QUEEN® GROWS GREENER
CONTRIBUTING TO THE GLOBAL GOALS

SUSTAINABLE DEVELOPMENT GOALS

SUSTAINABILITY
OUR RESPONSIBILITY

At Queen®, we do our utmost to minimize the impact of our production activities on the environment. Our mission is to produce beautiful, high quality flowers and plants, which can be bought and enjoyed with a clear conscience.

We have had a tradition of prioritizing the environment for three generations. Throughout the years we have optimized our operation, which has resulted in a wide range of initiatives regarding production, packaging, pots and trays etc. We are continually working on improved, sustainable solutions within our business practices.

The improvements we make for the sake of the environment are documented on a monthly basis since 2000, and we are proud to have earnt the MPS-A, MPS-GAP and MPS-SQ. MPS is an international authority which classifies how sustainable and environmentally conscious plant nurseries are.

THE GLOBAL GOALS
FOR SUSTAINABLE DEVELOPMENT

At Queen®, sustainability and business go hand in hand. We continuously aim to grow greener and believe we have a duty to help achieve the United Nations' Sustainable Development Goals. It comes naturally to focus on and prioritize the global goal 12 and 15, covering responsible consumption and production as well as protection and restoration of terrestrial ecosystems. We are strategically working on reducing our ecological footprint by changing the way we produce and consume resources on a daily basis and long term. Next, we have listed our different sustainable initiatives.

THE GLOBAL GOALS
For Sustainable Development

INDEX: SUSTAINABLE INITIATIVES BY QUEEN®

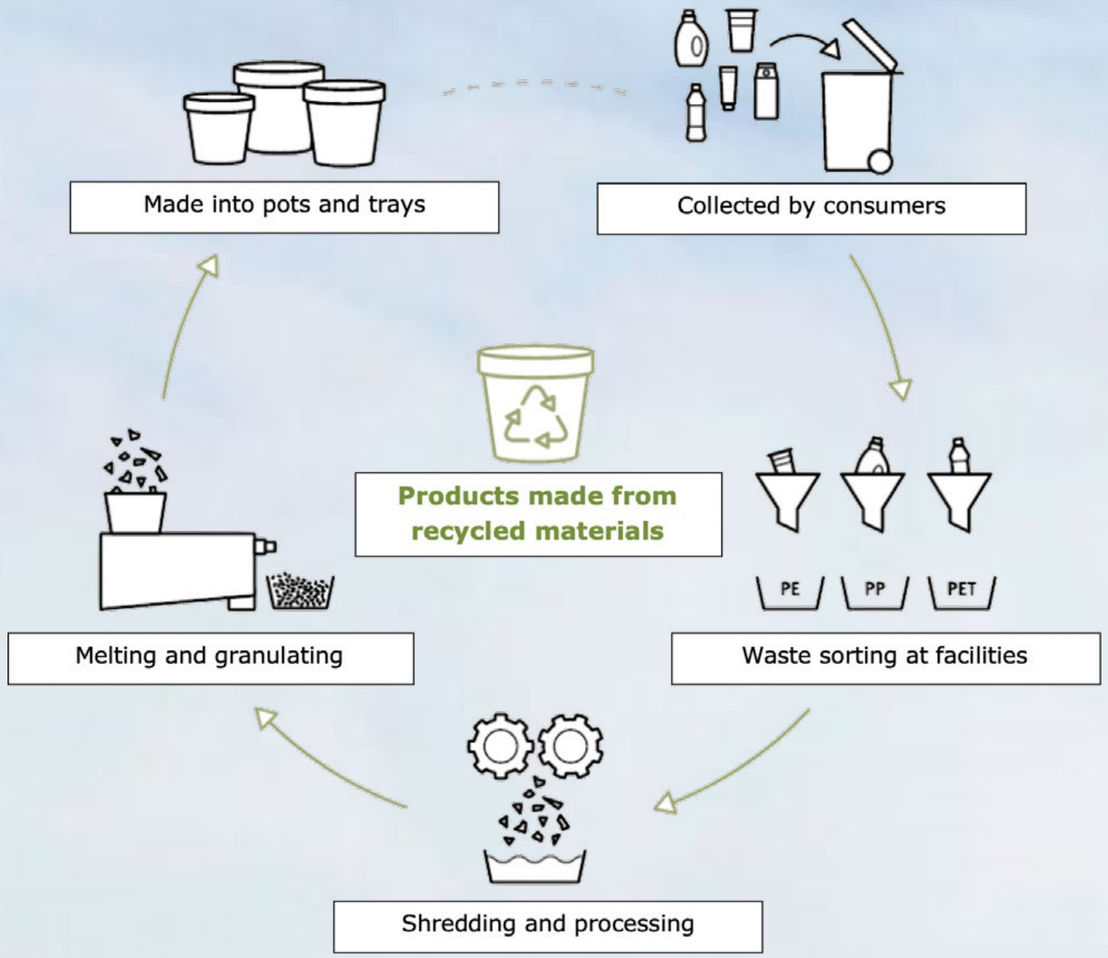
PACKAGING

At Queen® packaging plays a key role in protecting the quality and longevity of our plants. However, we are committed to finding better, sustainable solutions and minimize waste. We aim to use recyclable packaging and have improved the design of our packaging, so it can go through waste handling systems. Over the years, we have increased the amount of recycled materials within, e.g. our pots and trays.

PACKAGING
POTS AND TRAYS

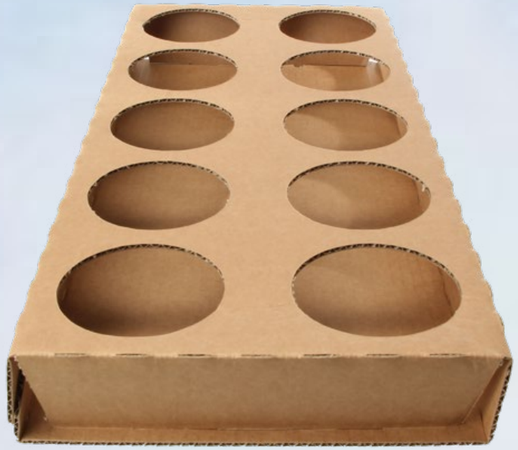
In 2020/2021 we are offering our customers:

- Pots made of PCR materials (post-consumer recycled plastic).
- At the moment our trays are made of PE (Polyethylene). By 2021 all trays will be made of PCR as well. Cardboard trays will be an alternative.
- We work on biodegradable solutions. Pots made from natural-fibre materials will soon be an option.



PCR materials
2020/2021

Cardboard trays
2021



Biodegradable pots
2021

PACKAGING
PAPER SLEEVES

We provide paper sleeves to our customers that protect our plants and meet the needs and requests for plastic reduction. In general, we have increased our focus on paper solutions. The paper is FSC certificated and recyclable. FSC paper is made with materials from well-managed forests and/or recycled sources. The areas are being replanted post-harvest.

FSC
MIX
Paper from responsible sources
FSC® C110367

PACKAGING
PAPER SLEEVES

On the back of our paper sleeves, we point out some of our eco-friendly initiatives, being relevant and essential for the consumers to make better, green choices.

Our plants are:

- Raised on rainwater
- Protected by biological pest control
- Grown in recycled pots
- Packed in FSC paper instead of plastic
- MPS A

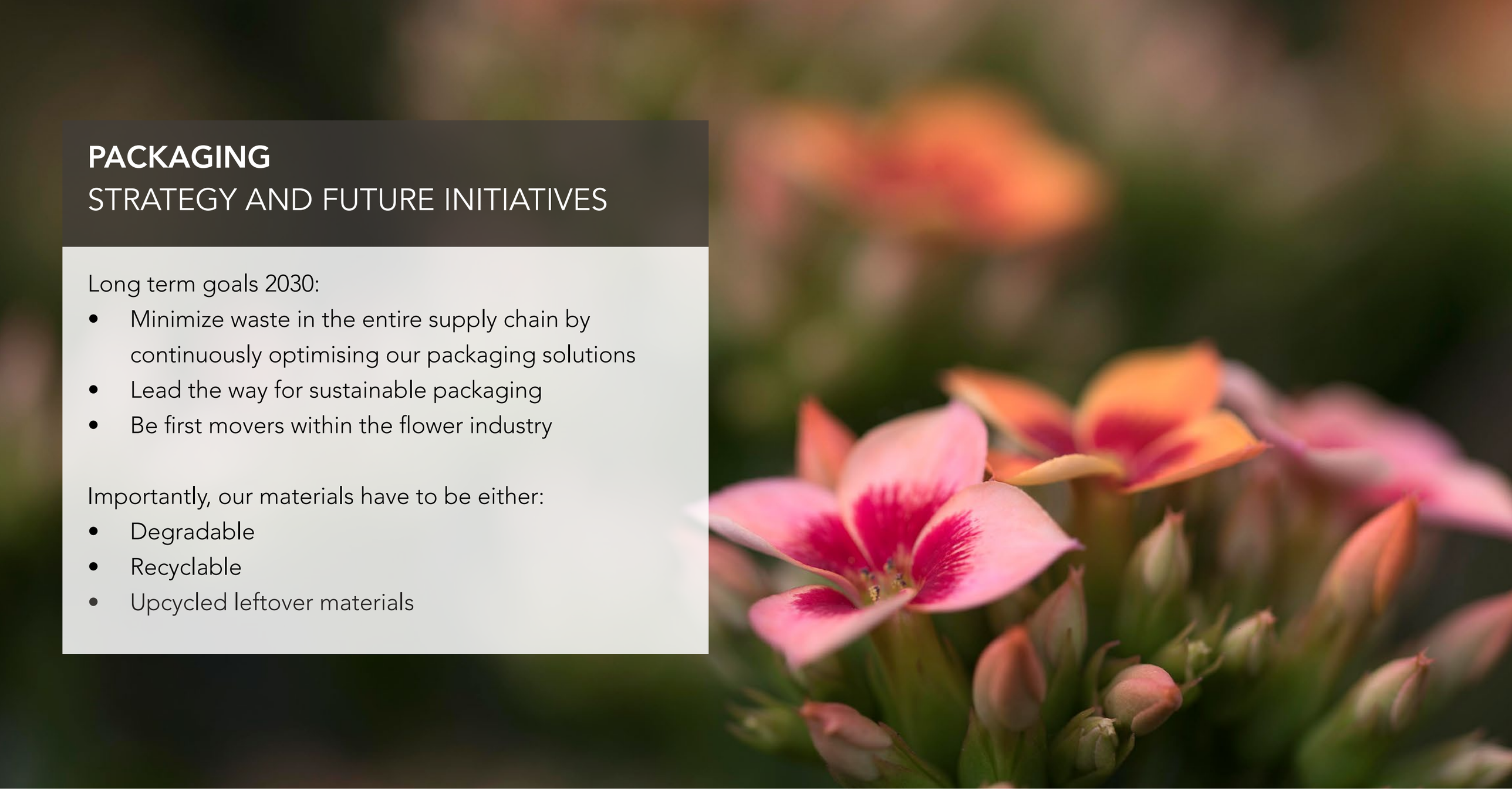
PACKAGING
STRATEGY AND FUTURE INITIATIVES

Long term goals 2030:

- Minimize waste in the entire supply chain by continuously optimising our packaging solutions
- Lead the way for sustainable packaging
- Be first movers within the flower industry

Importantly, our materials have to be either:

- Degradable
- Recyclable
- Upcycled leftover materials



SPHAGNUM-PEAT REDUCTION
CURRENT POSITION

Currently, our potting soil consists of approx 85% sphagnum-peat. The growing media we use are raw materials and/or natural, fibrous wood material (FSC-certified) stabilised with peat.

We emphasise that the growing media:

- Meet high quality standards
- Are approved for organic production
- Do not come from or exploits registered, protected areas and nature reserves
- From suppliers that work actively with restoration projects and re-establishing the nature after harvest
- Qualified as growing media

SPHAGNUM-PEAT REDUCTION
STRATEGY AND FUTURE INITIATIVES

A reduction of sphagnum-peat is a high priority at Queen®. We aim to decrease our use of sphagnum-peat towards 2025 and have a meticulously planned strategy we strive to reach best possible, without compromising on quality.

Sphagnum reduction strategy and ambitions

Years	*2021*	*2022*	*2023*	*2024*	*2025*
Wood fibre	10%	10%	10%	10%	10%
Sphagnum (young raw materials, 30 years)	5%	10%	15%	15%	15%
Coco peat		10%	10%	10%	10%
Coco fibre			15%	20%	30%
Perlite					
Vermiculite			5%	7,5%	10%
Pumis					
Compost		5%	10%	12,5%	15%
Non peat	15%	35%	65%	75%	90%
Sphagnum-peat (old raw materials, 5000 years)	85%	65%	35%	25%	10%

QUEEN® GROWS GREENER VARIETIES

As a company, we are full-on committed to growing greener and making new steps towards more sustainable production. Within the next years, we aim to produce varieties of all colours with no use of growth regulators. Our product development will breed beautiful and naturally compact varieties, that will be grown with biological control only. It is an extensive and important focus!

Currently, we can grow our kalanchoe varieties, Juliette and Geneva, free from growth regulators in the growing process. This new flower concept is an essential part of the Queen® Grows Greener strategy.

Available varieties:

Juliette

Geneve

Coming soon:

Washington

Noelle

Martha

Agathe

BIOLOGICAL CONTROL

We use biological methods to strengthen the plants, as well as combat diseases and pests during production. Biological plant protection meets our desire for sustainability, while at the same time ensures a healthier work environment for our employees. We work with several biological methods, including the use of banker plants, soil mites, insects, beneficial fungi and bacteria.

Additionally, we apply other useful and natural initiatives to strengthen our production and breed strong, healthy and well-formed plants. Among other things, we use different kinds of climate shocks; regulating heat, changing water temperatures and adding various natural nutrients.

BIOLOGICAL CONTROL
QUEEN® BIOPRODUCTION

Queen® has started developing its own biological control to meet best practice in growing flowers. Since 2018, our business unit Queen® Türkiye and EWH BioProduction have had a cooperative business arrangement, combining resources for the production of biological control and beneficials. This joint venture, Queen® BioProduction, is located in Turkey.

The primary purpose of this newly started initiative is to provide biological control to own production. At Queen® BioProduction, we focus on biological control of pests and diseases, so the use of pesticides can be reduced and eliminated. Long-term we aim at supplying natural products to local growers within the flower and food industry worldwide.

Queen®
Bioproduction

BIOLOGICAL CONTROL
BENEFICIAL FUNGI

We use a variety of microbiological agents, such as fungi and bacteria, which are used in a preventative manner to strengthen the plants and inhibit the attack of fungal diseases.

One of these invisible helpers is the fungus - Trichoderma harzianum. It is supplied via the irrigation, alongside the nutrients, from where the fungus colonizes the roots of the plants and protects them from attacks by harmful fungi, even after the plant has left the nursery.

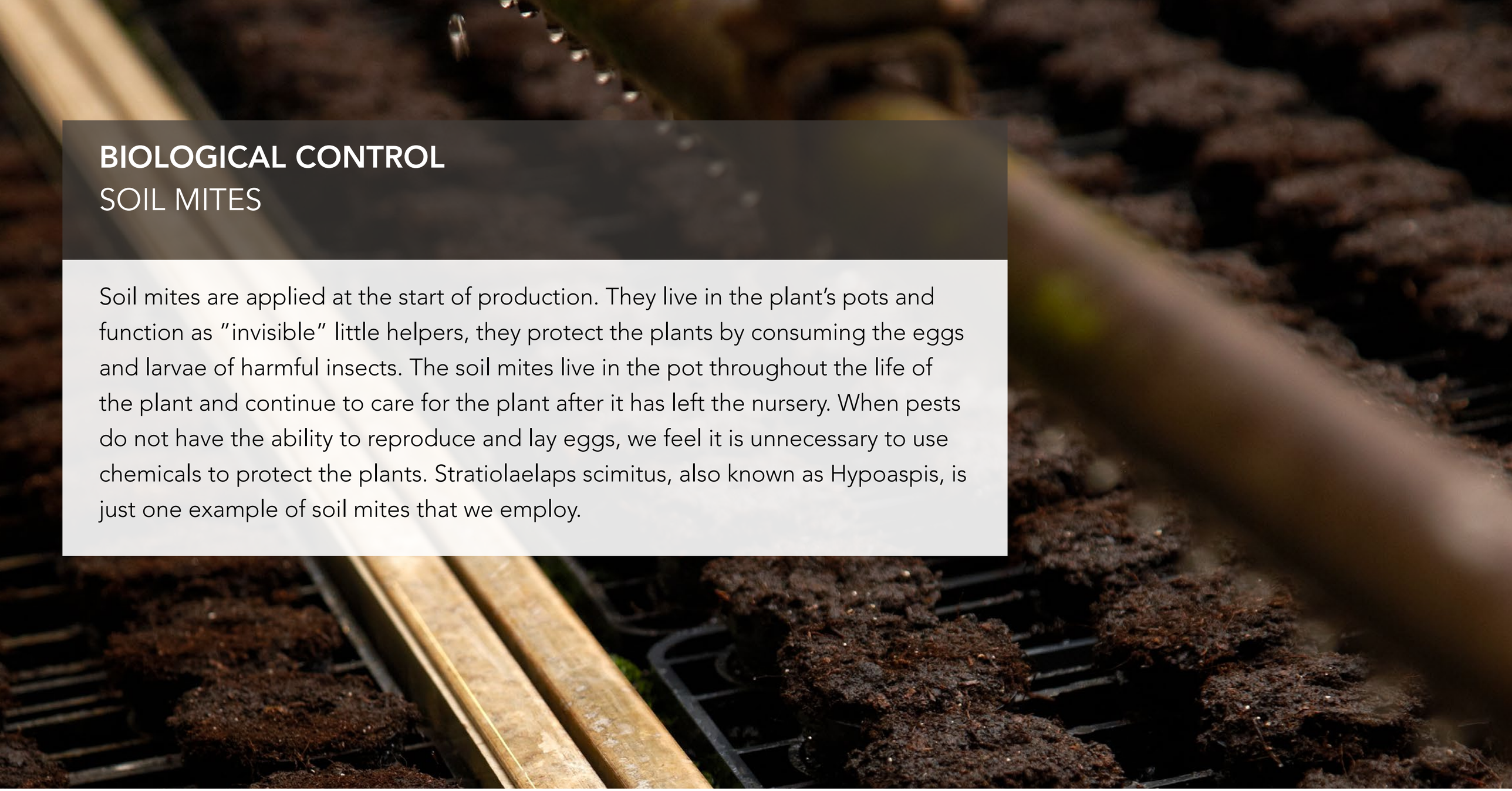
Other types of microbiological agents are sprayed onto the plants to protect the above ground parts in the same way as the Trichoderma fungus protects the roots.

BIOLOGICAL CONTROL
BENEFICIAL BACTERIA

The use of beneficial bacteria is another crucial and sustainable initiative within our production. We take advantage of natural bacteria to keep our plants strong and healthy. The main purpose is to inhibit fungal diseases and to minimize the need for fungicides and pesticides.

We use bacteria in a preventive manner to strengthen the plants. The bacteria protect the plants by infiltrating the soil forming a protective immune system to the roots. This is important, since pathogenic fungal diseases can attack the roots, causing dead plants and a huge waste, if the plants are left unprotected.

In our laboratory we test and cultivate the bacteria. We work hard on improving the initiative and succeeding in using bacteria for all potential plant threats. Using bacteria started as a research project in close collaboration with the University of Copenhagen in 2016. The project “Improving disease control and sustainable production of Kalanchoe by the use of endospore-forming soil bacteria” was successfully accomplished. We were able to find the right and most effective composition of soil bacteria.



BIOLOGICAL CONTROL
SOIL MITES

Soil mites are applied at the start of production. They live in the plant's pots and function as "invisible" little helpers, they protect the plants by consuming the eggs and larvae of harmful insects. The soil mites live in the pot throughout the life of the plant and continue to care for the plant after it has left the nursery. When pests do not have the ability to reproduce and lay eggs, we feel it is unnecessary to use chemicals to protect the plants. Stratiolaelaps scimitus, also known as Hypoaspis, is just one example of soil mites that we employ.

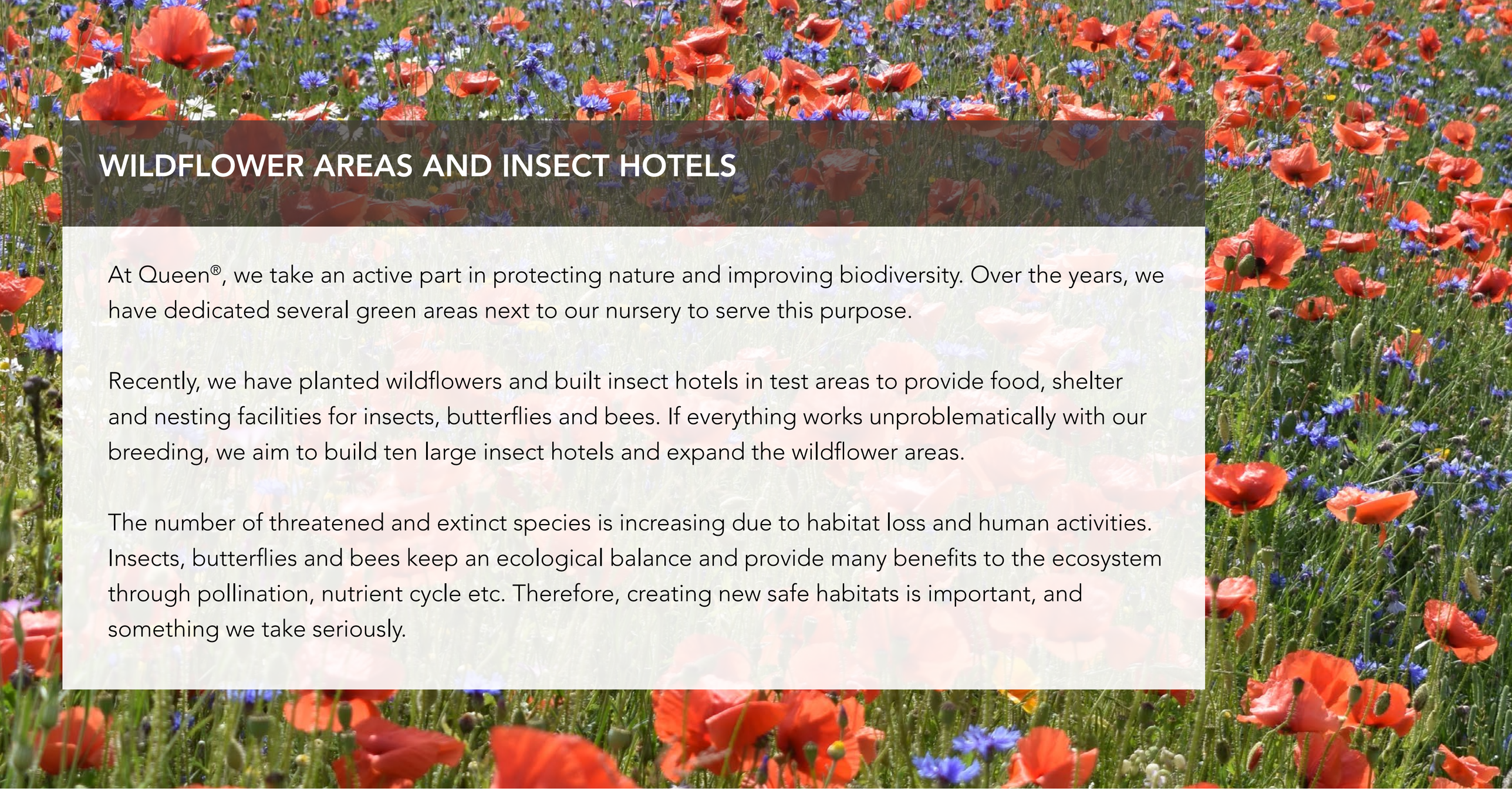
BIOLOGICAL CONTROL
BANKER PLANTS

”Simply put, banker plants are wheat infested with a specific type of aphid, which only eat the grass of the wheat plant itself. Therefore, the aphids will not attack our Kalanchoe and instead they sit on the banker plant, which acts as a kind of oasis. Our small parasitic wasps then seek out this oasis, because they want to parasitize the aphid, so the banker plant acts as a surrogate for the wasps, so to speak.”
- Says Ajs Dam, who is responsible for the day to day biological control at Queen®.

”When the parasitic wasp has stung an aphid, it lays an egg inside of it, which then becomes a new little wasp, and the more parasitic wasps the better. You could say that they are our own natural and sustainable helpers, because they paralyze the aphids that would otherwise attack our Kalanchoe.” - Reports Ajs Dam.

BIOLOGICAL CONTROL
BEES

At Queen®, we don’t use any plant protection that is harmful to bees. We pay attention to this issue, because bees are of great importance for biodiversity. When bees pollinate flowers and cross-breed varieties, biodiversity is improving and developing.



WILDFLOWER AREAS AND INSECT HOTELS

At Queen®, we take an active part in protecting nature and improving biodiversity. Over the years, we have dedicated several green areas next to our nursery to serve this purpose.

Recently, we have planted wildflowers and built insect hotels in test areas to provide food, shelter and nesting facilities for insects, butterflies and bees. If everything works unproblematically with our breeding, we aim to build ten large insect hotels and expand the wildflower areas.

The number of threatened and extinct species is increasing due to habitat loss and human activities. Insects, butterflies and bees keep an ecological balance and provide many benefits to the ecosystem through pollination, nutrient cycle etc. Therefore, creating new safe habitats is important, and something we take seriously.

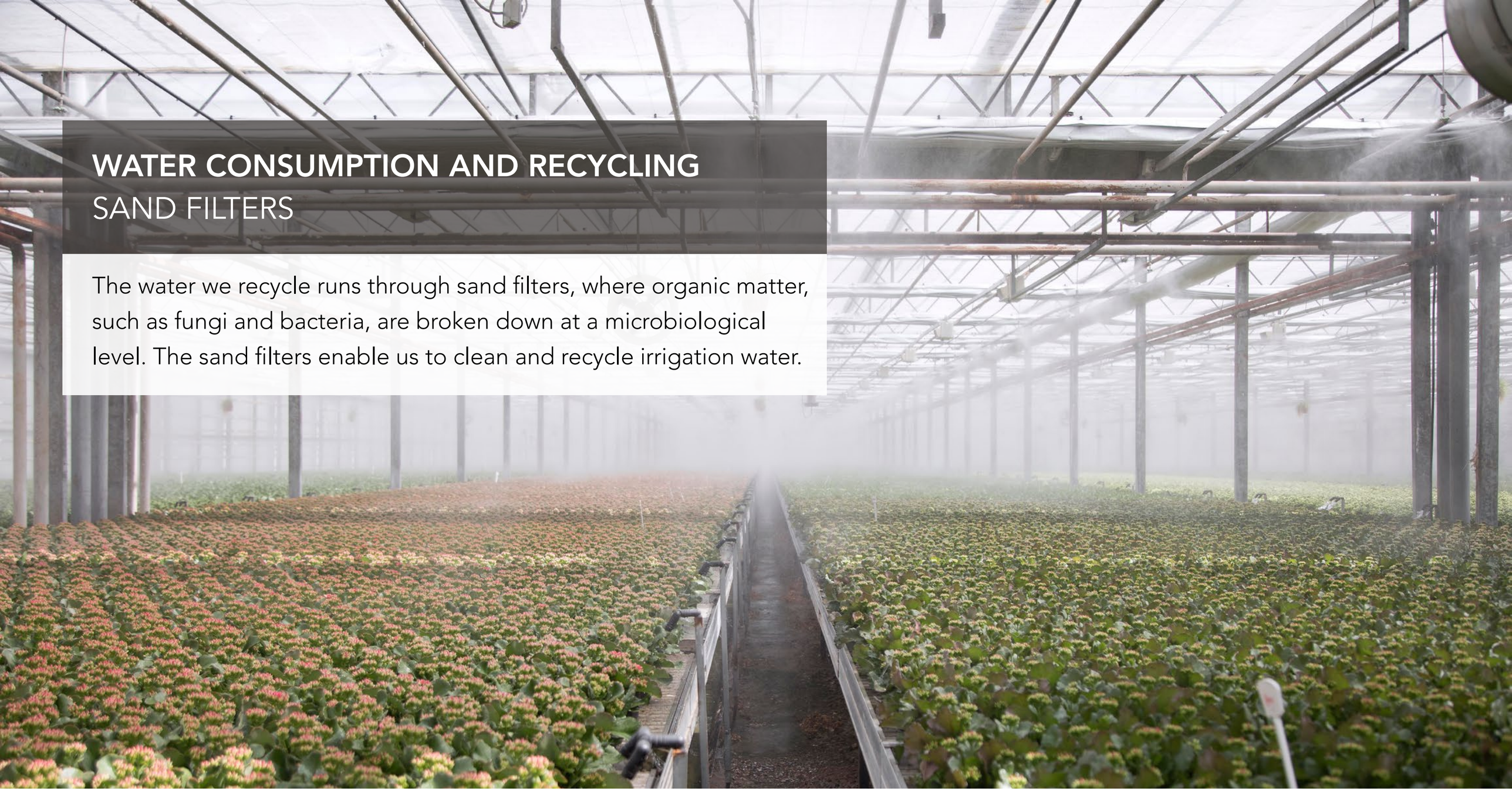
ORGANIC FOREST

For more than a decade, our property in Denmark has held large areas of planted forest, including organic forest, windbreak trees and thickets. Today we have half a hectare planted forest for every hectare greenhouse on-site.

The organic forest counts more than 80 percent of the total forest area, equaling 5 hectares. It was established ten years ago and has over the years become a dense forest, which is rich in wildlife and holds habitats for deer, foxes, hares, insects etc.

WATER CONSUMPTION AND RECYCLING
COLLECTION OF RAINWATER

We collect rainwater from the greenhouse roofs, which we later use for irrigation. The water that the plants do not use is then collected and reused, resulting in 100% efficiency of water usage. Our 9,000m^3 rainwater tank allows us to be self-sufficient. Rainwater is free from sodium and is the preferred alternative for our plants.



WATER CONSUMPTION AND RECYCLING
SAND FILTERS

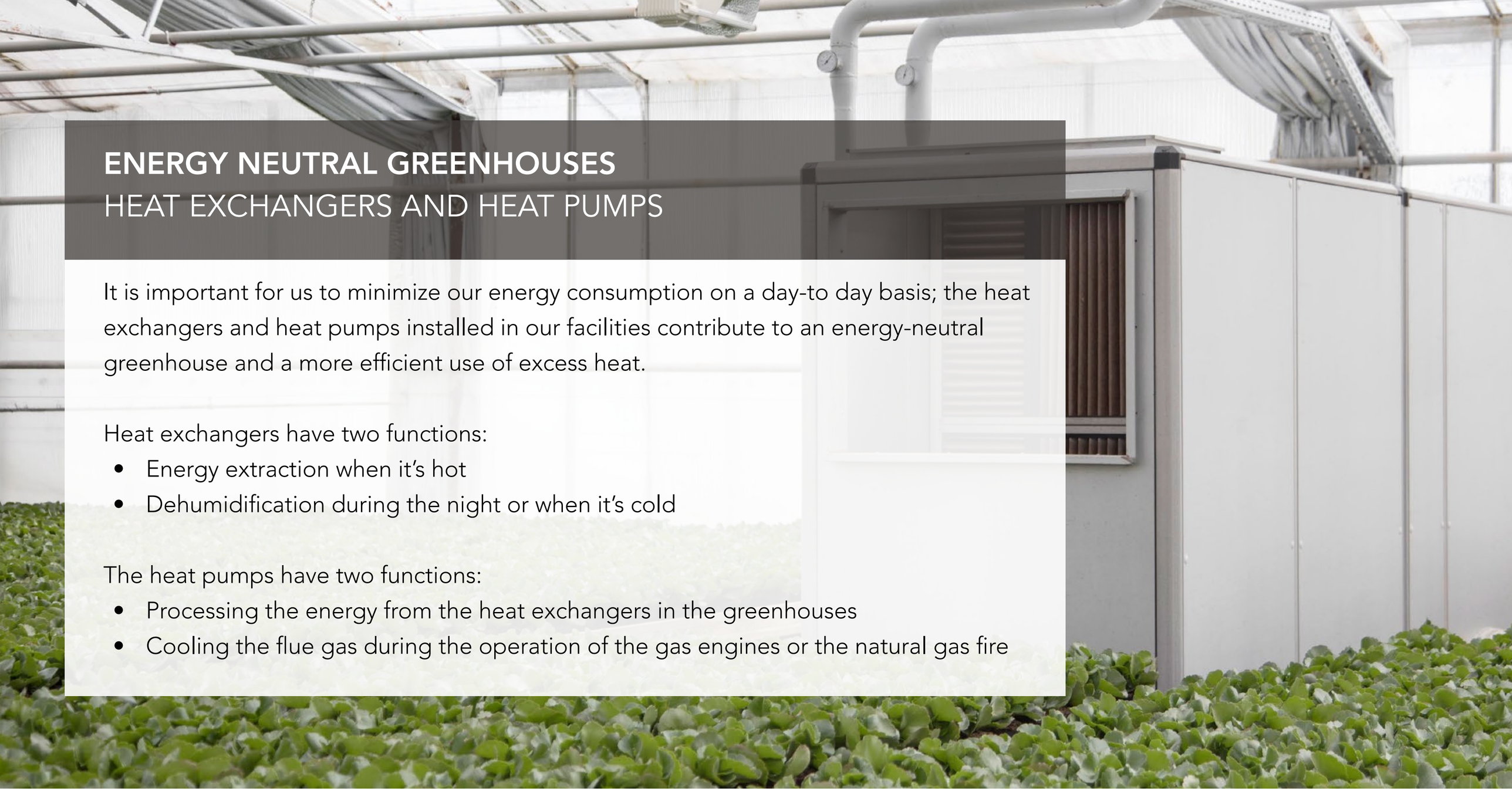
The water we recycle runs through sand filters, where organic matter, such as fungi and bacteria, are broken down at a microbiological level. The sand filters enable us to clean and recycle irrigation water.

WATER CONSUMPTION AND RECYCLING

WHAT HAPPENS TO THE WATER IN THE GREENHOUSE?

The plants are watered by flooding the tables that the plants sit on in pots, and here they absorb as much water as they need before it flows back through the sand filters - where it gets stored in large tanks ready for the next watering .The recirculating system is 100% closed. Plants release water into their surroundings just like humans and animals. The plants are the largest contributor to the humidity in the greenhouse; they emit a lot of water in connection with vital processes such as photosynthesis and respiration.

We collect the water which evaporates and condenses on the inside of the glass in the greenhouses. The condensed water is reused, and furthermore we take advantage of the energy in the water via the heat exchangers. When we dehumidify the greenhouses in this way, we avoid the traditional way of dehumidifying, using a combination of heat and ventilation instead, and by avoiding opening the windows we hold in the heat and save energy.



ENERGY NEUTRAL GREENHOUSES
HEAT EXCHANGERS AND HEAT PUMPS

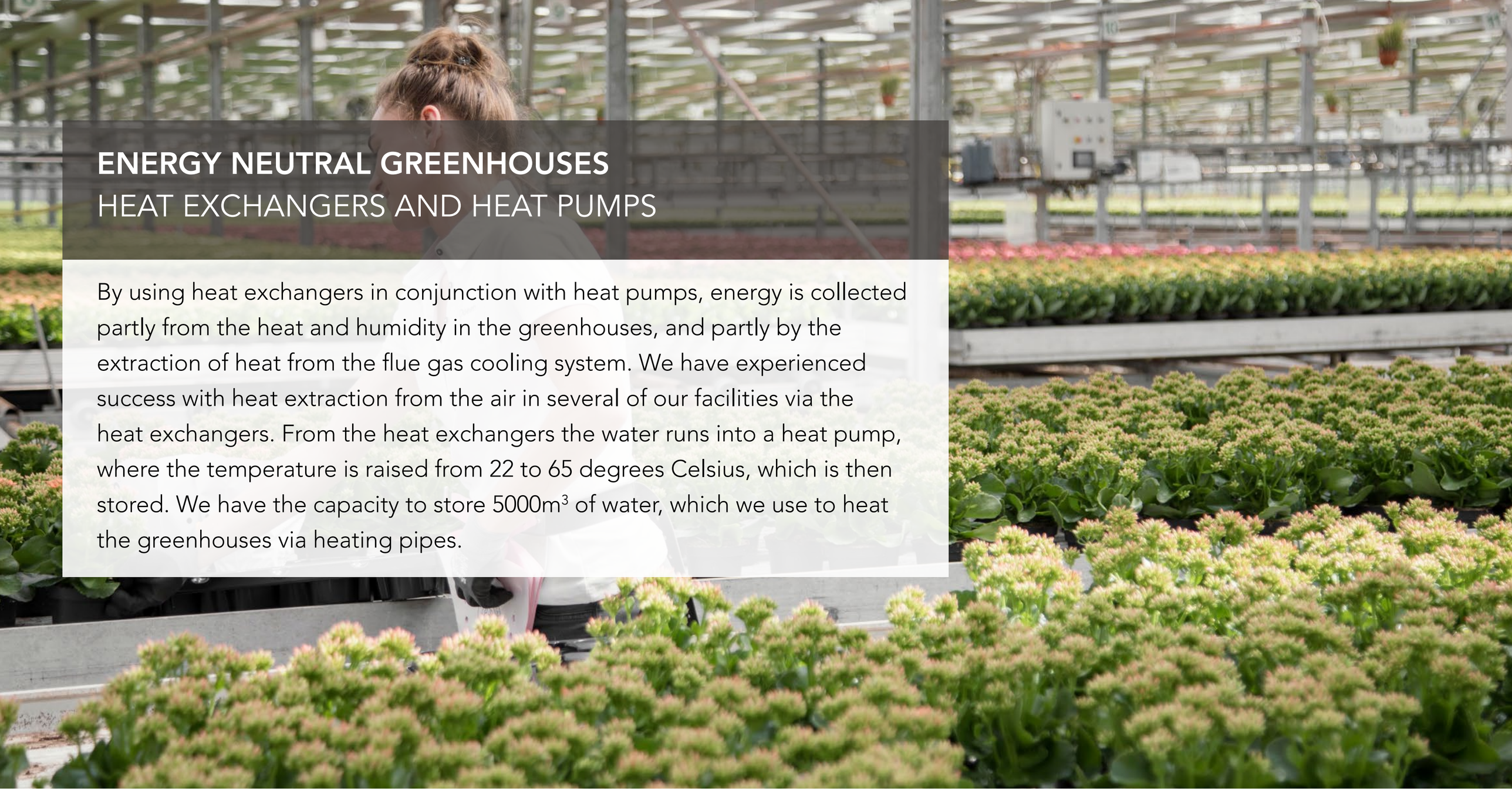
It is important for us to minimize our energy consumption on a day-to day basis; the heat exchangers and heat pumps installed in our facilities contribute to an energy-neutral greenhouse and a more efficient use of excess heat.

Heat exchangers have two functions:

- Energy extraction when it's hot
- Dehumidification during the night or when it's cold

The heat pumps have two functions:

- Processing the energy from the heat exchangers in the greenhouses
- Cooling the flue gas during the operation of the gas engines or the natural gas fire



ENERGY NEUTRAL GREENHOUSES

HEAT EXCHANGERS AND HEAT PUMPS

By using heat exchangers in conjunction with heat pumps, energy is collected partly from the heat and humidity in the greenhouses, and partly by the extraction of heat from the flue gas cooling system. We have experienced success with heat extraction from the air in several of our facilities via the heat exchangers. From the heat exchangers the water runs into a heat pump, where the temperature is raised from 22 to 65 degrees Celsius, which is then stored. We have the capacity to store 5000m^3 of water, which we use to heat the greenhouses via heating pipes.

ENERGY SAVING: GROW LIGHTS, LEDS AND MULTI-LAYER PRODUCTION

GROW LIGHTS AND LEDS

Throughout the years we have replaced the grow lights in the greenhouses, which have reduced energy consumption by 25%. Furthermore, we have invested in a program called DynaGrow. This program calculates how much extra light is needed in the greenhouse relative to the sunlight; plants must have a certain amount of light every day to achieve optimum growth. During the spring and autumn it is particularly important that they do not receive unnecessary light, which further reduces energy consumption. The amount of light supplied is adjusted according to weather forecasts over a five-day period, and this system results in the plants getting exactly the amount of light they need, no more, no less. Light turns on when electricity prices are lowest, and prices are lowest when the wind is blowing and when demand on the electricity grid is low. Consequently, the energy we use for production is primarily wind powered and therefore environmentally friendly.

In the newest production areas and greenhouses we use multi-layer production, this is only possible using LED lights. LEDs consume much less energy to deliver the same amount of light as traditional lighting, so electricity consumption is reduced, while at the same time making it possible to produce more plants using the same, or a lower amount of energy.

ENERGY SAVING: GROW LIGHTS, LEDS AND MULTI-LAYER PRODUCTION
MULTI-LAYER CURTAINS

In all greenhouses 2-layer insolation curtains are installed: a blackout curtain and a shade curtain. The second of which is used when there is too much sun, or if it is very cold outside; the curtain acts as insulation while allowing light to penetrate into the greenhouse. As the name suggests, a blackout curtain is used at night between the hours 17.00 – 07.00, and when the light drops below a certain level during winter months.

The control of the curtains is determined by the air temperature both above and below them; furthermore, they are affected by the heating pipes' temperature in the greenhouse. It is important to dehumidify under the curtains, this is where heat exchangers or dehumidifiers come into action.

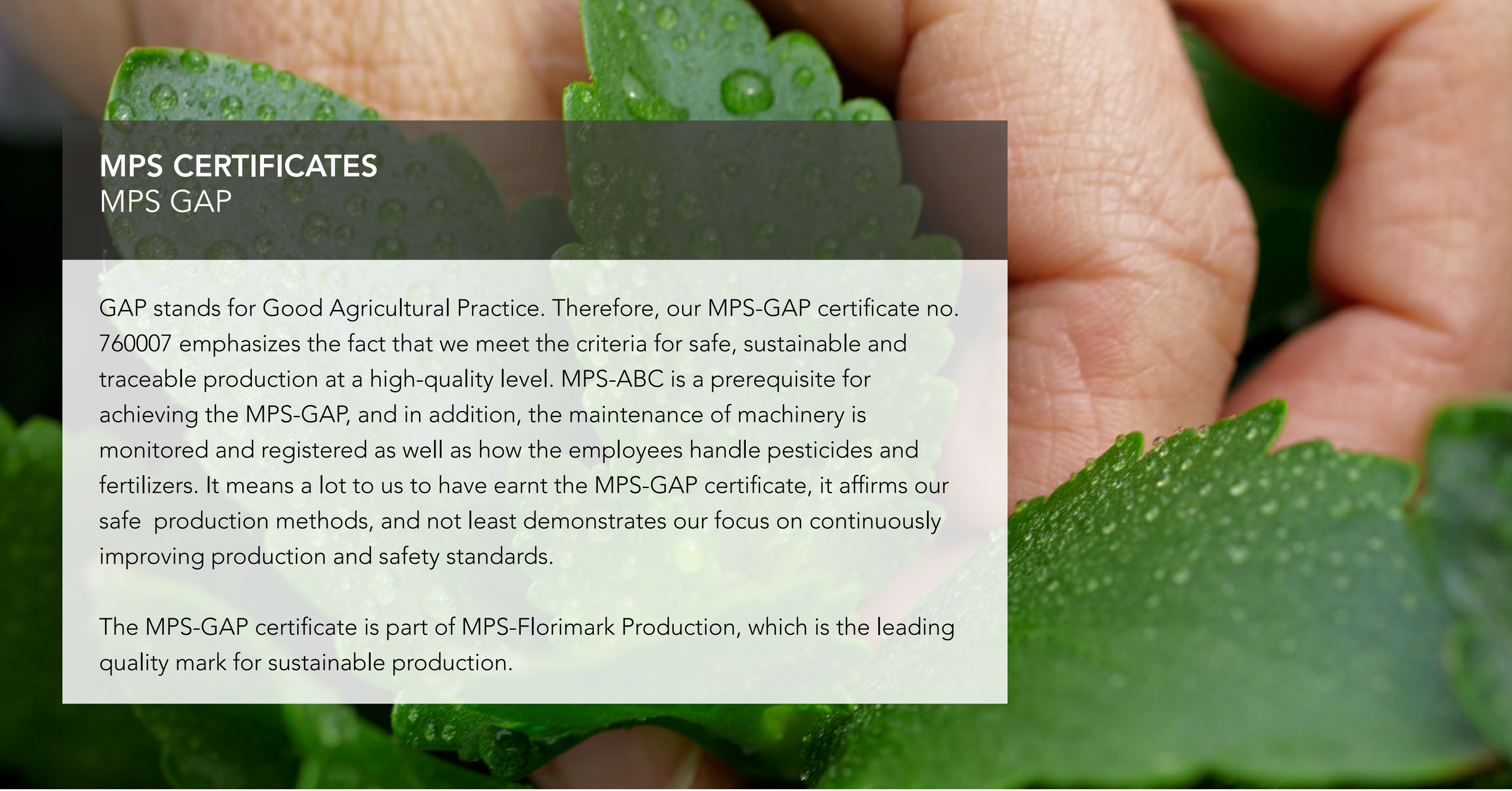
MPS CERTIFICATES

At Queen®, sustainability and business go hand in hand. The improvements we make for the sake of the environment are documented on a monthly basis, and the reports are sent to Milieu Project Sierteelt (MPS), who have since 1993, administered an environmental registration and certification program. MPS is an international authority which classifies how sustainable and environmentally conscious plant nurseries are. Therefore, at Queen®, we are proud to have earnt the MPS-A, MPS-GAP and MPS-SQ.

MPS CERTIFICATES
MPS A

As part of being certified by MPS, Queen® agrees to register its consumption of energy, fertilizers and chemicals in the greenhouses; various other categories of waste are also registered. Each month, members of the MPS program are allocated a number of points depending on whether consumption has fallen or risen relative to the specified limit values. Since Queen® joined the MPS program in 1998, MPS-A certified. Nurseries with more than 70 points are qualified for an MPS-A certificate, and our goal is to stay at the top.

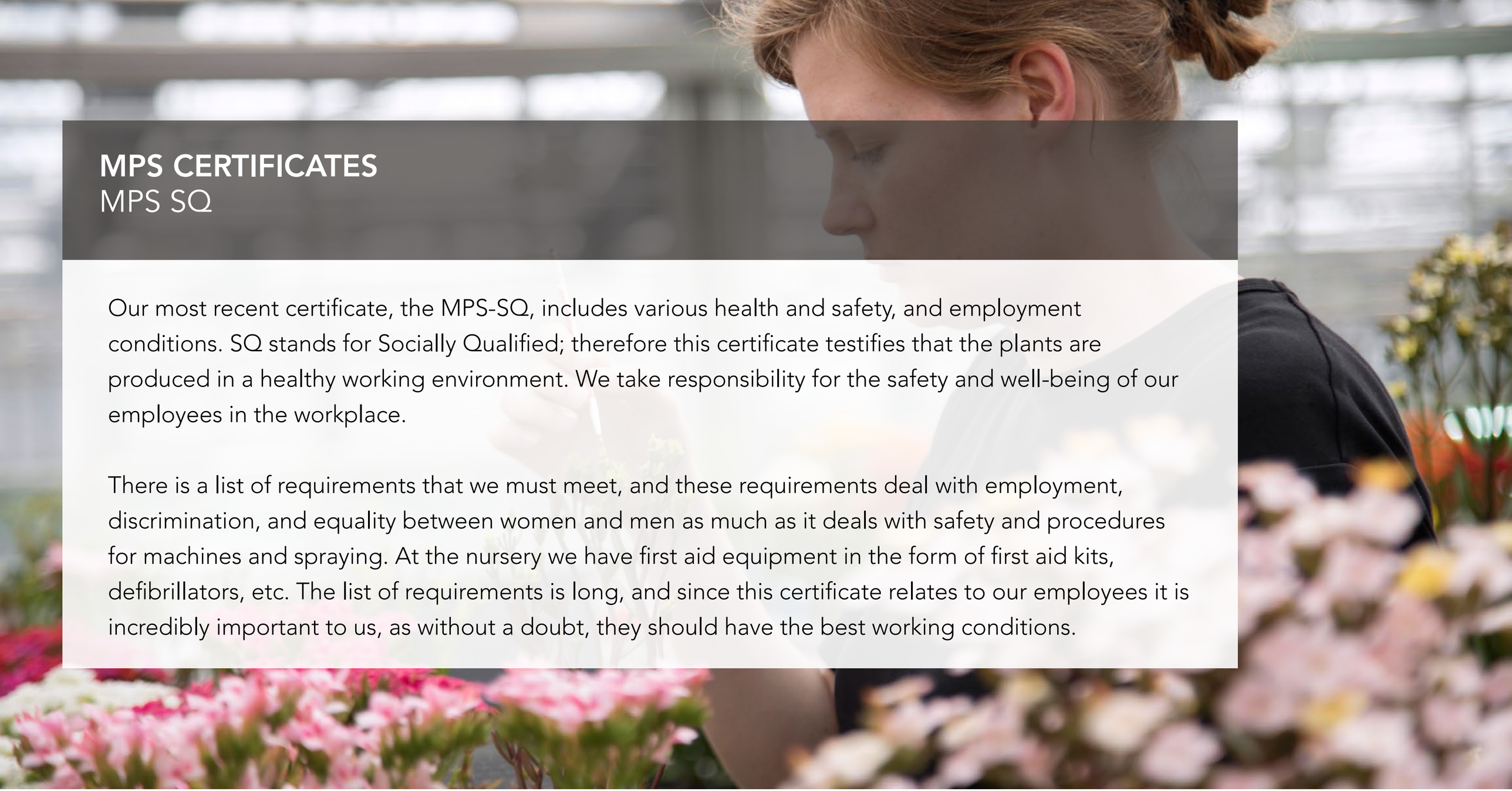
"Today, we pay close attention to our consumption, and continuously test alternative production methods that are kinder to the environment - without compromising on quality," says Frands Jepsen, Managing Director.



MPS CERTIFICATES
MPS GAP

GAP stands for Good Agricultural Practice. Therefore, our MPS-GAP certificate no. 760007 emphasizes the fact that we meet the criteria for safe, sustainable and traceable production at a high-quality level. MPS-ABC is a prerequisite for achieving the MPS-GAP, and in addition, the maintenance of machinery is monitored and registered as well as how the employees handle pesticides and fertilizers. It means a lot to us to have earnt the MPS-GAP certificate, it affirms our safe production methods, and not least demonstrates our focus on continuously improving production and safety standards.

The MPS-GAP certificate is part of MPS-Florimark Production, which is the leading quality mark for sustainable production.



MPS CERTIFICATES
MPS SQ

Our most recent certificate, the MPS-SQ, includes various health and safety, and employment conditions. SQ stands for Socially Qualified; therefore this certificate testifies that the plants are produced in a healthy working environment. We take responsibility for the safety and well-being of our employees in the workplace.

There is a list of requirements that we must meet, and these requirements deal with employment, discrimination, and equality between women and men as much as it deals with safety and procedures for machines and spraying. At the nursery we have first aid equipment in the form of first aid kits, defibrillators, etc. The list of requirements is long, and since this certificate relates to our employees it is incredibly important to us, as without a doubt, they should have the best working conditions.


THANK YOU