TOPSECTOR
HORTICULTURE & STARTING MATERIALS




Top Sector Horticulture & Starting Materials and the SDGs: practical examples

Top Sector Horticulture & Starting Materials

SUSTAINABLE DEVELOPMENT GOALS

Impact of the Top Sector Horticulture & Starting Materials on the Sustainable Development Goals (SDGs)

The Top Sector Horticulture & Starting Materials aspires to be the world leader in solutions for societal challenges in the field of horticulture, food and the green environment. Businesses, knowledge institutes and government work together in the top sector to make tangible contributions to the global challenges we are facing. From seed breeder to greenhouse builder and from vegetable grower to technology supplier, as a chain, the sector has a significant impact on food, energy and climate. Fighting hunger. Offering solutions for climate change. Making the world a better place. This sector works on these issues on a daily basis.

In the horticulture sector, we have been developing knowledge, methods and innovations to enable us to achieve "more with less" for many years now. More (and better quality) fruit and vegetables using fewer resources and less water. Our sector is a global leader in this field. And we have also developed many innovations that enable us to use energy more efficiently. Not only do we consume energy, we also generate it. These technologies are designed not only to improve efficiency and yield but also to make our sector more sustainable. Horticulture is an incubator for experiments in climate-saving measures.

In the field of energy supply, we are experimenting with geothermal energy, for example. It's a promising development that can't be applied everywhere, but the knowledge that we acquire will increase the potential for applying this technology both nationally and internationally. Just as spectacular are the results that we have achieved in the reduction of water consumption. We have reduced the amount of water required to grow a kilo of tomatoes to 4 litres (in other parts of the world around 60 litres are required). This is a significant result for countries where water is scarcer than it is in the Netherlands. We export our technology and knowledge to these countries, and we work with local partners on local sustainable solutions. The same is true of our knowledge and expertise in the field of greenhouse construction and glass technology. And in the field of crop protection, we have set ourselves the target of only using crop protection products in very exceptional cases by 2030. This further accelerates our efforts to breed improved plant varieties and make them resistant to pests and diseases. We also export this knowledge all over the world.

As a top sector, we bring together government, knowledge institutes and businesses. Because collaboration is essential. The businesses in our sector endorse the objectives set by the government. In our Knowledge and Innovation Agenda, we translate these social challenges into a number of missions and key technologies. The capacity for innovation is evident, amongst others, from our annual call for public-private research projects. Having consulted the businesses and knowledge institutes of which the top sector is comprised, the Dutch Government sets a target and we match funds from public and private sources to achieve it. The knowledge institutes and businesses subsequently work together to explore new opportunities and applications.

The Sustainable Development Goals (SDGs) defined by the United Nations in 2015 provide a practical framework for a wide range of initiatives and innovations. They are also an urgent invitation to governments, knowledge institutes, financial institutions and businesses to achieve impact for sustainability together. Our sector makes a significant contribution to the SDGs and related targets. This is clear from the wealth of successful, innovative solutions developed by the businesses in our sector. In this document, we highlight a number of prime examples of these innovations.

We want to demonstrate, through this publication, how hard the horticulture sector is working on new technologies and products and how much impact these innovations have on sustainability. We want to share our knowledge and experience, as well as to inspire all businesses, both in our own and in other sectors, and encourage them to get involved.

Loek Hermans,
Chairman of the Top Sector Horticulture & Starting Materials

Contents

1. Top Sector Horticulture & Starting Materials and the SDGs

"As the horticulture sector, with a large number of small businesses, together we make a significant contribution to sustainability, which we demonstrate through the SDGs - a language that is spoken the world over." - Gabrielle Nuijtens-Vaarkamp, Managing Director of the Top Sector Horticulture & Starting Materials

Sustainable development in the Top Sector Horticulture & Starting Materials

Making the world a better place. More sustainable. Without poverty and inequality. A world in which we put a stop to climate change. And in which food problems are solved. The United Nations expressed this vision in practical terms in 2015 through the SDGs. The businesses in the Top Sector Horticulture & Starting Materials have a clear policy on sustainability, which enables them to contribute directly to the achievement of these SDGs by 2030.

The Top Sector Horticulture & Starting Materials is at the heart of the sustainability debate. As a supply chain, the sector has a major impact on the continuity of safe food and a green living environment, on the use of clean energy and on innovative developments to achieve sustainable production. The supply chain includes a large number of innovative businesses. Not for nothing does the sector aspire to be the world leader in successful solutions for global societal challenges in the field of horticulture, food and the green environment.

This publication highlights a number of innovative projects, thereby demonstrating how the Top Sector Horticulture & Starting Materials as a whole has a major impact on the achievement of the SDGs. We show the progress that we have made, but we also want to hold up a mirror to ourselves and to inspire other businesses and sectors to get on board.

Dutch sector with an international outlook

Top sectors are fields in which Dutch businesses and research centres excel globally and in which the economic opportunities of social challenges are key. This is certainly the case with horticulture and starting materials: the Netherlands is top of the list of the most influential countries in botanical research. And the businesses in the Top Sector Horticulture & Starting Materials – breeders, propagators, growers, marketing organisations, auctions, traders, developers and suppliers, such as builders of greenhouses and related climate control systems – often come top globally in their respective fields. The Netherlands is the international trade hub for horticultural products and plant starting material. The Top Sector Horticulture & Starting Materials is therefore a unique network of businesses, knowledge institutes and authorities who work together on knowledge and innovation, internationalisation and the Human Capital Agenda.

Europe is the main market for horticultural products and starting materials from the Netherlands. With a view to further expansion, the Netherlands is increasingly focusing its attention on the global market. Businesses are active in the US, Asia and Africa, where the biggest growth markets lie. In the emerging economies ever more people are migrating to crowded cities. This puts pressure on liveability and this urban population has to be supplied with food. The Top Sector Horticulture & Starting Materials makes a vital contribution in this regard. Because the sector doesn't just export products, it also exports knowledge and even entrepreneurs. Many successful, innovative growers abroad are Dutch or of Dutch origin.

The Top Sector Horticulture & Starting Materials is in a strong position

- World leader in ornamental horticulture, propagation materials and greenhouse technology.
- World leader in exports of fresh vegetables.
- World leader in botanical research and solutions for food security and safety.
- Stringent sustainability requirements for horticultural products worldwide.
- Favourable climate for horticultural production.
- Strong international market position.
- Controlled supply chain that provides information on origin, cultivation methods, transport, authenticity, product content and safety.
- Healthy products (vegetables, mushrooms, fruit) for the prevention of chronic diseases such as diabetes, cardiovascular diseases, obesity and overweight.
- Healthy products (flowers, bulbs, plants, trees) for a healthier living and working environment.

The Top Sector in figures

Indicator	Amount (in € billions)	Proportion of Netherlands as a whole (%)
Production	17,7	1,4
Added value	9,8	1,6
Number of businesses	23.780	1,6
Number of employees	125.000	1,4
Export value NL	17	4,0
R&D expenditure in NL	0,31	3,3

Source: CBS Monitor Topsectoren 2017

A clear mission

If we are to be able to guarantee food security, biodiversity, health, water quality, the supply of freshwater and (water) safety in the future, innovation is crucial. The Netherlands is committed to a mission-driven innovation policy in which businesses are challenged to work together beyond the boundaries of sectors to find solutions. "Agriculture, Water and Food" is a key theme in this context, and various ministries, including the Ministry of Agriculture, Nature and Food Quality and the Ministry of Economic Affairs and Climate Policy, have translated this theme into missions. The aim is to make the sector more sustainable and to find an answer to the challenges of the future.

Missions	Examples of themes relating to the Top Sector Horticulture & Starting Materials
Circular agriculture	Zero emissions from plant protection products and nutrients to ground and surface water, circular use of nutrients in animal manure and products derived from water purification
Climate-neutral agriculture and food production	Use of geothermal energy, greenhouse horticulture as part of the smart grids and energy-neutral glasshouse horticulture
Climate-proof national and urban area	Encouraging and promoting sustainable use of water, for example, through the use of smart measurement, control and management systems, data and precision agriculture and by developing resilient plants and crops through breeding
Healthy, safe food that people value	A supply chain-wide approach to food waste, increasing the amount of healthy food available to consumers, with more plant-based proteins and a green living environment

2. Participating companies

The SDGs as the global sustainability agenda

The issues addressed by the missions on the theme of Agriculture, Water and Food touch (not entirely by coincidence) on the challenges as defined by the international sustainability agenda for 2030: the Sustainable Development Goals.

The SDGs are 17 goals that aim to make the world "a better place" by 2030. These goals are supported by 193 countries. So, they represent our shared global agenda. Everyone – businesses, local and national) authorities, NGOs, knowledge institutes and citizens – can help achieve these goals. The agenda and the goals are ambitious, so there's plenty to do! There are many opportunities for the Netherlands to contribute globally to the SDGs. Through knowledge sharing, support, trade and investments, for example. And with their wealth of innovative potential, the Dutch top sectors play a key role in this regard.

Underlying the 17 goals are 169 targets which set out what needs to be done if we are to solve the global challenges that society is facing today. SDG 2 (zero hunger), for example, has 5 targets that aim to end hunger, increase food security, improve the nutritional value of food and promote sustainable agriculture. The targets make the SDGs all-embracing and specific, and provide guidance on how to take action.

The SDGs are closely interlinked. For example, the sustainable and efficient use of resources during production (SDG 12) has a direct impact on the prevention of water shortages (SDG 6) and the reduction of our energy consumption (SDG 7). And the consequences of climate change and adaptive capacity (SDG 13) have a major impact on agriculture and, as a result, on the amount of food available (SDG 2). These links also occur in the horticulture sector and are highlighted in this publication.

The SDGs and the Top Sector Horticulture & Starting Materials

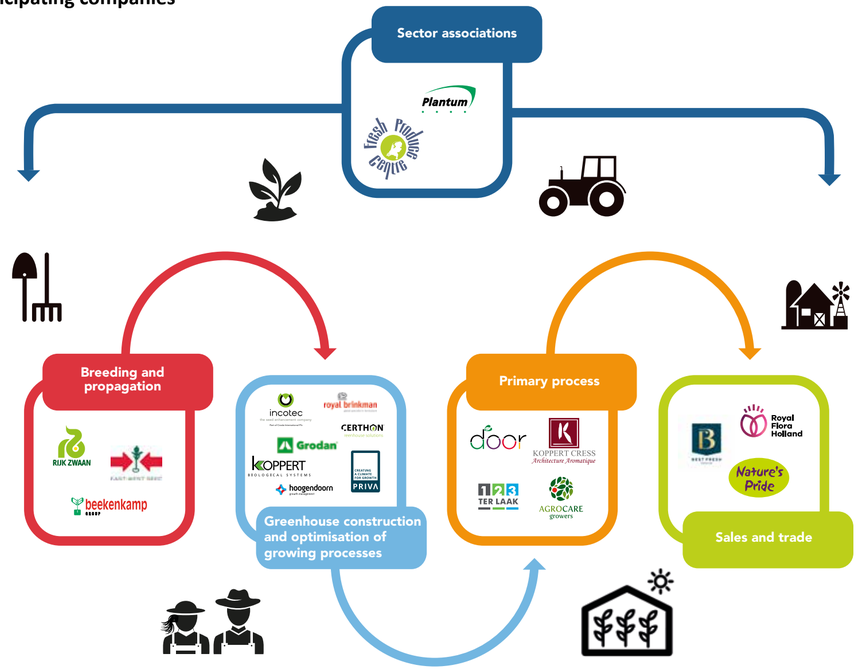
For each of the 17 SDGs we can name a project, process or product whose positive impact the Top Sector Horticulture & Starting Materials could enhance or whose negative impact it could reduce. However, some SDGs are more relevant than others, and there are some areas in which the sector can make a greater contribution than others. As a sector, we can make the biggest difference for the following SDGs:

This publication highlights a number of innovative projects. These are examples that demonstrate how the Top Sector Horticulture & Starting Materials as a whole has a major impact on the achievement of the Sustainable Development Goals. The aim of this publication is to inspire both ourselves and others to make headway on the SDGs.

The document is structured according to the company's position in the value chain: from breeding and propagation through the primary process (the growers) to greenhouse builders and companies that help optimise growing processes to sales and trade. We also interviewed two sector partners.

SDG 3 – Healthy Lives and Well-being – You might think this would be an obvious SDG for the horticulture sector. After all, healthy food is our business! But the targets for this SDG are all about diseases and epidemics, child mortality, reducing road traffic accidents and access to healthcare, so we have not included this SDG for the Top Sector Horticulture & Starting Materials.

2. Participating companies



Would you too like to contribute to the SDGs?
In the final chapter we give you tips & tricks for getting started with these 17 goals, or go to **www.sdgnederland.nl** or **www.un.org/sustainabledevelopment/sustainable-development-goals/**

3. Cases

Efficient production of ornamentals

Flowers improve air quality and reduce stress

"Bedankt voor de bloemen" (Thank you for the flowers). Every year, in a flower-strewn Saint Peter's Square, the Pope says these legendary words of thanks to the Dutch ornamentals sector. Dutch flowers are thriving, the world over. And that's a great thing, because flowers help create a healthy environment for people to live and work in. With its efficient, innovative growing techniques, the Netherlands is leader in the sector.

"Growing young plants is our speciality," says Peter Persoon, Managing Director of the Beekenkamp Groep. The family business produces 2 billion young plants annually, some 800 million of which are cuttings for chrysanthemums and pot and bedding plants. Beekenkamp delivers to growers, who grow the flowers and pot and bedding plants on for delivery to the consumer. Peter: "Separating these activities out makes the supply chain more efficient. Raising plants from seed requires different facilities to growing the end product."

Plants grown in Africa

Beekenkamp produces cuttings in Uganda and Ethiopia. Chrysanthemums are the core business, but there are more than a hundred other varieties in Beekenkamp's 36-hectare greenhouse too. Peter: "We breed to produce a good product in the Netherlands. Through the right crossings we create attractive flowers which grow quickly and are resistant to disease. We then plant parent plants in Africa, which we use to take cuttings from. The conditions in Uganda and Ethiopia are perfect. We make the best possible use of the local climate. During the day there's free heat and light from the sun. Sometimes we have to heat overnight for the pot and bedding plants. We use solar power for this. We store heat from the sun in a buffer tank, and use it when we need it at night. Lighting at night ensures that the parent plants don't bud too early. All our standard bulbs have now been replaced by energy-efficient LED lighting."

Potting the cuttings

"Three times a week a pallet of cuttings is flown to the Netherlands," Peter continues. "Because the cuttings don't have roots, they don't take up much space, so we can transport millions of cuttings at the same time. In the Netherlands we have 45 potting machines, which automatically pot the cuttings into pots. They then grow roots, and two weeks later they go to our customer to continue the growing process." In order to ensure that transport is efficient, Beekenkamp uses (and sells) crates which it has developed itself. Peter: "These go all over the world. Sometimes we find crates labelled with the name of one of our companies that hasn't existed for over 20 years. So, they last a long time. This durability is one of our strengths. We work globally, but we don't shout about it."

Social impact

"We're just a small part of the chain, but we realise that we still have a significant impact," says Peter Persoon. "More than 2,500 of our 2,900 employees work in Ethiopia and Uganda. Sustainable production in those countries makes our growing process extremely efficient. Clearly, we also want to do something in return for the local population, to create mutual understanding."

Beekenkamp:

- pays 10% to 30% more than the minimum wage.
- provides access to medical care for employees.
- sponsors childcare.
- provides workplace education, including sex education.
- provides healthy food in the workplace, including breakfast.
- builds wells in nearby villages.
- installs transformers for electricity in surrounding villages.

The examples from this case study contribute to the following SDGs:

SDG 8.8
Protect labour rights and promote safe and secure working environments

SDG 9.4
Sustainable and efficient infra-structure and industrial processes

SDG 12.2
Sustainable management and efficient use of natural resources

Helping small-scale farmers through knowledge of seeds and growing techniques

Better information, less hunger, more prosperity

Cucumbers, papayas, peppers, tomatoes, bitter gourds, kangkong and melons grow in Asia and Africa, mainly on plots of one or two hectares. Millions of small-scale farmers use high-quality Dutch seed to grow them. How do you increase production and their incomes further? Through free information, training and support.

"Many farmers in developing countries live in poverty. They are not getting the maximum from their soil. Often, they lack skills and basic knowledge of vegetable growing," says Maaike Groot from East-West Seed (EWS). The Dutch company supplies high-quality seed to 19 million small-scale farmers and is at the top of the Access to Seeds Index. "Information and training helps small-scale farmers increase their production. And, as a result, their income and standard of living. Plus, they produce for the local market, so they are important for food supply."

Field days and model farmers

Knowledge Transfer, as EWS calls it, is one of the company's five business pillars. Knowledge Transfer takes place in various ways: group training, demonstrations and training and support for model farmers. They act as role models for other small-scale farmers. Maaike: "We introduce hybrid seeds and modern growing techniques. And tell them, for example, about irrigation, growing seedlings in small trays, how to spread plastic film over beds, and that spacing may mean that you have fewer plants on an area but you get far more fruit. Through our Integrated Pest Management programme farmers learn to use pesticides in a responsible way. And we demonstrate, for example, that hybrid seed varieties produce a higher yield than traditional local seeds. We compare them growing them alongside one another in the same field."

Doubling of harvest

Hybrid seed and more modern growing techniques require a higher level of investment from the farmer. But the yield is always far higher. Maaike: "We breed not only for resistance to pests and diseases but also against the increasing heat and drought caused by climate change. The farmers see that our plants are more resilient. The fruit is more uniform and can all be harvested at the same time. As a result, the harvest quickly doubles in value."

[1] The Access to Seeds Index evaluates and compares seed companies according to their efforts to improve access to quality seeds of improved varieties for smallholder farmers. The Index seeks primarily to identify leadership and good practices, providing an evidence base for the discussion on where and how the seed industry can step up its efforts.

Living standard improves

The precise impact of the free transfer of knowledge by EWS is difficult to measure. It varies according to the country and the crop. "In more general terms: if farmers see that their yield and income is increasing, this has a major impact on an area. Other seed companies step in, as do all manner of suppliers, and an entire economy emerges and living standards improve. Children can go to school, and farmers buy themselves a smartphone and a motorbike, which gives them better access to the market. We actually see all this happen. Knowledge transfer also leads to more sustainable production and vegetables with a high nutritional value. For us, these are all reasons to scale up our knowledge transfer."

Soon 500,000 farmers a year

The information programmes are expensive and labour intensive. Maaike: "We can't do this on our own. In all the countries where we work we have partnerships: with government authorities, NGOs, universities, local businesses and donors. And we're always looking for new partners and donors." In 2018 EWS had direct contact with 100,000 farmers through its information programmes. The reach of digital information through social media is even greater.

"And we're also focusing increasingly on women, in Myanmar and India, for example. Within the next ten years, we hope to reach half a million farmers who, through the 'ink stain effect', will also have an impact on the environment around them."

The examples from this case study contribute to the following SDGs:

SDG 2.3
Increase the agricultural productivity and incomes of small-scale food producers

SDG 17.6
Cooperation and sharing of science, technology and knowledge with developing countries

Breeding varieties for a healthy future

Having an answer today to the issues of 2030

Breeding may relate to obvious characteristics: lettuce that does not discolour as quickly when you cut it, a cucumber with a firmer core or a smaller, more manageable cauliflower. But there's also another totally different side to breeding: creating robust plants that are resistant to external conditions and new pests and diseases. This is crucial if we are to be able to supply the global population of 2030 with healthy vegetables.

"Conditions are becoming ever more extreme, and the climate is changing," says Kees Knulst from Rijk Zwaan. "Some areas are becoming arid, while others are faced with flooding or soil salinisation. These abiotic stress factors have a huge impact on agricultural yield and, as a result, on the population. In the Netherlands we may feel the effects of a poor harvest in our pockets, but in other parts of the world a poor harvest can cause problems with food supply. Breeding is essential if we are to create robust plants that are resistant to such conditions."

Eating plenty of healthy food

At the same time, we are facing growing health problems, like diabetes and cardiovascular diseases," says Anneke van de Kamp from Rijk Zwaan. "Eating plenty of different vegetables is essential and reduces the risk of contracting these diseases. Supplying the growing world population with healthy food is a challenge, so it's great that vegetable breeding can help achieve this." Rijk Zwaan supplies over 1,200 different varieties of seeds for some 25 vegetable crops.

Investing and anticipating

"We believe that there is enough space on the earth to grow vegetables without putting too much pressure on vulnerable areas," Anneke continues. "The plants just have to be resilient enough to cope in difficult conditions, including due to climate change. That's what we're working on. For example, we're investing in the development of drought-tolerant and salt-tolerant varieties, so crops can be grown without much water or in brackish water. A variety that thrives in the Netherlands will probably grow less well in Africa, for example. We are developing varieties specifically for the various climate zones. Around 30% of our company's annual turnover is invested in research and development. That comes down to €10 million a month. As well as investments in research into drought and salt tolerance, a great deal of money is being invested in research around taste, yield, shelf life and resistance to pests and diseases."

Developing resistance

"A good example of our impact is our resistance breeding," says Anneke. "Downy mildew is a fungus that occurs in spinach and that increasingly evades resistance by adapting itself. We are constantly developing varieties that are resistant to downy mildew. And this reduces the use of crop protection products too. So, we're helping to make the vegetable supply chain and food supply more sustainable."

The examples from this case study contribute to the following SDGs:

SDG 2.4
Sustainable food production systems that increase productivity even in extreme conditions

SDG 12.3
Reduce food waste throughout the supply chain

Greenhouse cultivation is possible anywhere

CERTHON
Greenhouse solutions

Feeding the whole world with innovative growing systems

"How a tiny country like Holland, being half the size of the UAE, uses technology to not only feed itself but also the world, literally!". The Minister of Food Security of the United Arab Emirates was impressed: the hi-tech solutions provided by the Dutch horticulture sector prove their worth on a daily basis. And not only in the hot, dry climate of the Gulf.

The demand for healthy, fresh, locally produced products, 365 days a year is increasing the world over. A growing world population, climate change and a shortage of water require innovative growing systems. These come from the Netherlands and are sold all over the world. There's a solution for every situation. As in the Gulf: "The fully conditioned air and excess pressure in the SuprimAir greenhouse provide the perfect climate for growing healthy vegetables. Not only in the desert but in any climate," Lotte van Rijn from Certhon explains.

All over the world

Certhon designs and builds greenhouses and technical installations for greenhouse cultivation the world over. In deserts and in snowy regions, in wet polders and in earthquake zones, in urban areas and in remote areas. A greenhouse in the snow in Russia is quite different to a greenhouse in an earthquake zone in Japan. Or a fully sealed, odourless greenhouse in the middle of a residential area in the US. And an orchid greenhouse in the Netherlands is another thing again.

Food production must be increased

"The impact of climate change is becoming ever more obvious, especially for food production," says Lotte. "From drought to flooding, from warming to extreme cold. And close to home too. In countries like France and Slovakia the differences in temperature between summer and winter are getting bigger and humidity is being disrupted. All

these diverse and difficult conditions require specific food production systems. We're working on this, globally. Not only to make cultivation possible but also to optimise production."

Hi-tech farming is the future

One of these innovative cultivation systems is indoor farming. Certhon is researching and optimising daylight-free cultivation systems in its own Certhon Innovation Centre. Lotte: "In a daylight-free climate chamber, multiple growing layers grow on top of each other under water-cooled LED lighting. The technology can also be used for growing tall crops such as tomatoes, peppers and raspberries. A chamber like this is installed in an existing building, in the middle of a supermarket even. Indoor farming is the future, especially in urban areas. The sustainable growing process is beneficial for the propagation of young plants and the cultivation of mature plants, and is ideal for growing healthier vegetables and pesticide-free crops. "You have full control over the production process. In other words, over water and energy consumption too."

More with less

The more advanced the greenhouse, the more effectively the growing process can be controlled. Cultivation under glass already produces yields that are four times higher and uses thirteen times less water than cultivation in the open field. In a semi-sealed SuprimAir greenhouse, the yield is fifteen times higher and eighty times less water is used. In the various indoor farming systems, the ratios between input and output are even better. Lotte: "The art is to find the optimum growing solution for each area. We can't do this on our own. The entire horticulture sector is involved. We collaborate on this with seed supplier RijkZwaan and climate systems supplier Priva, for example. Our greenhouses and installations are part of the Dutch value chain, which delivers food all over the world."

The examples from this case study contribute to the following SDGs:

SDG 2.4
Sustainable food production systems that increase productivity even in extreme conditions

SDG 9.4
Sustainable and efficient infrastructure and industrial processes

SDG 13.1
Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

Sharing knowledge on optimum growth conditions for maximum harvest

hoogendoorn growth management

The plant is king

Three variables affect the optimum growth of plants: energy, water and nutrients. Traditionally, "green fingers" provided the optimum balance. Knowledge and experience was passed from father to son. This has made the Netherlands what it is today. But we have now progressed even further.

"Nowadays, we let the technology and the data do the work," says Freerk Visser, Managing Director of Hoogendoorn Growth Management. "The online analysis tool LetsGrow.com lets you use your green fingers in your business. We use computer models to determine exactly what a plant needs. And by sharing this knowledge and technology, growers can get more from their greenhouses using far fewer resources. In greenhouses in China, for example, the yield can easily double. And we also see increased yield in the developing countries where we supply our systems. In India and in African countries like Kenya, Tanzania, Ethiopia and Nigeria, for example."

Power to the plant

The technology is based on scientific research, initiated by three renowned scientists and endorsed by Hoogendoorn Growth Management. Freerk: "The principle is known as Plant Empowerment and it can be used to improve cultivation anywhere in the world. If a crop thrives, not only does it produce a higher yield but pests and diseases occur less frequently and you do not need to use as many pesticides. To achieve this, all you have to do is listen to what a plant wants. The opening of the stomata, photosynthesis – these are natural processes that already exist. Only the environment determines how you must apply the variables of energy, water and nutrients. Whether the environment be hot, cold, sunny or humid, we disseminate technology and knowledge for optimum growth conditions in all conditions."

Pressing the buttons

Plants grow best if the supply of energy and the availability of water, nutrients and CO_2 are in balance with each other. Everything is monitored by sensors. "In the Netherlands we're used to these systems," says Freerk. "Interpreting graphs and pressing buttons, that's our kind of horticulture. But if you build a hi-tech greenhouse like this in China, the yield won't double straight away. You need knowledge too. We deliver training worldwide, much of it through e-learning. On the plant and greenhouse climate, energy optimisation and water management, for example. And, of course, how these factors can be regulated in our greenhouse systems."

Cultivation support

The systems are complex, but there's a solution for this too. Freerk: "The LetsGrow.com platform uses collected data to indicate the optimum greenhouse settings, depending on your external influences. It works in Siberia, where it's –40° Celsius in winter, to China, where summers are hot and humid. The yield may not double straight away, but even if it only goes up by a few percent, it's still an improvement. And you can build on that. In a nutshell, we're working together to produce a higher yield of sustainably produced, safe and healthy food worldwide. Even in regions where food production may not be the obvious choice."

How big?

How big are the greenhouses? In the Netherlands, 10 hectares is pretty big. In China, there are greenhouses that cover an area of 50 or 100 hectares. And what about yield? In the Netherlands we sometimes get 100 kg of tomatoes per crop year from one square metre. In Mexico the best growers get 50-60 kg and in China sometimes they don't even get a kilo per square metre. Thanks to our knowledge and technology, these figures are gradually increasing.

The examples from this case study contribute to the following SDGs:

SDG 2.4
Sustainable food production systems that increase productivity even in extreme conditions

SDG 9.4
Sustainable and efficient infrastructure and industrial processes

SDG 12.2
Sustainable management and efficient use of natural resources

Striving sustainably for the maximum yield

incotec
the seed enhancement company
Part of Croda International Plc

An optimum start for the plant

How do you give plants the best possible start? By applying crop protection products and nutrients directly to the seed. In Europe, the US, South America and Asia they have been doing this for years. Now, seed technology company Incotec is also taking its technology to areas where the local population still have plenty to gain. To Ethiopia, for example.

Seed coating: this technology developed by Incotec, which is now fifty years old, is both logical and complex. Femke Appelman, Technology and Innovation Manager at Incotec explains: "The seed is covered in a layer of products to give it the best possible start and to protect it from pests, diseases or extreme conditions. These products can be nutrients, biostimulants or microorganisms, or crop protection products. We constantly gather data to make our techniques more predictable and more efficient."

Organic and biological crop protection

Applying the right plant protection product directly to the seed means that more seeds germinate successfully. "You only need a fraction of the product compared with traditional methods of crop protection. The difference can be as much as 90 per cent." The company is also developing organic and biological plant protection. "We use organisms to protect the roots more effectively against attacks from all kinds of harmful diseases. Ultimately, we strive for optimum yield with minimum environmental impact," says Communication Manager, Marion Smorenburg.

Getting to work in Ethiopia

Seed technology allows vegetables and field crops to be produced more efficiently, which results in a higher yield and a reduction in the use of pesticides. And, as a result, it also helps solve the global food problem. In Africa in particular it can have a major impact. Together with other partners such as Wageningen UR, Koppert Biological Systems BV and local Ethiopian partners, Incotec launched the Seed2Feed project in Ethiopia. Some 30% of Ethiopia's population lives below the poverty line. As Femke says, it's a challenging project: "It's all very well having a good product that's tried and tested, in this case our GeniusCoat product, a seed coating with added biostimulants, but you still have to make it useful to the local population. And then distribute the product and the knowledge that relates to it."

First consent...

In Ethiopia the technology was initially tested on corn, barley, wheat and chickpeas. Under the watchful eye of the country's government. "Because that's crucial," says Femke. "Without consent there's no project." Luckily, the government saw the value of the application and approved the launch of the product on the market. "On average, we achieve a 10 per cent increase in yield."

...then training and distribution

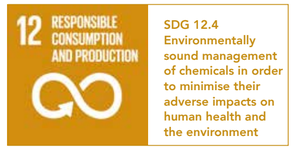
To enable it to supply, distribute and share knowledge relating to the product, Incotec sets up local networks of importers and distributors. Femke: "And we train people in how to use the technology. At all stages of the project you have to be patient and tread carefully. Every step that you take in the Western world takes more time and effort in a developing country. There's a lot of politics involved. And there are major cultural differences."

We still do it

"We do it in spite of this," Marion continues, "because we have a technology that can increase agricultural yields in countries where this is necessary to meet the demand for food." Incotec will soon be offering new solutions for Asia too, for the sustainable cultivation of rice. "That will be a similar challenge."

The examples from this case study contribute to the following SDGs:

SDG 2.4
Sustainable food production systems that increase productivity even in extreme conditions



SDG 12.4
Environmentally sound management of chemicals in order to minimise their adverse impacts on human health and the environment

SDG 17.7
Development and transfer of environmentally sound technologies to developing countries

Natural solutions produce more and healthier food

More biological solutions, fewer chemicals

Controlling pests and diseases in the greenhouse using predatory mites and ichneumon wasps; making plants more resilient using fungi in the soil and using bumblebees to improve pollination. The use of natural predators can enable a significant reduction in the use of chemicals in horticulture. That is better for the plant itself, for the people working with it and for the consumer.

Many insects and mites are extremely effective at controlling pests. Take the ichneumon wasp, for example. It lays its eggs in aphids, where they develop fully and leave the dead louse as a wasp. Pollination of plants by bumblebees is extremely efficient, nature does its work! The precision of the bees also increases yield and improves the quality of vegetables. "We want to reduce the use of chemicals in horticulture," says packaging technologist Paul Leistra from Koppert Biological Systems. "Because chemicals harm the plant too." But greenhouses are not always completely chemical free. "Sometimes the best simply isn't effective enough," says Paul. In that case, a grower can use a combination of beneficial insects and certain chemicals.

Tackling the problem at the root

It was cucumber grower Jan Koppert himself who became ill from the chemicals that he used to control spider mites. Searching for a natural solution, in the late 1960s he found a natural enemy of the spider mite: the predatory mite. Koppert Biological Systems launched this solution as an alternative to chemical insecticides.

As well as insects, certain fungi can also be used to reduce the use of chemicals in horticulture. Trichoderma, for example. This genus of fungi is applied to the roots and the growing medium of a seedling before cultivation. This encourages the plant to create a more branched root system, which causes it to take up more minerals from the soil and protects it from soil diseases, thereby ensuring significantly improved growth. Paul: "As a result, the plant is more resilient and fewer chemicals enter the soil."

Seed2feed

The Dutch horticulture sector is already doing a lot of work with insects, mites and fungi. Now, Koppert Biological Systems is also sharing this knowledge in Kenya, to help small-scale farmers improve their yield. Kenyan farmers often lose a significant part of their harvest through the use of cheap chemicals. To offer a solution to the food and poverty problems of these farmers, since 2016 Koppert Biological Systems – together with other Dutch companies – has been part of a Seed2Feed project in Kenya. Paul: "The programme shows farmers how they can increase their yields by using better varieties and biological control." "And, as a result, their income too, which again reduces poverty," says Executive Manager of the Koppert Foundation, Ed Moerman. Between 50 and 100 Kenyan farmers in this project have now learned how to use the Trichoderma fungus, how to catch moths using natural attractants, and how to control whitefly attacks using sticky traps.

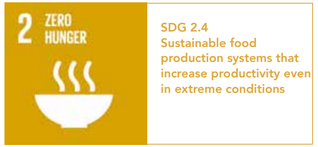
Knowledge sharing

As well as knowledge of the cultivation process, knowledge of the supply chain is important for the Kenyan farmers. Ed: "Often, the market is controlled by buyers. The individual farmer is dependent on what they will pay. We bring groups of farmers and buyers together to make this supply chain shorter and to ensure that a fair proportion of the added value goes to the farmers."

Bumblebees in a nutshell

- Bumblebees are big and hairy, so they transfer large amounts of pollen, through what is known as buzz pollination.
- Bumblebees can be used all year round, even in bad weather and on covered crops.
- Commercially produced bumblebees are mainly used on tomatoes, potatoes, raspberries, blueberries, stone fruit and pumpkins.
- In tomato crops, the use of bumblebees increases yields by an average of 30 per cent.
- Different (local) species of bumblebee are used for different regions.
- The production of bumblebees is strictly monitored by the authorities. Bumblebees always come with a veterinary certificate, in accordance with the requirements of the receiving country.

The examples from this case study contribute to the following SDGs:



SDG 2.4
Sustainable food production systems that increase productivity even in extreme conditions

SDG 12.4
Environmentally sound management of chemicals in order to minimise their adverse impacts on human health and the environment

SDG 17.7
Development and transfer of environmentally sound technologies to developing countries

Ultra-efficient cultivation: reduced water consumption and higher yields

Intelligence in the greenhouse

Hardware, software and algorithms bring intelligence into greenhouses. Automation and optimisation of the growing process makes food supply more sustainable. It gives rise to higher yields using fewer resources and less water. As a result, growers use between six and ten times less water than uncovered crops in the outdoors.

Powerful industrial computers make controlled horticulture possible. Growers can precisely control and manage the growing processes in the greenhouse. "The application of fertilisers, irrigation, energy management, climate and even tasks like harvesting and leaf cutting can be fully automated," says Maren Schoormans, who is responsible for strategy and business development at Priva. "That makes the growing process ultra-efficient. And in areas where there's a shortage of water and developing countries that's really important. In Senegal, for example, we're working with the largest grower of mangoes, tomatoes and avocados to purify polluted river water. This increases yields, produces healthier products and saves water."

Saving water

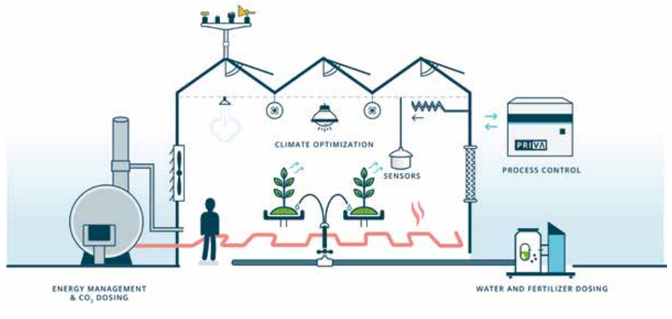
The supplier of hardware, software and services for climate and process management in China, for example, is helping with the automation of hi-tech horticulture. Maren: "But in China a lot of food is still grown in small lean-to greenhouses. Here too, Priva is helping to save water and to make the application of fertilisers more efficient. For example, we can manage multiple greenhouses (up to 40) using one system for the controlled addition of water and fertiliser."

Smart horticulture in urban areas

The majority of horticultural businesses are located in places where there is plenty of sun and cheap labour. Where water is scarce and poverty is never far away. Clearly, this is not sustainable. Why aren't there any greenhouses in cities? "There are some, you know," says Maren. "We're getting involved more and more in projects where food production plays a key role in the creation of cycles. In the US, for example, we're helping a grower utilise the residual heat and CO2 from a factory. Closer to home, much of the residential district of Hoogeland in Westland is heated by means of groundwater wells using residual heat from tomato greenhouses, while in the summer the wells are used to cool the homes and greenhouses. We make it possible to combine the processes that take place in the greenhouse with this supply of resources."

The Netherlands as a testbed

Over the next 30 years, every 3 months a city of more than 9 million people will appear somewhere. Many of these cities are found in a delta. The Netherlands too is a "city" in a delta. The CEO of Priva, Meiny Prins, is keen to demonstrate that the integration of food production in urban areas gives rise to social cohesion, a green environment, employment and economic growth. And it also fosters the development of a circular



economy. The Netherlands is a prime example of this. With our efficient food production system, we supply an area far bigger than the Netherlands with food. And we can also name countless examples of cross-sectoral innovations. The Floating Farm dairy farm in Rotterdam, for example. Or Delft Blue Water, a project which demonstrates that urban waste water can be purified and reused in the irrigation of food crops. Meiny: "The Netherlands is currently the greenest 'city' in the world and the Westland region is urban farming. We sell sustainably grown, healthy products within a range of over 800 kilometres. A city like Shanghai, with a population of 27 million people, would be delighted with such a fascinating and innovative ecosystem!"

The examples from this case study contribute to the following SDGs:

2 ZERO HUNGER
SDG 2.4
Sustainable food production systems that increase productivity even in extreme conditions

6 CLEAN WATER AND SANITATION
SDG 6.4
Efficient use of water and sustainable withdrawals of freshwater to address water scarcity

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
SDG 9.4
Sustainable and efficient infrastructure and industrial processes

12 RESPONSIBLE CONSUMPTION AND PRODUCTION
SDG 12.2
Sustainable management and efficient use of natural resources

Sustainable on three counts thanks to stone wool substrates

Deep roots make for sustainable growing process

Less soil, less water, less fertiliser, lower CO_2 emissions, but a significantly higher yield. That's precision agriculture. Stone wool substrates play a key role in this. When plants have their roots deep in the stone wool you can regulate the growth process in the best possible way. This is one of the sustainability benefits of cultivating plants on stone wool. But there are others too!

Fifty years ago an employee of ROCKWOOL – the parent company of Grodan – discovered that plants thrived on an untreated piece of insulating material that he had left outside by chance. Since then stone wool has been an integral part of hi-tech horticulture. "You can grow 45 metres of tomato plants on a 120x15x10 cm piece of stone wool," says Vincent Deenen from Grodan. "Clearly, that's something quite exceptional!"

Sustainable production of stone wool

Stone wool is made from basalt. "We only extract basalt from areas that have little natural value, so the impact is minimal," says Vincent. "Once we have extracted it, we restore the quarries in such a way that nature can thrive. We plant more trees, for example. In other words, we leave the area in a better condition than we found it. We have done this in three quarters of our old quarries in Germany." The basalt is converted into stone wool in ROCKWOOL's factory. "ROCKWOOL's core business is insulation. Every year we produce the stone wool using less energy," says Vincent. "We're constantly improving our operations by producing more using less energy."

Sustainable agriculture

Grodan has a number of stone wool products that enable precision farming. Vincent: "Our product is made for hi-tech greenhouses. Growing plants in stone wool requires less soil and less greenhouse space. Water can be recirculated, because the excess water doesn't just seep into the soil, it's collected in drainage channels. So you only need 4 litres of water for a kilo of tomatoes. Outdoors, it's 60 litres. And fertilisers are recirculated too. Sensors allow growers to see exactly what a plant has or has not absorbed. So, growing plants in substrates requires 20-25% less fertiliser. Also, given the higher yield, CO_2 emissions per kilo of tomatoes are about 10-15% lower."

Circular solutions post cultivation

Once the growing season is over, great piles of stone wool can be seen beside the greenhouses in Westland. People sometimes worry about the environmental impact of this. "They don't need to!" says Vincent. "We recycle everything. As a su-pplier, we feel it's our responsibility to do so. The roots taken from the stone wool are composted, which then serves as natural nutrients for other types of agriculture. Even the plastic round the stone wool is reused. It's made into new plastic bags. And it's also used in the automotive industry to make dashboards. And the stone wool itself, which accounts for by far the largest volume, is used to make fibres for bricks. That reduces the amount of clay that needs to be extracted. Not only that, but the firing temperature in the furnace can be a few degrees lower."

Global recycling is the objective

Grodan supplies growers in 70 countries, all over the world. And the recycling initiative is being rolled out in more and more countries too. Vincent: "Our main aim is to produce a good product for the grower, but we also feel responsible for related aspects. Globally, we recycle around 70% of what we sell annually to the food horticulture sector. In the Netherlands it's almost 100%."

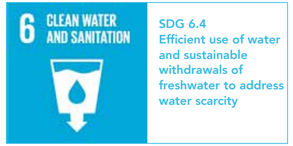
The life cycle of stone wool in a nutshell

- From one cubic metre of basalt you can make 50 cubic metres of stone wool.
- And on it you can grow 175,000 kg of peppers, 350,000 kg of tomatoes or a million cucumbers in a highly sustainable way.
- From the 50 cubic metres of stone wool that you have used you can produce 8 cubic metres equivalent of bricks.

Growing in substrate vs growing in soil

- 20-25% less fertiliser due to circulation and reuse.
- 10-15% reduction in CO_2 emissions per kilo produced because the yield is higher.
- 4 litres of water per kilo of tomatoes compared with 60 litres outdoors.
- 15-40% higher yield due to the optimum growing conditions of precision agriculture.

The examples from this case study contribute to the following SDGs:



SDG 6.4
Efficient use of water and sustainable withdrawals of freshwater to address water scarcity

SDG 8.4
Resource efficiency in consumption and production by decoupling economic growth from environmental degradation

SDG 12.2
Sustainable management and efficient use of natural resources

Sustainability is a prerequisite when developing innovations

Working together to improve greenhouse horticulture

The whole of the horticulture supply chain is working on improvements and innovations. Collaboration is crucial. The development of new technologies unites partners with a commitment to sustainability. In fact, sustainability is a prerequisite in the search for new solutions in the sector.

As adviser, installer and supplier of materials to horticultural businesses, Royal Brinkman contributes to innovative initiatives across the chain: from floating solar panels to data-driven farming, from hygiene and integrated plant protection to solutions for emission-free farming, from local procurement to circular packaging. Collaboration is vital in this context. Royal Brinkman drives sustainability in the horticultural sector, by bringing producers, growers and consumers together, and deciding together where there are opportunities to make things more innovative and more sustainable. In every phase of the growing process. "For us, sustainability is a prerequisite for innovation," says the company's innovation manager, Maartje Jung.

Biodegradable twine

For example, Royal Brinkman discovered a company that develops products from biodegradable polymers. "The material was tested for 3D printing. We thought it was a good alternative to the conventional plastic twine that is used to support tomato, pepper and cucumber plants while they are growing. And the manufacturer was keen to expand into horticulture," Maartje explains. "The project has involved partners throughout the supply chain. We brought together all the partners that were needed to refine the twine for glasshouse horticulture." It had to be possible to wind the twine round a hook, for example, and it had to be able to withstand the conditions found in greenhouses all over the world. "For example, it must not break or start to decompose if the plants take a bit longer to grow."

Organic waste becomes residual power

We're now three years down the line and Royal Brinkman is busy marketing the compostable twine, which is known as Bio Valent, to growers. What makes a sustainable product successful? A good business model, for all stakeholders. Bio Valent demonstrates that sustainability can benefit both the parties involved and the environment. Growers get the same high-quality twine and, once production is over, they can dispose of it as compostable waste at a cheaper rate. The twine and plant waste is easier for waste management companies to process. Processing is less labour intensive and cheaper. The organic waste can be used as residual power to produce compost or to develop new products, so it still has value.

Circular plant pots

Even at the end of the horticultural supply chain, the consumer, Royal Brinkman takes sustainability into account. By using consumers' plastic waste as a raw material for plant pots, for example. "Sustainability starts with better use and reuse of resources," says Mark van Antwerpen, product manager for Packaging & Design at Royal Brinkman.

"Our suppliers make recycled pots which we sell to our growers. We now have several circular plant pots in our range. A number of growers are already working with them. But we need to get more on board. It's not easy. Mark: "The colour of the material derived from household consumer waste varies slightly. So, here too, an integrated approach is key."

The examples from this case study contribute to the following SDGs:

SDG 8.4
Resource efficiency in consumption and production by decoupling economic growth from environmental degradation

SDG 12.2
Sustainable management and efficient use of natural resources

SDG 12.5
Reduce the amount of residual waste through prevention, reduction, recycling and reuse

Investing in local initiatives thanks to Fairtrade tomatoes

Colourful tomatoes brighten up the lives of Tunisians

In the middle of the Tunisian desert is a sea of greenhouses. Thirty hectares of them, to be precise. And every year another five hectares are added. More than 400 local people work in the greenhouses. The vast majority of them are women, including in managerial roles. And there will soon be a crèche for their children. The dentist visits and all employees have access to healthy food.

The greenhouses in Tunisia belong to Desert Joy, a subsidiary of the Dutch company Agro Care, which specialises in the cultivation of tomatoes. "Growing crops in North Africa has its advantages," says CEO Kees van Veen. "There's plenty of sun, so we hardly ever have to heat the greenhouses. Only at night really. So we can produce crops more cheaply than we can in the Netherlands."

Another million kilos every year

Operations in Tunisia are going so well that Desert Joy is expanding on an annual basis. "Every year we build another five hectares of greenhouses," says Kees. "We can easily get 20 kg per square metre from our hi-tech greenhouses. So, every year we expand by a million kilos. The tomatoes go to the Netherlands initially, and from there they're distributed all over Europe." Why don't you grow everything in the Netherlands, then? Or sell the Tunisian tomatoes over there? Kees: "We do grow the majority of our tomatoes in the Netherlands! And I hope that, ultimately, we'll be also able to sell tomatoes in Tunisia itself. In the meantime, our operations have a major impact on the country. We contribute to local employment and boost the regional economy. And, what's more, all our tomatoes from Tunisia have been Fairtrade certified since 2014."

Good employer

"We are the first Fairtrade-certified tomato company in the world," says Kees proudly. That means that Desert Joy offers its employees good terms and conditions of employment, such as a decent wage and equal rights for women. Kees: "The Fairtrade tomatoes from Tunisia are a bit more expensive than normal tomatoes. But the additional revenue goes straight back to the local people. So far, three projects have been funded. A kitchen has been built, so all our employees can have a good lunch every day, prepared by a chef, with ingredients sourced from local farmers, butchers and bakers. And the dentist visits on a regular basis – going to the dentist is not something that's taken for granted in Tunisia. And we're going to build a crèche. We have lots of women working for us. Often, they often have to stop work if they have children. If there's a crèche, they can carry on working with their child close by."

Water shortage

Kees is also aware of the disadvantages. The tomatoes are destined for the European market and are transported initially to the Netherlands. In addition, water is a scarce resource in the desert. Agro Care found a solution to both problems. Kees: "We transport the tomatoes without packaging, so we can get 20,000 kg in a truck. With packaging, we could only transport 10,000 kg. As far as water consumption is concerned, our greenhouses are ultra-modern and are just as good as the greenhouses we have in Westland. Water consumption is minimal. We only need 6-10 litres of water for a kilo of cherry tomatoes. Traditionally in North Africa growers would use ten times that amount."

Building the future

All the tomatoes produced in Tunisia are Fairtrade certified, but unfortunately they are not all sold as such, because supermarkets don't think consumers would be prepared to pay for them. Kees: "I hope this changes in the future, so we can make an even bigger contribution to local development. And perhaps we could grow some of our tomatoes for the local market!"

How much do Desert Joy tomatoes cost?
A tub of Fairtrade tomatoes costs about 15 per cent more than standard cherry tomatoes. Desert Joy invests all the additional revenue in projects that benefit the local population.

The examples from this case study contribute to the following SDGs:

SDG 8.3
Promote development-oriented policies that support productivity, entrepreneurship, innovation and access to financial services

SDG 8.8
Protect labour rights and promote safe and secure working environments

Using natural resources efficiently

Tackling the problem from both sides

Energy consumption is a controversial issue in the horticulture sector. "Yes, we are major users, but we're also leading the way on sustainability," says Jacques Wolbert from the DOOR cooperative. "The drive to make the sector more sustainable is coming from the sector itself. That makes us unique."

According to the Dutch Federation of Agriculture and Horticulture (LTO), 14.6 per cent of the energy in greenhouses must be sustainably generated by 2020. By 2030, this figure must be 47.8 per cent. Jacques: "So, to have achieved 22 per cent by 2018 is pretty good." This 22 per cent is based on a baseline measurement from 2018 taken amongst the 54 growers in the DOOR cooperative. In total they account for 570 hectares of greenhouse production. So, what's going on? "Wherever possible we use sustainable energy sources like geothermal energy and biomass and residual heat and residual CO_2 from industry or fellow growers. We also use water as efficiently as possible and look for new uses for our waste flows."

Reducing energy consumption with gas

Virtually all of the businesses in the DOOR cooperative use CHP (combined heat and power) to heat their greenhouses. Jacques: "Clearly, this is gas-fired but it's super-efficient because it uses all the residual flows. The generated heat and CO_2 enter the greenhouse – a flue gas cleaner separates pure CO_2 from the waste materials – and any excess electricity that is generated is returned to the grid. That way there are virtually no residual flows." There are a number of DOOR growers in the province of Noord-Holland. They use a lot of geothermal energy in that region. "Once the Trias well comes on stream, a large number of DOOR businesses in the Westland region will also be connected to geothermal heat. This is a great way of reducing the use of fossil fuels."

CO_2: Both the problem and the solution!

Just as people need oxygen to live, plants need CO_2. Using alternative heat sources means that no CO_2 is released. The solution is to reuse the gas from industry, where it's only a waste product – a win-win situation. Some 29 growers in our cooperative are already using it. The OCAP pipeline, for example, transports CO_2 from Botlek – where it's a waste product – to Westland where it's used as a raw material." The problem, however, is that this facility produces too little CO_2. "The shortage of external CO_2 is the biggest obstacle to making horticulture more sustainable."

Careful with water

Rainwater is captured in basins and used as irrigation water for the plants.
All 100% of the water and the nutrients that the plants don't use is recirculated and reused. But innovation goes further than that. "Underground water storage is a solution for storing excess rainwater when above-ground buffers are full," says Jacques. "Four growers have jointly invested in water storage in an underground aquifer. These are not

tanks in the ground, they are natural pockets of water that are topped up in the event of an excess of water and from which water is drawn if there is a shortage of suitable irrigation water. That way, high-quality irrigation water is always available."

Working with your neighbour

Water storage is a good example of making things more sustainable by working together. Jacques: "It happens a lot. A fertiliser factory in Terneuzen, for example, supplies excess heat and CO_2 to two of our growers in the area. And Microsoft's new data centre in the province of North Holland will supply residual heat to local growers. By using the greenhouse as a source of energy, heat is stored in the summer so it can be used to heat the greenhouse in winter. So, clearly, the horticulture sector is a key player in the achievement of energy and climate targets."

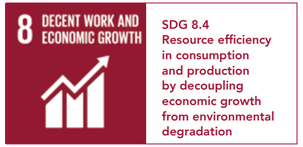
Where are we now?
Of our 54 growers:

- 60% are working on a sustainable energy project.
- 17% are already connected to geothermal heat.
- 6% are already connected to residual heat.
- 7% are exploring the options.
- 10% are not actively working on anything.

The examples from this case study contribute to the following SDGs:

SDG 6.4
Efficient use of water and sustainable withdrawals of freshwater to address water scarcity

SDG 7.2
Encourage the use of renewable energy



SDG 8.4
Resource efficiency in consumption and production by decoupling economic growth from environmental degradation

SDG 12.2
Sustainable management and efficient use of natural resources

From residual heat through geothermal heat to a hydrogen power plant

KOPPERT CRESS
Architecture Aromatique

On the way to gas-free greenhouse horticulture

With smart use of geothermal heat, residual heat, harvested heat, pipelines and aquifers, soon the whole of Westland could be gas-free. Water plays a key role in this. "Once the province of South Holland 'heat roundabout' is up and running we'll be able to store hot water from industry here all year round," says Rob Baan from Koppert Cress, whose operations are already gas-free.

The greenhouses of Koppert Cress in Westland produce almost 70 different varieties of cress. They don't all grow in the same climate. "We get the plants from all over the world. In our greenhouses we mimic the different climates in which they grow," says Koppert Cress Director, Rob Baan. The company's micro-vegetables find their way to some 70,000 restaurants (including leading ones), most of which are in Europe. "So we have to make sure we produce the same high-quality produce all year round."

Recirculation and reuse

To do this, the company uses an energy and heat management system that, over the years, has been ever more finely tuned. Innovation and sustainability always come first. In the greenhouse that's being built at the moment, for example, the main priority is recirculation, reuse and recycling. Rob: "Why? My customers demand it. And so do my children." In the summer the greenhouse is cooled by cold water from a water source known as an aquifer. In the winter the greenhouse is heated with warm water. This water comes from an underground well 170 metres below the surface. The company stores it there in the summer as residual heat from the greenhouses.

From 25°C to 40°C

Rob: "Our new greenhouse is eight metres high. Making a greenhouse higher costs a bit more but it gives you a lot more air. That makes the greenhouse climate more stable and, in the summer, we can now harvest far more heat. We try to reuse all the heat flows that we produce. Everything from the LED lighting to the body heat of our office staff. All this heat goes into the ground." Koppert Cress also has a licence to inject water at 40°C rather than the standard 25°C. "Water that's at 25°C has to be heated up further. 40°C, on the other hand, is hot enough to heat our greenhouses in the winter as it is."

Heating houses too

The licence to raise the temperature from 25°C to 40°C is temporary. If the pilot does not have a detrimental impact on the ground, the temperature will be raised on a permanent basis. This could save up to 400,000 cubic metres of natural gas and 900,000 kg of CO_2. Rob: "But what I'd really like is water at 60°C. Then horticulture could be used to heat houses too." He makes reference to the new Polanen heating cooperative. "They are looking at the possibility of a geothermal well with a loop that would connect

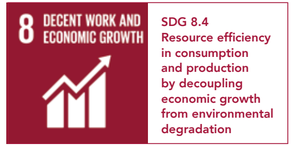
25 businesses. If they are successful, I can fill my aquifer up in the summer with that hot water and, in the winter, I can give any heat that's left over to the city."

Own hydrogen power plant

Rob is also expecting great things from the South Holland "Heat Roundabout": a network of pipelines in which water transports heat from the Port of Rotterdam and industry to greenhouses and the city"This 'roundabout' will allow us to store industrial heat all year round and use it in our greenhouses." All of these initiatives constitute a breakthrough in the use of energy in greenhouse horticulture. But Rob wants to go one step further: to have his own hydrogen power plant. "Imagine if every horticulture business had one ...".

The examples from this case study contribute to the following SDGs:

SDG 7.2
Encourage the use of renewable energy



SDG 8.4
Resource efficiency in consumption and production by decoupling economic growth from environmental degradation

SDG 12.2
Sustainable management and efficient use of natural resources

Solar-powered greenhouse is ready for use

More sun, less gas

Solar power is sustainable, clean and inexhaustible. And it's free! So it's perfect for increasing renewable energy's share in the energy mix of greenhouse horticulture. In its brand new "daylight greenhouse", Ter Laak Orchids harvests energy from sunlight, thereby saving 45-50% a year on fossil fuels.

Ter Laak Orchids produces eight million orchids (Phalaenopsis) a year in greenhouses covering an area of 17.5 hectares. Three million of them are grown in a brand new greenhouse known as a daylight greenhouse, which is the most energy-efficient greenhouse currently available. At five hectares, it's the only daylight greenhouse of its size. The greenhouse was developed by Technokas in conjunction with Wageningen UR and Ter Laak Orchids. "We had a first 4,000 m2 demo type built in 2014. This performed extremely well in terms of the energy that it saved. The greenhouse has now been refined based on our insights," says Edith Bentvelsen, Managing Director of Ter Laak. The technology is now so advanced that less energy-intensive plants can already be grown in the greenhouse in a fully energy-neutral manner.

Optimal use of the sun

At the heart of the innovation is the double-glazed greenhouse roof. The 16 Fresnel lenses in the south roof concentrate the sun's rays on pipes that contain running water. This causes the temperature of the water in the pipes to increase from 20°C to 50°C . To ensure that the sunlight is utilised to the full, the pipes move according to the position of the sun. The water can be used immediately or stored in four ground source wells for use at a later date, at night or in the winter, for example. The thermal storage, in combination with heat pumps, serves two output systems, including air-conditioning units for Next Generation Growing initiative.

3,000 tonnes less CO_2

Edith: "We constantly measure the heat that we harvest. On sunny days we can reach a peak output of 13 MW. The energy that we harvest is fully reused. Not only in the daylight greenhouse but also in our other greenhouses. As a result, we currently save 30 m3 of natural gas equivalents per square metre. And this leads, in turn, to 1.8 kg less CO_2 for each cubic metre of natural gas. In total we save 3,000 tonnes of CO_2 a year."

The lenses intercept the direct sunlight and provide diffuse light to the greenhouse. Edith summarises the benefits as follows: "We don't have to use screens as much, we don't have to use as much lighting in the winter and we keep the temperature under control better. This all saves energy."

Better plant quality

The 45-50% saving on fossil energy that the daylight greenhouse provides does not have an adverse effect on the quality of the Phalaenopsis. "With diffuse light, the light is distributed evenly over the greenhouse. The plants won't grow more quickly as a result but they will be stronger and the quality will be better."

According to greenhouse builder Technokas, the daylight greenhouse is now out of the test phase and is ready for a broad market launch. Edith: "Groups from all over the world who are interested in the innovative new daylight greenhouse visit us to find out more about our experiences."

Encouraging innovation on an ongoing basis

Ter Laak Orchids is building an inspiration centre next to the daylight greenhouse, which, once it is built, will tell visitors the story of the grower's work in the field of sustainability: 660 solar panels (180,000 kWh), the use of LED lighting, combined heat and power and the purchase of OCAP CO_2 from industry. "And, every year, we collect some 100 million litres of rainwater in an underground water tank. Rainwater is the best for our plants," says the managing director. The company won the government's EZK Energy Award 2018 for its pioneering role in the development of the daylight greenhouse. "We hope that our inspiration centre will encourage innovation on an ongoing basis."

The examples from this case study contribute to the following SDGs:

Eat healthily, don’t waste

Sustainable use of our natural resources

A wonky pointed pepper, an avocado with a dent in it, an aubergine that’s nearing its sell by date. All of these are perfectly edible but are no longer suitable to be sold. The horticulture sector is committed to producing high-quality products with a long shelf life. Although we want to cut food waste as much as possible, some waste within the production chain is inevitable. What are we doing about this?

“Clearly, reducing your negative impact is important. But what is even better is if, at the same time, you can also create positive impact. We reduce negative impact by fighting food waste,” Emma den Ouden from Best Fresh explains. “The vast majority of waste is generated by the consumer. The right packaging and growing high-quality fruit and vegetables improves the shelf life of the products, thereby helping to reduce waste. But, as a chain, inevitably we also produce products that are not suitable for the supermarket. It doesn’t feel good to simply throw these away.”

Round the table

“In March 2018, a number of partners from the sector got together to discuss the idea of a collection point for fruit and veg. The idea was supported by a number of partners from the sector and also by the Ministry of Agriculture, Nature and Food Quality. This gave rise to the Fruit & Veg Brigade (Groente & Fruitbrigade), a group of some 20 volunteers. A room on the premises of ABC Westland was made available. Commercial companies like Best Fresh, as well as growers and cooperatives, deliver fruit and vegetables that are no longer suitable for sale to the collection point. This fruit and veg is then made into food bank packages via a distribution centre. It’s a two-way thing: the food banks get fresh produce and we waste less: it really is win-win.”

Not thrown away

The packages contain products that people on low incomes often can’t afford. Emma: “They’re now eating a more varied and therefore a healthier diet. The figures? In six months, the ‘brigade’ has collected more than 250,000 kg of fruit and veg. Every week, some 10,000 clients are provided with fruit and veg. In 2018, Best Fresh supplied 147,294 kg, about 0.1% of our total volume. What we’re supplying people with here would have gone in the bin! We’re really proud of this joint regional contribution. In Westland, businesses in the sector often work with each other - we’re more than just each other’s competitors. We’d like to expand this initiative to national level. There are already plans to fight food waste in this way throughout the Netherlands!”

Global standards

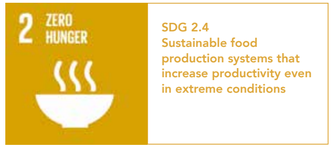
The Dutch Horticulture & Starting Materials sector has operations all over the world. Exotic produce is good to eat, but the sustainability that the supply chain is striving for here only has value if people in other countries do business sustainably too. Businesses are increasingly aware of this issue.

Yex is an importer of exotic produce and part of Best Fresh. Clearly, its products come from afar. “Sustainable sourcing is a major challenge in high-risk countries,” Malou Bakuwel from Yex explains. “You can’t always just control how people do things on the other side of the world. But that’s what we want to do, so we can guarantee maximum sustainability within the chain. And our customers and consumers demand it too.” Yex and FV SeleQt are members of the SIFAV (Sustainability Initiative Fruit & Vegetables). As are many retailers, suppliers and other partners. “The covenant is hosted by IDH (Sustainable Trade Initiative). They provide committed partners that get involved with the initiative and take SIFAV forward. Every year we set new targets. They keep us focused.”

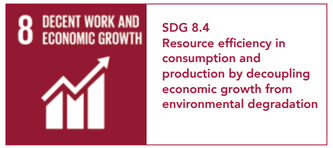
Greater insight means greater responsibility

Malou: “The main aim now is to achieve robust certification. The suppliers are visited by independent auditors. They supply data and insights into the supply chain. This makes things more transparent for us and enables us to take responsibility. Through these insights we know where the risks lie and we can take action to address them in a well-informed way. SIFAV is currently also busy developing further objectives with working groups in the field of social and environmental issues for 2020 onwards. As a young business, we are committed to a sector-wide initiative for, ultimately, 100% sustainable procurement by 2020. I believe this is something we should be really proud of.”

The examples from this case study contribute to the following SDGs:



SDG 2.4
Sustainable food production systems that increase productivity even in extreme conditions



SDG 8.4
Resource efficiency in consumption and production by decoupling economic growth from environmental degradation

SDG 12.3
Reduce food waste throughout the supply chain

SDG 12.7
Promote public procurement practices that are sustainable

Improving local working conditions and fighting food waste

Know what you're eating

Ready-to-eat mangos and avocados, asparagus and other exotic fruit: all very tasty, of course. But importing these exotic fruits from South America, Africa and Asia makes for a long supply chain. Supplier Nature's Pride is committed to sustainability, in the field of working conditions and food waste, for example.

"Ever since we were first set up 18 years ago, Nature's Pride has been working with its growers worldwide to improve their living and working conditions," says Erik Molendijk, Manager Sustainable & New Business. "Decent working conditions are a priority for us, but we're also working on things like employment for women and the development of communities."

Continuous improvement

You can't improve working conditions overnight. Nature's Pride has been working on it for years. Erik: "We follow the regulations of the Sustainability Initiative Fruit and Vegetables (SIFAV) and aim to make our imports 100% sustainable by 2020. The target for 2018 was 80%. In 2019, we will achieve 90%. That makes us leaders in our field. But certification is not a goal in itself; it's a means to an end – better working conditions – and one of the seven pillars in our integrated sustainability plan up to 2023." Nature's Pride keeps a record of exactly where products come from: the locations of fields and warehouses, what certification they have and the results of audits. "We know what's going on with our growers and the best way to support them." Nature's Pride employs a number of advisers for this purpose. "They know the local situation and provide tailor-made advice."

Fighting food waste

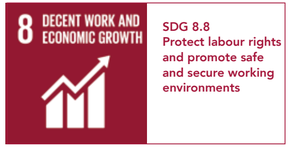
Another important strand in Nature's Pride's sustainability policy is reducing food waste. Erik: "We do this by extending the shelf life of products, for example. We're working on this with Apeel Science. They have developed a 100% plant-based coating which we can apply to our avocados, for example. This layer keeps moisture in and oxygen out. This slows down the deterioration process, so the avocados can be kept for twice as long. This reduces the risk of waste by both Nature's Pride and the supermarkets. And consumers can keep their avocados in their fruit bowls for longer. We expect this new technology to reduce waste in the supply chain by at least 10%. It's a game changer! These avocados will be in stores by mid-2019."

From plane to ship

And, what's more, the coating means that soon some products will no longer need to be transported chilled. That's better for the environment and financially. "And soon we'll even be able to transport some products, like asparagus, by ship rather than by plane. That will significantly reduce our CO_2 footprint."

The examples from this case study contribute to the following SDGs:

SDG 2.3
Increase the agricultural productivity and incomes of small-scale food producers



SDG 8.8
Protect labour rights and promote safe and secure working environments

SDG 12.3
Reduce food waste throughout the supply chain

How sustainable are my plants and flowers?

Digital marketplace leads to greater transparency

Where do their plants and flowers come from, how sustainable are they and what pesticides have been used? Consumers want to know more and more. The Royal FloraHolland cooperative is committed to transparency in the supply chain. Digitisation of the marketplace will really help with this.

Royal FloraHolland brings together some 4,000 growers, both nationally and internationally. Via Royal FloraHolland's marketplace, the plants and flowers find their way to retailers and, ultimately, to the consumer. Sustainability is becoming increasingly important to consumers. Luckily, the same is true of most growers. Maarten Bánki, Manager Sustainable Development & Quality at Royal FloraHolland: "Often they are family businesses. They want to be able to hand their business over to the next generation in good shape. And that includes using natural resources, like water, responsibly. We call this good stewardship."

Digitisation of the marketplace

As a major player in the sector, Royal FloraHolland is keen to improve transparency in the supply chain. This is done in various ways. For example, the cooperative is currently strengthening the physical marketplace and developing a digital marketplace. "With the digital marketplace, buyers can see the products on offer from behind their screens." The aim is to make as much product information available as possible. And that includes information on sustainability and quality. "That way, buyers can make a sustainable choice in a well-informed way."

Recycling plastic packaging

Royal FloraHolland plays a key role in the development of ultra-efficient and sustainable packaging across the supply chain. On 21 February, the cooperative signed the Plastic Pact: a collaboration between the Dutch Government and 75 leading businesses that aims to make the use of plastic more sustainable. The Pact's year of reference is 2025. By 2025: single-use packaging must be 100% recyclable; there must have been a 20% reduction in the use of plastic; it must be possible to recycle a minimum of 70% of all single-use plastic products and packaging without loss of quality. And all single-use plastic products launched on the market must comprise of at least 35% recycled plastic. Almost 86% of flowers are transported in reusable packaging; most plants, however, are still transported in single-use packaging.

Transparency helps growers stand out from the crowd

Transparency also offers growers opportunities. It allows them to respond to the growing demand for sustainable products, for example. Certification is increasingly important in this regard. It allows growers to become a preferred supplier of major exporters and their retail clients. The sector-wide FSI 2020 initiative helps producers choose the right sustainability certification for their market. Maarten: "Take environment registration, which includes the registration of plant protection products, for example. That's a topical issue. The market requires growers to do this properly and to obtain the necessary certification. We help growers with this. We help them be more transparent. And being transparent helps them stand out from the crowd in the marketplace."

Ministry of Infrastructure and Water Management | February 2019

The examples from this case study contribute to the following SDGs:

SDG 12.4
Environmentally sound management of chemicals in order to minimise their adverse impacts on human health and the environment

SDG 12.5
Reduce the amount of residual waste through prevention, reduction, recycling and reuse

SDG 12.7
Promote public procurement practices that are sustainable

Smart packaging for minimal carbon footprint

Towards a circular economy

Packaging plays a key role in the shelf life of fruit and vegetables. Protecting products means less food waste. But it also increases the use of packaging materials, such as plastics. It's a challenging dilemma.

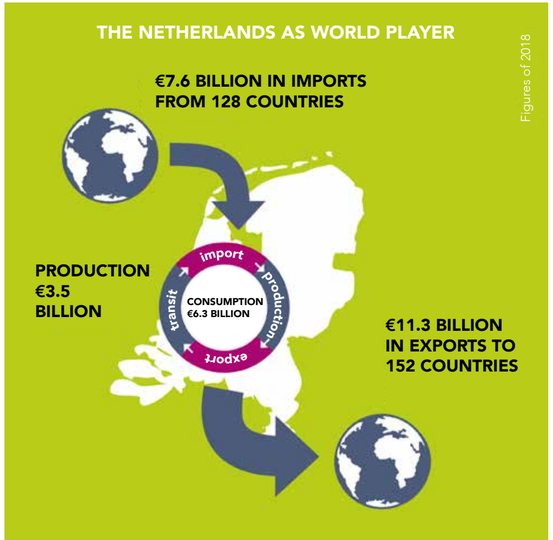
The Netherlands is a hub for the global trade of fruit and vegetables. "We export, we import and we produce products ourselves," says Daan van Empel, programme manager for Food Safety and Sustainability at the sector organisation Fresh Produce Centre. "We encounter the issue of packaging throughout the supply chain. And this issue is becoming ever more complex given the changing needs of consumers."

More packaging

"For example, the composition of households is changing," continues Daan. "So there's more demand for food packaged in smaller portions. And the trend for convenience is becoming ever stronger. Take pre-packed chopped vegetables, processed products and ready meals, for example. Packaging keeps these products fresh for longer. But with the demand for these types of products increasing, the total quantity of packaging materials is increasing too. On the other hand, there's less waste, because, with tailor-made packaging, consumers can buy exactly the right amount of food for them."

Sustainable packaging

Packaging is a complex issue. Daan: "Our starting point is that the Dutch fruit and veg sector will only package products if it reduces the overall environmental impact. Packaging must have a beneficial impact on food safety, shelf life, protection, quality, handling or traceability of the product. As a sector organisation, in conjunction with our members, we have produced a sector-wide plan for sustainable packaging (Brancheplan Duurzaam Verpakken), which contains guidelines for our members. Businesses can't make their packaging sustainable on their own. The whole sector must get involved, with us acting as driver and facilitator."



Working on solutions

Fresh Produce Centre works closely with other sectors on concrete solutions, focusing on:

- Reduction of packaging materials and alternatives to packaging.
- Making packaging recyclable.
- Use of materials with minimal environmental impact.
- Reusable, standardised transport packaging.
- Consumers' views on and impression of packaging.

Circular economy

What next? "We must start by asking ourselves the question whether the packaging adds something. If it does, then we must optimise it. To give you an example: by covering punnets of strawberries with film rather than a lid, we have saved tonnes of CO_2 because we have reduced the amount of plastic that is used. At the same time, the product is still properly protected, so its shelf life is retained. But if we are to move towards a circular economy, we need to do more. We must use homogeneous, recyclable materials. We can't assume that this is the case at the moment, because often different materials – two different types of plastic, for example – are used in the same packaging."

Making sustainability quantifiable

Making sustainability quantifiable helps the process of raising awareness. Daan: "We will work towards objective statistics, amongst others in conjunction with CBL, the supermarket sector organisation. By working out the total carbon footprint of different packagings, we can ensure that we make the most sustainable choice in the fruit and veg supply chain.

Making objectives clear
The fruit and veg sector aims to reduce the percentage of packaging material per sold kg of product by 15% by 2022 and 25% by 2025. The sector also wants to ensure that by 2022, some 90% of packaging can be recycled through the usual collection and recycling processes.

The examples from this case study contribute to the following SDGs:

8 DECENT WORK AND ECONOMIC GROWTH	SDG 8.4 Resource efficiency in consumption and production by decoupling economic growth from environmental degradation
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	SDG 12.3 Reduce food waste throughout the supply chain
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	SDG 12.5 Reduce the amount of residual waste through prevention, reduction, recycling and reuse

Collecting missions maintain biodiversity

Genetic variation must be widely available

What are the Dutch doing in the mountains of Uzbekistan, Tajikistan and Jordan? Looking for plants? It may seem mad, but by searching for plants like wild spinach and lettuce, the Dutch are making a significant contribution to the maintenance of biodiversity. As sector association for businesses in the plant reproduction material sector, Plantum plays a facilitating role in this context.

Plantum represents businesses that are active in the field of vegetable seed, agricultural seed, the cultivation of ornamentals and vegetable plants. Some 12,000 people work in the sector in the Netherlands, and the sector has an export value of €2.9 billion. "As a sector, we have significant impact," says deputy director Anke van den Hurk. "On food safety and quality, product quality and diversity and well-being in a healthy living environment, for example. We are keen to make an even more significant contribution. As sector organisation, we lead the way on this. We facilitate. We promote the maintenance and sustainable use of biodiversity, for example."

Parent material

Genetic resources may contain important characteristics for the future, such as resistance to pests and diseases or characteristics that make the plant resilient to climate change. Anke: "It's all about wild varieties of cultivated plants or old agricultural varieties. We look for these during international collecting missions. We do so because breeders can then use the characteristics of these plants to develop new plant varieties both for now and for the future."

Searching for genes

The Dutch collecting missions are conducted in accordance with international agreements and financed by a number of different businesses. "We put out a call for this," says Anke. "Whether businesses are interested or not clearly depends on the plant we're looking for. The missions are led by Wageningen University. They hunt for new material together with local experts. Half of the seeds collected go to the local government and the other half are taken back to the Netherlands. They are then released under the terms of a standard contract, which sets out the conditions governing their use."

Safeguarding genetic diversity

"Before we get to that point, we have to look carefully at what we have found," continues Anke. "Firstly, the companies propagate the seeds on behalf of the gene bank. They also describe the characteristics of the plants, so we know what we have got and whether the genetic diversity can be used to develop new varieties. By providing this direct help to gene banks the sector makes a significant contribution to the safeguarding of genetic resources for the future!"

Access to genetic resources

Unfortunately, access to genetic resources can't be assumed. Anke: "We have good agreements in place with some countries, but many countries are loath to make the local biodiversity available. Unfortunately, in that case, the bureaucracy involved prevents us from discovering new varieties. So knowledge about nature is lost. In our view, that really is a missed opportunity. We believe that genetic resources should be made available under reasonable conditions. Clear rules for access are in the interests of biodiversity and future generations. We are committed to this cause!"

The Noah's Ark of seeds

The Global Seed Vault on Spitsbergen has copies of all national gene banks, so finds are always retained, even if national gene banks are affected by natural disasters or war, for example.

The examples from this case study contribute to the following SDGs:

SDG 2.5
Maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species

SDG 15.6
Promote fair and equitable sharing of the benefits arising from the utilisation of genetic resources and promote appropriate access to such resources

4. Tips & tricks

4. Tips & Tricks

If you have been inspired by the SDGs and you want to get started on the 17 global goals for 2030 in your own organisation, these tips & tricks will help you do just that.

1 – Understanding the SDGs

The first step is for your organisation to learn about the SDGs. You can do this by organising a workshop, for example. Don't forget to:

- Consider the business case for the SDGs together. How can you link your business activities to the SDGs and how can the two be mutually beneficial? Think, for example, about green innovations or using resources more efficiently; things that benefit your business and solve global problems.
- Ensure the SDGs have support within your organisation. It's important that you contribute to the SDGs on an ongoing basis up to 2030. Involve the people who can make long-term decisions for your organisation.

2 – Selecting SDGs and defining priorities

Not all of the 17 goals will be equally relevant to your business. So, establish which SDGs are best suited to your organisation. You can use the 169 underlying targets to help you with this. On average, businesses focus on around five SDGs. When prioritising the SDGs, you should consider the following:

- What is the positive and a negative impact of your business for each SDG and target? Don't just consider your own organisation, think about the value chain of your business too. Where can the positive impact be increased or the negative impact be decreased? Where are the biggest opportunities for your organisation?
- Decide which targets you want to work on first. Which projects can be tackled in the short term, and which in the long term? Where are the biggest opportunities which you must tackle as quickly as possible?

3 – Setting goals

Once you have decided which SDGs to focus on, it's time to define specific goals and indicators. If you link these to your business objectives they will be more meaningful. Specific, measurable, time-related indicators are also useful. They provide guidance and allow you to measure progress. When setting goals, you should consider the following:

- Decide on the scope of the goals and the related indicators (KPIs: Key Performance Indicators). You can do this in the same way as you normally set goals and measure performance. You should look carefully at the baseline too; what image do you portray at the moment?
- Decide how ambitious you want to be with the SDGs and targets. What are the expectations and interests of internal and external stakeholders in this context? Clearly, bold, ambitious goals have an inspirational effect!

4 – Integrating

If the maximum impact is to be achieved, it's vital that sustainability is embedded at the heart of your organisation and embraced at different levels. Fully integrating sustainability within your organisation will take time and may require significant changes. Since these changes often affect the entire organisation, it's essential to get all your employees on board. Involve everyone in your ambitions and the responsibilities that they bring. Many businesses decide to enter into partnerships during this process: within the sector, with authorities, NGOs or value chain partners. By joining forces you can achieve more!

5 – Reporting and communicating

Stakeholders have a growing need for information on your sustainability policy and the SDGs. By keeping brochures, reports and information up to date on your website, for example, you demonstrate how your business is contributing to a better world by 2030. The SDGs allow you to communicate your progress on the goals to the outside world in a common language.

The five-step plan based on the UN Global Compact:

In the Netherlands, the government, businesses and knowledge institutes report jointly on progress on the SDGs on an annual basis as part of the Accountability Day which takes place in May. The Broad Wellbeing Monitor (Monitor Brede Welvaart) gives a broader picture of progress made based on the SDG indicators.

The Top Sector Horticulture & Starting Materials would like to thank the businesses and organisations for their input on this publication. There was lots of interest in participation and there are plenty of good examples of how the various parties in the supply chain are working on the SDGs. Unfortuntately, we could not include all of them in this first publication. Therefore, the Top Sector, supported by the enthusiasm of the businesses involved in the sector, intends to look at ways of raising the profile of the SDGs and the contribution our sector makes to them. We would like to thank Sustainalize for helping us explore and discover the SDGs. For further information on the Top Sector Horticulture & Starting Materials, see www.topsectortu.nl and www.dutchhorticulture.nl

Contact:
Topsector Horticulture & Starting materials
Bezuidenhoutseweg 12
2594 AV Den Haag, The Netherlands
P.O. Box 93002, 2509 AA Den Haag, The Netherlands
+31(0)70-3490301
Info@topsectorTU.nl
www.topsectorTU.nl