporate them into our breeding programs. Moreover, we constantly strive to improve our acquisition pipeline, strictly adhering to The Nagoya Protocol and acquiring relevant wild species that can bring much-needed variation to our germplasm. Our team also focuses on developing new protocols and techniques to assess reproductive traits and break reproductive barriers to best use all the acquired material.

As we drive this initiative forward, we encourage our colleagues at Dümme Orange to think about the bigger picture and the impact of their job. Our work goes beyond just creating beautiful flowers; it also involves breeding for traits that make them more resilient to biological and environmental stress in our changing world. I'm proud to contribute to maintaining biodiversity and preserving genetic diversity, and hope to inspire others to join us in this important endeavor."

Anna Karen Zapata Carbonell
Project Lead Trait Exploration, The Netherlands



"Our R&D team has developed a software program that helps us estimate the genetic variation in each of our crops."

Anna Karen Zapata Carbonell
Project Lead Trait Exploration

The Nagoya Protocol

The Nagoya Protocol is a global treaty under the **Convention on Biological Diversity (CBD)**. It aims to promote access to genetic resources and the fair and equitable sharing of benefits arising from their utilization. It was adopted in 2010 and has been ratified by over 120 countries.

The Protocol stresses the importance of obtaining prior informed consent (PIC) from countries providing genetic resources and ensuring that benefits, such as monetary and non-monetary benefits, are fairly shared with those countries and communities that hold traditional knowledge associated with the genetic resources.

The Protocol also highlights the need for compliance measures and capacity-building to support its effective implementation at national and international levels.



Technological development in a nutshell

The aforementioned stories illustrate our focus on technology and our dedication to providing our partners with cutting-edge solutions — a key factor in keeping us competitive. We continuously work to improve our products and services, resulting in significant sustainability benefits. Our dedication to this field enables us to deliver top-quality solutions and play an instrumental role in striving toward a more sustainable floriculture industry.

As leaders in floriculture plant breeding, we leverage cutting-edge techniques and prediction software to create sustainable solutions and expand our global variety portfolio. Moreover, we are passionate about safeguarding plant genetic diversity for future generations and have a roadmap for cultivating resilient and thriving plants through chemical-free solutions.



Sustainability and beyond

As we approach 2025, a critical year for driving sustainability, our commitment to ESG matters remains a cornerstone of our operations. This commitment is strongly embedded in our overarching company strategy, and we continue to track our progress toward the SDGs through the challenging yet achievable ambitions and goals we have set for ourselves.

In 2022, we demonstrated our dedication to the environment through initiatives such as the Footprint Project, using natural pesticides, water conservation efforts, and new cutting specifications for Pelargoniums. We strive to lead the way toward a more sustainable future by prioritizing efficiency and waste reduction.

We prioritized social sustainability and ethical practices that benefit employees and communities. Our ongoing Living Wages Project guarantees decent living standards and access to basic human rights for our workers and families. Additionally, our efforts to place our people at the forefront have been rewarded - our farm in El Salvador was recognized with the National Award for Decent Work by the country's Ministry of Labor and Social Welfare.

2022 also saw us celebrating several milestones, including the significant progress we've made in developing ornamental plant varieties resistant to diseases and requiring fewer chemicals. Our roadmap to introduce more hardy varieties and our research and development efforts helped us make notable strides in achieving our sustainability goals. Additionally, our measures to prevent genetic erosion by monitoring genetic variation in our crops and incorporating new genetics from wild relatives into our germplasm are essential in developing more resilient plants that require less crop protection.

We are proud of our commitment to sustainability and our efforts to safeguard ethical and responsible practices in the floral industry. By continuing to innovate and lead the way in sustainable practices, we look forward to contributing to a more sustainable and resilient future — and one we know we cannot achieve without your help.

Acronyms

CBD	Convention on Biological Diversity
CSR	Corporate Social Responsibility
CSRD	Corporate Sustainability Reporting Directive
DEI	Diversity, Equality, and Inclusion
EHPEA	Ethiopian Horticulture Producer Exporters Association
ESG	Environmental, Social, Governance
EU	European Union
ExCo	Executive Committee
FSI	Floriculture Sustainable Initiative
Greencare	Dümmen Orange's Phytosanitation Protocol
GreenGuard	Biological Protection
HRM	Human Resource Management
IPM	Integrated Pest Management
IRBC	International Responsible Business Conduct
ILO	International Labor Organization
IT	Information Technology
KFC	Kenya Flower Council
KPIs	Key Performance Indicators
LTA	Lost time accidents
MPS	Milieu Programma Sierteelt (Environmental Program Horticulture)
OHI	Organizational Health Index
PIC	Prior Informed Consent
PVC	Petunia, Verbena, Calibrachoa
SFDR	The Sustainable Finance Disclosure Regulation
UN	United Nations
UN SDG	United Nations Sustainable Development Goals
WEF	World Economic Forum

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