The Partnership

news and views from Enza Zaden

ENZA ZADEN

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(Phytosanitary) challenges in seed imports and exports

Enza Zaden imports seeds of all our varieties, produced worldwide, to Enkhuizen for central processing and quality control. Once ready, the packaged seeds are exported to the different countries/markets where we sell them.

More and more regulations make import and export – let's call it – challenging. The phytosanitary regulations are the most important in this respect. A multi-lateral treaty of the Food and Agriculture Organization of the United Nations (FAO) has resulted in 24 different International Standard Phytosanitary Measures (ISPM's), guidelines for dealing with phytosanitary matters. Aim is to simplify them and to have a clear ISPM for seeds, but this is a long process.

So we still have to deal with the situation that each country implements its own set of phytosanitary rules for seed imports based on the production country of origin. We produce 35 crops in 25 countries and sell in 110 countries. Theoretically this means 100,000 requirement sets. Of course we do not produce and sell varieties in all these countries, but it gives an idea about the complexity. We fulfill most of the requirements through field inspections during seed production, but some countries require seed tests.

We therefore have contractual arrangements with our producers for inspection of the relevant diseases by the local phytosanitary authorities of the country of production. To maintain flexibility we arrange a broad inspection allowing us to fulfill as many country requirements as possible. To give an idea: for the fruity crops fifteen to twenty pathogens each are checked during production; for other crops on average two to three. Strangely enough, not all these diseases are seed-borne, but on the ones that are, we also test the seed lots received.

We see regulations change and become stricter increasingly more. This is also caused by more sensitive seed health tests, which not always give relevant results though. Authorities, however, are difficult to convince and they use the precaution principle.

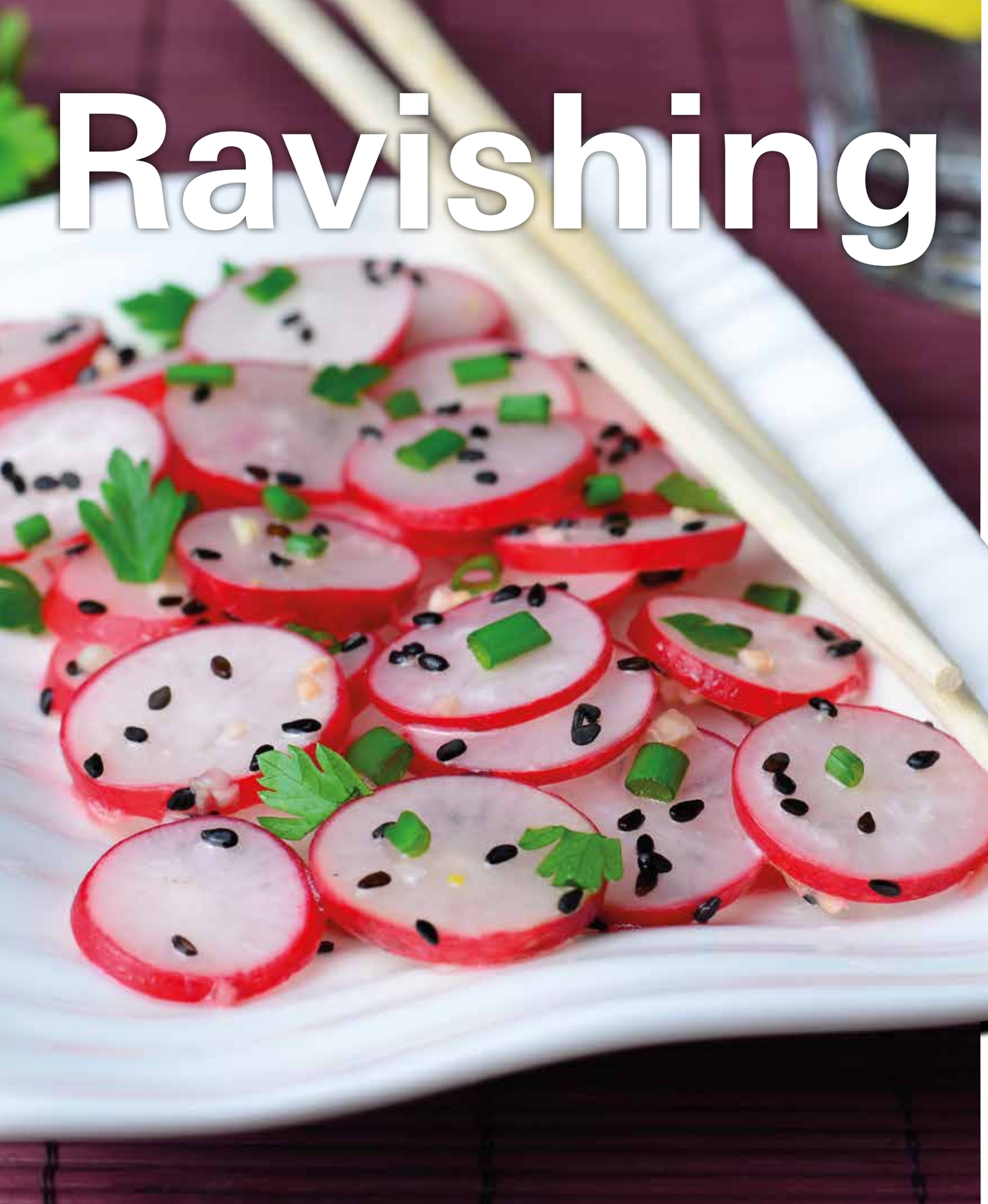
Enza Zaden works with seed trade associations and – in cooperation with you, as our partners – directly with local phytosanitary bodies, in order to smoothen seed imports and therefore not to lose sales. Towards the future this will be even more important. We count on you!

Vincent van Bentum
Managing Director Seed Operations

Enza Zaden

*Cover: **Andrea Schieder**, Crop Breeding Manager Radish & Herbs at Enza Zaden Germany*

Ravishing radish



They come in different colours, sizes and shapes: radishes. In Spain you see black ones, in Asia the large, pointy daikon and in France cylindrical bicoloured radish. Worldwide the red, round radish is most common, and its popularity is steadily increasing.

Radish is grown all over the world, mostly outdoors and in tunnels. It is produced in very small up to extremely huge, very specialised farms. The centre of this global product's cultivation lies in and around Germany. With an acreage of more than 4,500 hectares of outdoor crops, this country is the largest producer of red round radishes. Because of this, and also the ideal climate conditions, the available product expertise and the vicinity of other large markets such as Russia, Poland and France, Enza Zaden's radish-breeding efforts are carried out in the German town Dannstadt.

Market

"We focus primarily on openfield and greenhouse varieties for the European climate," says Rudi Jock, Sales and Portfolio Manager Radish at Enza Zaden in Germany. Radish is a fresh, versatile product, crispy with a pungent flavour. Consumers mix their green salad with radishes to add colour and to make it more spicy. But they also love a natural radish salad or eat the bulbs with salt and pepper. Thanks to its appearance and taste the product has conquered its place into today's life-style cooking. Jock: "With the introduction of hybrid varieties the quality increased: a more uniform bulb with a more intense red colour on the outside and a brighter white on the inside. The radish therefore looked fresher and more attractive, resulting in supermarkets demanding only this hybrid quality. This has boosted the consumers' interest for the product even more."

This happened worldwide. Until a few years ago, Russia and Ukraine were not really large markets for hybrid radish varieties, in spite of their high consumption of radish. But in a few years' time these countries have evolved into important radish markets. When the economy began to grow and people had more money to spend, growers felt more confident about investing in radish, and switched from OP to hybrid varieties. They soon found that the hybrids are of better quality and more reliable, and that the advantages they offer help them to recover their investments.

China is currently becoming ever more important. The development that we previously saw in Russia seems to be taking place in China now. The variety Celesta has been sown in trials there, and is doing very well. "We expect that things will proceed in the same way in this country."

Traditional product

Radish is a rather traditional product that is not, or virtually not, susceptible to trends. If a market wants a smaller tuber you don't need a special variety to meet that demand. "You simply sow in a greater density and harvest the radish a little earlier." So breeding efforts need focus on only a few specific characteristics other than

resistance to downy mildew and Fusarium, i.e. uniformity, bright red colour, internal quality and keeping quality.

Taste

Glucosinolates are the substances that are responsible for the taste and pungency of radish. Radishes use these substances as a natural repellent for pathogens and to protect themselves from plant eaters. Besides in radish, glucosinolates are also to be found in various members of the cabbage family, such as broccoli and cauliflower. They may have health benefits.

Taste is incidentally not a primarily breeding objective. "The radish's taste is made up of not one, but many different glucosinulates," explains Crop Breeding Manager Radish Andrea Schieder. "So it would be too complex to focus your breeding efforts on it. What's more, different consumers tend to prefer different tastes: whereas the French and Austrians like their radishes to be fairly mild, German consumers prefer theirs to be pungent. A third reason is that a radish's taste is not dependent on variety, but above all on cultivation conditions. For example, little daylight in winter results in radishes that are milder than the summer radish grown outdoors. What we want is a radish that remains fresh and crunchy for as long as possible. So we must aim for radishes with a full centre, because that largely determines the crunchiness, and the consumer's perception of it."

Trends

In spite of the product's conservative market still a certain trend can be observed. So far, the production costs with mechanical harvesting have always exceeded those with manual harvesting, but the difference is rapidly decreasing. In actual fact, the situation will be reversed within just a few years. Labour costs keep increasing, especially because of all the social security contributions that employers are required to pay for their staff. This makes it very likely that ever more growers will switch to mechanical harvesting, and this will have consequences for the breeders.

Great challenge

This development will increase the importance of uniformity. Loose radishes intended for plastic packets are often all harvested together and later sorted on the basis of their diameter by the processing industry. Harvesting machines, on the contrary, harvest them one by one and immediately tie them together in bunches, irrespective of their size. So then growers want their radishes to have a uniform size. Uniformity is indeed the greatest challenge in today's radish-breeding programmes.

And uniformity can only be achieved with hybrid varieties. Homozygous parent lines, i.e. lines in which both DNA strands are the same, produce identical offspring. Breeders develop such parent lines via inbreeding. Schieder: "However, radish is a real cross-pollinator, and inbreeding soon leads to depression, resulting in weak plants with little vigour. So it takes a lot of searching to find good lines, with eighty percent being unsuitable because of inbreeding depression. That's why we work with many different lines in our breeding programmes."

Healthy food

The consumption of radish is increasing. Radish was originally a spring vegetable, one of the first that could be harvested after winter. Now it's available all the year round worldwide. And this is not the only reason why its consumption is intensifying. With today's healthy food trend, consumers are eating salads – and hence also radishes – more and more often. Moreover, radishes contain high levels of important vitamins, minerals and anti-oxidants. Jock: "They therefore fulfil all consumer demands to be a trendy product: attractive, striking appearance, good flavour and healthy."

The radish breeding team, Enza Zaden Germany: Katharina Textor, Junior Breeder; Andrea Schieder, Crop Breeding Manager; Stephanie Kuntz, Product Specialist.

Topless or with leaves?

How do you like to see radish presented in shops? In some countries the product is sold mostly with leaves, whereas elsewhere you'll find it processed, without leaves. In a few European countries, such as the UK, radish is presented topless in plastic bags. This is also the most popular way of selling radish in the US. Jock: "Radish without leaves can be kept for longer: three weeks as opposed to three days. So this product model works perfectly for countries that have to import the product, or where it has to be transported over long distances."

In most North-West European countries radish is still sold mostly in bunches, with leaves. That's for example how eighty percent is still sold in the traditional market of Germany. This form of sales presentation is also still favourite in France, the second European radish market, especially for the local French Breakfast type. "This type looks very attractive in bunches because of its two colours and cylindric shape. But while the demand for the French Breakfast radish appears to remain stable, round red radishes are becoming more popular in France. Young consumers like to buy them topless in plastic bags, and the white-tipped kind don't look as attractive presented in this way. So this part of the market wants round, red radishes, which have the added advantage of a longer shelf life.

The **Rolls Royce** among **radishes**

Breeding is a long process, and this is all the more true in the case of radish. Breeding takes around eight years, and varieties are replaced only after at least ten to twelve years. Celesta is still at the top of the market after more than ten years.

Rudi Jock, Sales and Portfolio Manager Radish at Enza Zaden in Germany: "In breeding programmes you often see a variety excelling in a few characteristics, but showing some disadvantages in others. Celesta is different. This variety may not excel in a few specific features, but it is extremely reliable. All the important characteristics are satisfactory: it is a uniform variety with a good shelf life, it is of a good quality, colour and shape, and the tubers don't split. On top of that it's also a fast variety that is suitable for highly diverse cultivation conditions, thanks in part to its resistance to downy mildew. So all in all many advantages for the entire chain worldwide. In Russia the variety even became a quality brand. The demand was for Celesta radishes. Any other variety was simply unacceptable."

In spite of the conservative market, plenty of developments are taking place in the radish chain. Consumption is intensifying and the market is changing. The requirements that the product is expected to meet are consequently changing too. The breeders face the challenge of responding to these changes. ■

Mexico

Vegetable paradise

Getting to know the Mexican vegetable culture

Healthy food is a worldwide trend. Fruit and vegetables are hot. Mexico is not part of this trend, for people in this country have always eaten large amounts of fruit and vegetables. Thanks to the favourable climate, fruit and vegetables are plentiful here, and therefore also affordable and readily available all the year round.

Even so, the healthy food lifestyle trend has consequences for Mexico, too, because this country is one of the largest suppliers of fruit and vegetables to its neighbour the United States and, on a lesser scale, to Canada.

Kitchen garden

Since the North American Free Trade Agreement (NAFTA) came into effect in 1994, Mexico has evolved into the largest supplier of tomatoes and sweet peppers to the US, and the second largest to Canada. The North American market would also suffer a great blow if Mexico should ever decide to end its export of onions and cucumbers. Mexico grows large amounts of LET and BAT cucumbers specially for the Americans. These types are virtually unheard of in Mexico itself; 99% of their production is intended for export. “The same holds for aubergine,” says Marketing Specialist Enza Zaden Mexico Juan Labastida. “98% of the aubergines grown in Mexico are exported. We’re also the world’s largest producer and exporter of avocados.”

“**99%** of the Mexican production is intended for **export**”

"Mexicans like to eat salsa at any time of day"

Mexican cuisine is rich and diverse thanks to the country's great abundance of fresh produce. Fruit and vegetables are eaten throughout the day, in the form of snacks or meals. Vegetables are consumed mostly at lunchtime – cooked or raw and seasoned with chili pepper. "We add the peppers to the food while it's cooking or use them in the form of a salsa to spice up our dishes," explains Marketing Specialist Juan Labastida.

Trends in Mexico

The Mexican market is still fairly traditional, though slight changes are now slowly beginning to take place in the consumers' buying behaviour. In Mexico, too, double-income families are becoming more and more common. Such households have less time to prepare traditional meals but more money to spend. Labastida: "So just like in many West-European countries we see ever more processed, ready-to-eat products appearing on our market. Convenience has become all-important in today's society, though Mexicans do still prefer to buy fresh produce."

Labastida has also noted increases in purchases of sweet peppers, cocktail tomatoes and mini sweet peppers by households with higher incomes, though they still represent only a small part of the market. He does not think that the cause of these changes is that local consumers have become familiar with these products because Mexican farmers grow them for the American market. Of greater influence, he believes, is the arrival of foreign retailers selling the products on the Mexican market.

There's no disputing the substantial increase that can be observed in the sales of lettuce in Mexico. Lettuce is one of the vegetables that the country produces for the North American market. "The salad trend is something we also see here in Mexico. It is incidentally greatly dependent on income: households with more money to spend are more likely to experiment with new and different products. Those products then come to form part of the family's eating habits."

Salsa

But the consumption of lettuce fades to nothing when you compare it with that of the country's most important products. Outranking all other vegetables by far is the chili pepper. Next come tomatoes, followed by onions. These vegetables are available all year round and are the basic ingredients of the famous Mexican salsas. "Whereas other cultures use dressings to add some extra flavour to their salads, Mexicans like to eat salsa, at any time of day. There are many different recipes, but they all contain chili pepper, tomato and onion."

Of the three most cultivated crops, chili peppers have the largest acreage. And 85% of the total national production of the peppers remains in Mexico. Mexicans love to add a hot touch to their food. Whereas the serrano type was most popular in the past we now observe a tremendous shift towards the milder jalapeño type. This is a consequence of the increased influence of the processing industry. Jalapeño peppers are more suitable for the canning industry and are also quite a bit larger than serrano peppers, making them more economic in industrial use.

Fresh cut

As in many West-European markets you see plenty of fresh cut food in Mexico, too. This has actually always been the case, but in a different way than in, say, the US. Office workers and school children are accustomed to buying cut fruit – melon and watermelon – and fresh vegetables – (slicer) cucumber – at stalls, and then of course seasoned with plenty of chili pepper or salsa. "We're not familiar with mini cucumbers, mini sweet peppers or cherry tomatoes. In Mexico, fruit and vegetables are sold cut. Nowadays supermarkets of course try to get their piece of the pie by offering these snacks in a more attractive, cleaner environment, but they just don't taste the same."

Local versus international

Mexican crops are almost all grown outdoors. Nevertheless, cultivation under cover is intensifying, in particular in shade houses and plastic greenhouses. According to the Mexican association of greenhouse growers, crops are now being grown under cover in sixteen thousand hectares. The number of crops grown in greenhouses has increased tremendously the past ten years and is expected to grow even more the coming five to ten years.

"Generally speaking, there are two types of Mexican growers: entirely professionalised growers focusing on global export, and growers concentrating on local, regional and national markets," says Labastida. He goes on to explain that the former are often large parties exploiting the benefits of the latest technological developments and always prepared to innovate. In many cases they represent several links in the chain by also covering packaging, trade and marketing, besides the products' actual cultivation. But although these growers focus entirely on export, Labastida sees some changes taking place: "Local retailers are increasingly often asking these suppliers for produce too. Now that welfare is growing, quality and food-safety requirements are intensifying. You see this for example in the way in which fruit and vegetables are nowadays being sold: often individually and not prepacked, so that the consumers themselves can choose and pay for the quality and quantity they want."

Future

Mexico is broadening its horizons. For example, exports of products such as mangoes, melons and Kabocha pumpkins to Asia are steadily increasing, as are exports of ready-made salsas. In 2015 exports of agricultural produce for the first time exceeded the income generated by tourism or the export of oil. They represent around 10% of the national gross product, and that's good news for the 33 million Mexicans, about 30% of the population, who are involved in agriculture. And there are still plenty of challenges for these Mexicans, also in their own country, thanks to changes in consumer behaviour. ■

Turkey growing in high-tech horticulture

Things are going well with high-tech horticulture in Turkey. Backed by a flourishing economy the country has invested a lot of money in modern greenhouses, cultivation systems and knowhow over the past decade. Smyrna Seracilik is successful in Europe with its cultivation and export of Diamantino tomatoes on the vine.

Smyrna Seracilik (Smyrna Greenhouse) was established in 2007 as the latest member of Akça Holding, the industrial and trading conglomerate of the entrepreneurial family of the same name. There was no doubt about where it was to be located: right next to the geothermal power plant of the energy branch Akça Enerji in the province of Denizli. “Winters can be fairly cold here, so heated greenhouses are a must if you want to grow tomatoes in winter,” explains the horticultural company’s director Osman Goksan.
The farm and power plant benefit from one another. The hot spring water that is pumped up from a depth of 1800 metres to generate 4 MW electricity in the power plant loses a lot of its heat in the greenhouses’ heating network before being pumped back into the ground. This enables the power plant to realise greater thermal yields and profits, while the greenhouse complex enjoys the benefit of cheap, clean energy. According to Goksan, the power plant’s capacity is sufficient for heating greenhouses with a total area of 40 ha – twice as much as the modern tomato farm’s present area.

Fast growth

At the time of its completion in 2007, Smyrna Seracilik measured just over 8 ha. In 2012 its area was expanded with another 11 ha. From the very start the tomatoes have been grown as sustainably as possible in coco substrate. The farm has modern measuring equipment to control irrigation, fertilisation and the supply of CO^2. It also has a reverse osmosis system to purify its water, and it is one of the first farms in Turkey to use biological pest control.
From the high-tech horticultural company’s fast development it is evident that the first five years were a success. That was not a matter of course, because the family had no experience whatsoever in high-tech horticulture. Agronomists, first of all from Italy and later from Turkey itself, gave them a helping hand.
“If you want to grow tomatoes that are worthy of export while ensuring sufficient production, you really have to work with the right people,” says Goksan. “We weren’t worried about sales; our family has been exporting dried fruit for more than sixty years and has a widely branched commercial network. But we did have to hire cultivation expertise and pass it on to our own people. We still do that today. Our cultivation managers are always well prepared for their tasks.”

Close cooperation

The first few years the focus was on finding good varieties and optimum climate conditions. That search brought Goksan into contact with Burak Gönen of AG Tohum, Enza Zaden’s exclusive seed distributor in Turkey. Their first talks led to a form of cooperation that has been very close ever since. “AG Tohum was of great help to us in organising trials and optimising our cultivation conditions,” says the entrepreneur.
One of the reasons for this was the keen commitment of an advisor whom AG Tohum had assigned to this product/market combination. This advisor in turn has regular contacts with Enza Zaden’s specialists, who have international experience in this field. After a few trial years the farm chose the vine tomato Diamantino as its main crop in 2012. It is grown in 19 of its 20 hectares. Goksan: “It is an attractive, uniform vine tomato with an excellent taste and a good shelf life. Its productivity is also good and is still increasing, thanks in part to the continuing commitment of Burak and his people.”

Increased production

In the trials Diamantino produced an acceptable 29 kg/m2 in the season (November until July). Between 2012 and 2015, when all the setpoints were geared entirely to this variety, that was around 35 kg. “This year we hope to harvest 38 kg/m², which would be a fantastic result,” says Goksan.
“I’m delighted that we have been able to contribute towards Smyrna’s success,” adds Burak Gönen. “Our cultivation advisor talks to the growers every month and we discuss managerial matters once every quarter. In those talks we discuss both developments in the fields of varieties and the farm’s trials, and market developments. Entrepreneurs such as Osman are used to planning things strategically and looking beyond the limits of their own farm.”

Turkish cultivation in transition

Gönen estimates that the total acreage of high-tech cultivation in Turkey now amounts to around 800 ha. Vine, beef and cocktail tomatoes are the main crops, along with sweet peppers and chili peppers. “Things have gone very quickly the past five to six years in particular,” he continues. “Further growth is now a bit restricted by the current political unrest and instability in and around Turkey, but I’m sure growth will soon continue when the situation improves.”
According to the seed distributor, the success of companies such as Smyrna Seracilik will not go unnoticed. Smaller farms that have hitherto focused mainly on the home market will now also start considering possibilities of export, and will get ready to expand their business and make the move to high-tech horticulture. “The Turkish cultivation of fruit vegetables is in the middle of an extensive transition,” says the seed distributor. “The present stagnation is slowing things down a little, but it will not stop this transition.”

The next phase

Osman Goksan shares that expectation. He hopes to be able to expand his farm once again in two years’ time. “The Russian market is now temporarily closed due to bilateral tensions, but by working hard we have managed to make up for that with growth in Europe,” he says. “Because of the greater distance to suppliers and the market our cost price is a little higher than that in Spain, but is competitive with that of Dutch tomatoes. Spain and the Netherlands are by far the two most important production countries in Europe. However, the brand name Smyrna has acquired a good reputation in wholesale channels. If we succeed in consolidating our positions I think we’ll be able to take our company another step forward in 2018.”
How big that step will be, and whether it will be taken with Enza Zaden’s varieties, the entrepreneur is unable to say at this stage. “We are very satisfied with Diamantino and with our relationship with AG Tohum. Neither of them will be changing in the near future, but we will of course be keeping a close eye on developments at seed companies. We also grow two other types of tomatoes on a small scale. They come from other seed producers. For each segment we will always choose the varieties that best meet our objectives and requirements. Of greatest importance to us are a reliable high production, good external and internal quality and a good shelf life. Varieties that can provide all that make us, our customers and consumers happy.” ■

Closing in on phytopathology

Knowledge of DNA is growing tremendously, creating ever more opportunities and possibilities in phytopathology, too. Extensive research shows phytopathologists which piece or pieces of a plant's DNA play(s) an active role in protecting the plant against pathogens.

"Classic phytopathology focuses on how a disease develops," says Manager Phytopathology Karin Posthuma. "The discipline is all about visual observation of symptoms of diseases, knowledge of pathogens, and deliberately infecting plants with pathogens in order to identify resistances. Those aspects are still important, but our studies now also include molecular phytopathology, which involves finding out what actually happens in a plant when a pathogen enters it."

Molecular phytopathology

What do we actually know about the dialogue between plants and pathogens? What it boils down to is that plants have sensors that emit a warning signal when foreign substances enter the plant. Like other living beings, most plant pathogens have DNA, RNA and proteins. The plant's sensors recognise the pathogens' proteins and the plant responds to them. In a resistant plant, recognition of infection will effectively render the pathogen harmless; in susceptible plants, this recognition does not occur and plants will become sick.

Burglar system

All this may sound very simple, but things are actually fairly complicated. Pathogens can adapt very easily and very quickly, causing them to go undetected by a plant's sensors. Posthuma compares it with home security: "Say your burglar system identifies burglars by their yellow jackets. The system will work fine until a burglar decides to wear a blue or green jacket instead of a yellow one; then your system will no longer emit a warning signal."

Effectors

Pathogens introduce molecules into plants to switch off the plants' defence mechanism. These effectors, as they are scientifically called, are small proteins that shut down a plant's basal defence. Special resistance genes identify the very same effectors and respond to them by causing plant cells to die in the affected area so that the pathogen is unable to develop any further.

Molecular phytopathologists study how to identify the most important effectors. Knowledge of the plant genes that identify these effectors can help breeders to more effectively develop new varieties with additional resistances. In the spinach leaves on the left, the effector has not been recognised by a resistance protein, resulting in the cells remaining intact. The resistance proteins in the leaves on the right have recognised the effector, and cells that have received the effector have consequently died.

You can of course protect your home with sensors, shutters, locks and gates that will prevent any thief from breaking into your property, but that's taking things a bit too far. "It's quite similar in the case of plants. We could pre-emptively cross all possible resistances in a plant, but then the plant would invest all its energy in fighting pathogens, and would consequently grow poorly and produce very few fruits and seeds. In other words, that's no option."

Interaction between plants and pathogens

Molecular phytopathologists investigate which of a pathogen's proteins interact with plant proteins and what the effect of that interaction is. Such knowledge enables them to discover how plants are able to sense the presence of a pathogen.

By identifying which proteins are vital for the pathogen and which proteins can be easily adapted or discarded, it is possible to make informed decisions on selecting resistance genes that are more durable.

The research

How do you study something like that? The gene pool, i.e. species that can be crossed with the crop of interest, offers some starting points. Wild species often have resistance to plant pathogens and these resistances can be crossed into modern varieties. Molecular phytopathologists study which of the pathogen proteins (effectors, see box 1) are being sensed by which wild plants. They check how variable the effectors are by studying sequences of these effectors from many different pathogen isolates. If the effector is identical in all isolates tested, it is likely that the protein is vital to the pathogen. Wild accessions that react resistant in response to these effectors are likely to offer more durable resistance than those that react in a resistant manner in reponse to very variable effectors.

Posthuma: "We also enhance our knowledge by studying resistance mechanisms in unrelated plants, such as barley." Posthuma is referring to the research into resistance to powdery mildew in barley. The researchers discovered that barley is resistant to powdery mildew when a specific gene has a defect, leading to an absence of the protein for which the gene normally encodes. This resistance has now been used for more than forty years in barley and may be termed durable. Although barley is not directly related to vegetable plants, the gene in barley yielded information that could be used to develop resistance to powdery mildew in other crops.

Durable resistance

This is only one example. Phytopathologists also study the genetic characteristics of various crops when focusing on other pathogens. And the knowledge they obtain eventually goes to the breeders, who use it in their crossing and selection programmes.

Molecular phytopathology has greatly enhanced the field of phytopathology. Knowledge of what precisely makes a pathogen a pathogen and how plants respond to it, brings the concept of durable resistance closer to reality. Posthuma: "The more we know about resistance genes in combination with molecular knowledge of the pathogens, the sooner and more effectively we can respond to prevent the risk of the resistance being broken. That's what we want to achieve." ■

Local grown bittergourd emerges in Europe

Bittergourd, Bitter Melon, Karela, Bitter Sopropo and Fu-kwa all refer to the same vegetable that just like the cucumber and pumpkin comes from the family of Cucurbitaceae. It is well-known and appreciated in Asian, Eastern African, South American and Caribbean cuisine where it is used in curries and stir-fried vegetable dishes.

The fruit differs one region from the other. It can be smooth and prickly, light and dark. What is common for all bittergourds, however, is the bitter taste and the healthy compounds of the fruit: vitamins A, B1, B2, B6, C, K and the minerals potassium, calcium, magnesium, phosphorus, iron, manganese and zinc. For centuries bittergourd has been used in Chinese medicine in applications against diabetes.

Bittergourd in Western countries

The vegetable is in general not that well-known in most Western countries such as the USA, Europe or Australia. But this seems to be changing. "Immigrants, looking for their traditional dishes, ask for their local vegetables in their new home countries," explains Marketing Analyst Hans Verwegen. "We see this in the Netherlands, Canada and the UK, for instance, where ethnic shops sell bittergourd. This exotic product, imported from overseas, also triggers the local population to try the 'new' vegetable in their dishes. Given the bitter taste it will not get immensely popular fast, like we have seen with sweet pepper some decades ago. However, the interest in health combined with attractive internet posts from Asia, makes it a potential growth crop."

Bittergourd in Western trends

The demand for bittergourd will rise as the young generation of immigrants continue to prepare it. Therefore, the option for local production has been investigated. Some bittergourd varieties, bred for Asian countries, appear to grow very well in Dutch greenhouses too. Verwegen: "The Asian population in Europe welcomes this very much. We have started small local pilot productions in the Netherlands this year, distributing the products to ethnic supermarkets and regular retailers. And it even looks like Western trends are slowly starting to embrace the bittergourd; new recipes are emerging in Europe, like bittergourd smoothies. This is very promising for the future."

Organic at the Asia Fruit Logistica

Successful organic cropping starts with top quality organic seeds. At the Asia Fruit Logistica Enza Zaden will therefore focus on Organic. "Vitalis Organic Seeds, a subsidiary of Enza Zaden, is the global leader in organic seed production and breeding," says Produce Chain Manager Chris Groot. "All of our varieties are thoroughly screened at the Vitalis research stations worldwide to provide quality seed that is healthy and germinates well."

Quality

But quality means more than that. Disease resistance, taste and presentation for instance. "We only breed and select the varieties having the highest resistance levels. And as the ultimate consumer looks for tasty products, we make crossings with hundreds of lines to find the combinations that stand out in taste and presentation."

Combining expertise and experience

Groot stresses the importance of the varieties being adapted to the organic growing systems of today. "Combining Enza Zaden's expertise in breeding and seed technology with Vitalis' experience in organic selection and seed production, results in first-class products. This makes Vitalis the best choice for the professional organic vegetable grower. We'd like to show this to the visitors of the fair and talk about this in person."

Booth S-28

You are most welcome to visit the booth at the Asia Fruit Logistica S-28. Here you'll find a great selection of the Enza Zaden product range, including the organic varieties. And you will also be able to taste them! A chef will create surprising and delicious bites with the products at the booth. While tasting, our representatives are available to answer all your questions.

ASIA FRUIT LOGISTICA

VitaliS Organic Seeds

Growing welfare determines course of product development

Value creation under the influence of global trends

Global welfare is steadily increasing. Many wealthy consumers are open to new foods with a high added value, including numerous non-traditional vegetables. Other developments are also leading to further differentiation of the demand. Enza Zaden responds to all this at a very early stage by developing varieties with specific characteristics. Successful introductions are spreading across the world faster and faster. This is aptly illustrated by sweet peppers.

The rate of economic growth may have decreased somewhat in the past few years, but worldwide the economy is still increasing. What's more, ever more regions in areas such as Asia and Central and South America are becoming prosperous, and this is good news.

Increasing welfare tends to go hand in hand with certain trends that have a major impact on society and our consumption patterns. Examples of such trends are changes in the composition of families resulting in a larger number of small households, ageing of the population, better access to (higher) education, greater mobility and increasing cross-border traffic, more leisure time and a growing demand for (healthy) convenience products.
More frequent travelling and wider access to mass media such as film, television, glossy magazines and the Internet meanwhile more often and more intensively bring us into contact with other cultures, many of which have different eating habits. Another influential factor in this respect is labour migration. The outcome of all this is that the diet of the prosperous part of the global population has become more varied than ever before.

Fast spread of products

Another seemingly unstoppable development is the globalisation of trade and industry, which has now also reached retail level, as can be inferred from the international expansion of for example supermarket chains in the past 25 years.
These supply-and-demand-related megatrends cause products that appeal to the trends to spread across the world at a tremendous pace. They may be totally new products, or products that have long been popular in a certain culture and then suddenly start to appeal to a wider public.
Initially, the products concerned tend to be exclusive luxury articles that are imported by plane and cost quite a bit, so ideal for prosperous world citizens who want to impress with their cosmopolitan outlook. But the step to wider availability, local production and lower prices is only small, and is often quickly taken.

Also in fresh food

Numerous examples of these developments can be given in the field of food, for instance dim sum from China, sushi from Japan and tapas from Spain. In their countries of origin they are all everyday, very affordable (and therefore popular) dishes with a marked identity of their own. When they were introduced to other parts of the world they were almost all expensive, luxury snacks with which trendy, wealthy consumers could indulge and distinguish themselves. And nowadays they are widely available in almost any metropolis, and often elsewhere too, at both restaurants and supermarkets.
We see something similar taking place in fresh vegetables. The mini plum tomatoes that we have recently got to sample, and now greatly appreciate as snack tomatoes in Europe and North America, actually originated in Japan and Taiwan, where they are much less exclusive. Another group of products that has rapidly become very popular on an international level is that of babyleaf vegetables. Originally introduced in the USA, they are now grown all over the world where conditions allow their cultivation.

Important role of seed companies

It goes without saying that breeding companies play a crucial part in the development and distribution of new, popular vegetable varieties. Modern vegetable breeding has widely branched all over the world, in particular from the Netherlands, where many of such breeding companies were first established and have flourished in the past century.
A crop that most clearly illustrates this is sweet pepper. In the 1960s the first grassy, bitter sweet peppers grown in southern Europe began to be sold in small numbers on the rest of the continent. They were eaten almost exclusively by wealthy consumers, often at high-end restaurants. The seed industry of Northwestern Europe started to experiment with these products and ultimately arrived at the sweet, shiny, blocky fruits that appealed to a larger group of consumers. Local (Dutch) production gradually increased, broadening the range with different colours, and the most successful varieties were then exported all over the world.
At first it was primarily all about the fruits themselves, which were very rare, or even totally unavailable elsewhere. The peppers were exported to e.g. Canada, Korea, the USA, Japan, Hong Kong, Singapore and the Arabian Peninsula. There, the sweet bell peppers were initially a novelty and a niche product until they started to be grown locally. Now seed companies have taken over the baton and supply the seed concerned to local growers. Growers in Canada and Mexico nowadays produce plenty of blocky sweet peppers for the USA. Korea, New Zealand and the Netherlands export this fruit vegetable to Japan, but it is starting to be grown there, too.

Sweet bells for China

This development may very well repeat itself in China. After years of expansive economic growth and urbanisation the rapidly growing group of urban professionals has more money to spend. During holidays in Europe and America the Chinese have become acquainted with the uniform, shiny, juicy, ripe blocky sweet peppers that are offered for sale there. After two years of intensive planning, during which various phytosanitary difficulties had to be solved, the first sweet peppers are being flown from the Netherlands to China this summer. Although this is a small-scale test lasting for only two weeks, all the Dutch parties involved are confident that export will be resumed with larger volumes on a structural basis next year, and that the peppers will acquire a permanent place on wholesale markets and in supermarkets in the large cities.

Tremendous potential

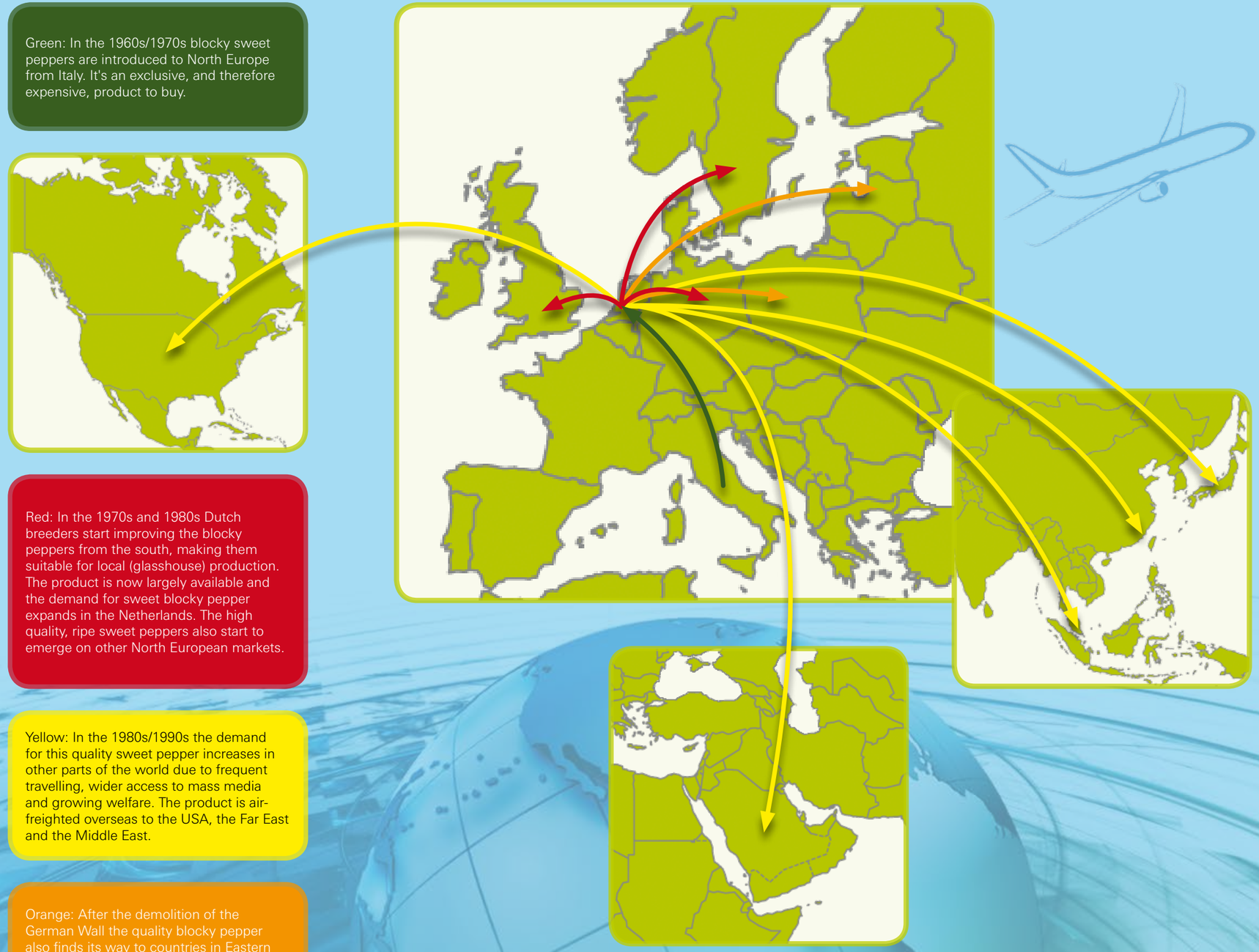
Regional Sales Director Jan Panman of Enza Zaden Export and Zhiping Wang, General Manager of Enza Zaden China, expect that Chinese growers will soon become interested in this – now still exclusive – greenhouse product. Wang: “Enza Zaden’s sweet pepper varieties are among the best worldwide. We see a tremendous potential here for both consumption and local cultivation. Enza Zaden China already has a sizable turnover in sweet pepper in China, especially in the main greenhouse province Shandong. The trend will though be for higher quality fruits and higher quality growing systems. When growers see how restaurants, supermarkets and consumers appreciate the vegetable quality, the high segment of the market may increase very quickly.”

Tribelli and other recent successes

The Spanish success story of Enza Zaden’s versatile sweet pepper concept Tribelli® has been repeated in Mexico and the USA. After Spanish suppliers had introduced American consumers to these red, orange and yellow mini sweet peppers and they became extremely popular, Mexican growers soon took over the baton. And now the acreage of Tribelli® in Mexico is many times larger than that in Spain.

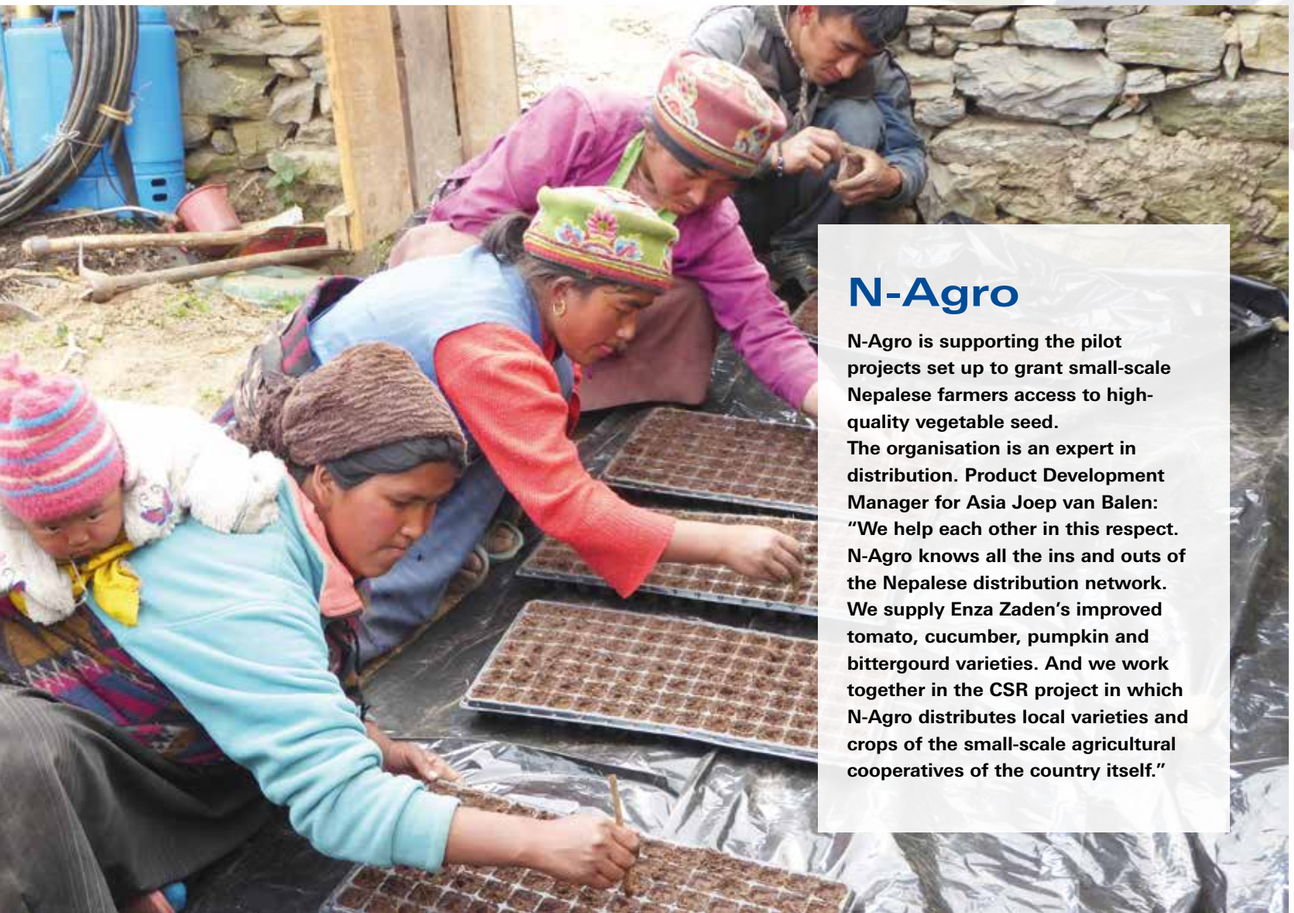
“By initially importing successful innovations as end products, countries also create new opportunities for local producers,” Panman explains. “In today’s modern, technology- and media-driven world the timespan within which this process takes place becomes progressively shorter. We are living in a global village in which good ideas and products spread like wildfire. Enza Zaden wants to continue to play an important part in this. This means that we have to keep a close watch on what is taking place in the world, and on what people want and need, so that we can translate those needs into products with added value for local production and trade chains. Our motto is: think globally and act locally.” ■

“Create new **opportunities** for **local producers**”



Stronger together in Nepal

It may be a cliché, but it's oh so true: you're stronger together. This is certainly the case in Nepal, where hundreds of thousands of farmers work together in small village cooperatives to grow the best produce.



N-Agro

N-Agro is supporting the pilot projects set up to grant small-scale Nepalese farmers access to high-quality vegetable seed.
The organisation is an expert in distribution. Product Development Manager for Asia Joep van Balen: "We help each other in this respect. N-Agro knows all the ins and outs of the Nepalese distribution network. We supply Enza Zaden's improved tomato, cucumber, pumpkin and bittergourd varieties. And we work together in the CSR project in which N-Agro distributes local varieties and crops of the small-scale agricultural cooperatives of the country itself."

"Nepal is a challenging country for our hybrid varieties, partly because farmers there grow their own regional crops using local varieties," says Joep van Balen, Product Development Manager for Asia. "Because of the small-scale production, this area is characterised by a tremendous diversity in plants, and that should of course remain unchanged. Nevertheless, it is our moral duty and mission to support these farmers with our expertise, to help more growers gain access to high-quality seed in this country, too." So, in the context of Corporate Social Responsibility, Enza Zaden has entered into a partnership with Agriterra, an international agri-agency promoting cooperation between farmers, and hence also a specialist in small-scale agricultural cooperatives.

Present situation

In every Nepalese village you'll find a cooperative in which the local farmers work together in sowing, growing and selling their crops, but also in producing the seed for their next crops. These cooperatives encounter various problems, such as unwanted cross-pollination, plant diseases and limited seed production - problems that have a great impact on the next harvested crops. Such problems can be countered with good varieties and the right technical expertise.

Technical support

"That's why Enza Zaden has decided to help. Not with financial resources, but with technical support. This we are doing in three pilot projects involving three local crops." They are all three staple crops in Nepal: a local chili pepper, a dry bean and broadleaf mustard, a leaf vegetable that is widely consumed in this country. The pilot projects involving these crops are carried out by cooperatives of three different villages. The local chili pepper project was launched first, in Makwanpur, a district just south of Kathmandu.

Local expertise

"We first wanted to find out how the farmers grow their crops now. I then gave them tips and advice for identifying, selecting and maintaining their national varieties. And I mean just advice, because the village farmers themselves know best which characteristics of their crops they need to evaluate. We're simply helping them in their search for success by improving quality without adversely affecting genetic variation too much. This way each farmers' cooperative develops their own variety, which is theirs alone.

Joep van Balen explains that the local chili pepper pilot project has already started to pay off. The seed of the best hundred plants has been sown and the project is coming along nicely. "In July we launched the projects for the broadleaf mustard and dry beans in two other villages. It's wonderful to be getting so much in return for so little effort. And our efforts are entirely in line with our primary mission: to grant professional growers access to high-quality seed."

Distribution

There's actually more involved than just offering the farmers technical support to help them produce high-quality seed themselves. Two other parties are making efforts to help turn the mission into a success. The Nepal Agricultural Co-operative Central Federation Ltd. (NACCFL), a national organisation, is providing knowhow on processing and packing seed, and will later help in the varieties' registration. Registration of varieties is very expensive, but essential for the farmers, to allow them to sell their seed on the market. "This party is also of great importance for distribution, along with our Nepalese distributor N-Agro. All of the four parties are together helping to improve the standard of living of the population in general, and the small-scale farmers in particular. The projects are entirely altruistic, though I can't deny that our support is also providing us with new contacts and inspiration. So in this respect it's an ideal partnership."

The projects have been launched for a period of two years. Van Balen hopes that more good things will follow after that period: "These two years are for the pilot projects. Right now we're still searching for the best approach and the best cultivation schedules. Once we've found them, we'll be able to use that knowledge for other crops and other areas, too." ■

In a PFAL it's **always spring**

Good arable land and clean water are becoming ever scarcer, whereas the global population is rapidly growing and big cities are becoming even bigger. So it may be worthwhile to grow crops in a different way, besides in the traditional ways outdoors and in greenhouses - i.e. in PFALs: Plant Factories with Artificial Light in which the crops are grown in several layers in conditioned climate conditions. However, success is not always guaranteed, because 'high-tech' often goes hand in hand with 'high risk'.

It would seem to be a good answer to one of today's greatest social problems: how can we continue to feed the constantly growing global population in a sound way? Theoretically, fully conditioned cultivation areas offer every opportunity to do so. They can be built anywhere where water and energy are available, irrespective of the quality of the soil. Growing crops in layers with artificial light moreover makes it possible to super-efficiently put relatively expensive space in urban areas to profitable use. In closed cultivation systems, water and fertilisers can be recycled, and if the cultivation areas are hermetically sealed from the outside world there will be less risk of diseases and pests. And, last but not least, the climate and lighting can be accurately controlled to ensure a permanent ideal environment for the plants' development, crops of a constant quality and maximum yields.

PFALs

"All that can in principle indeed be realised with the present state of the art," says Spinach Product Specialist and Indoor & Hydroponic Lettuce Specialist Jan van Kuijk. "Japanese and Taiwanese technology firms especially have invested large sums of money in this in the past few years. In those two countries there are now around 160 of these PFALs of different sizes. The form of cultivation is also referred to as 'multilayer cultivation', 'urban farming' or 'vertical farming' – they all work according to the same principle."
According to Van Kuijk the largest of these factories, which are actually not even that impressive in terms of size, produce around 20,000 heads of top-quality lettuce a day.

Pioneering market Japan

Young Han, Area Manager for Japan and Korea of Enza Zaden Export, confirms this. "In Japan this form of horticulture is attracting a lot of interest, especially among technology firms that were not originally involved in horticulture; they see it as a promising long-term opportunity."
There is a concrete reason for the fact that Japan in particular is so very interested in this new phenomenon: the 2011 nuclear disaster in Fukushima, which rendered the surrounding area radioactive, making it unsuitable for agricultural use for dozens of years.
"It's easier to guarantee the food safety of crops that are grown in fully conditioned, sealed areas," Han explains. "It's not surprising that precisely Japanese consumers and retailers are particularly concerned about food safety. This also explains the sudden interest in horticulture among Japanese technology giants such as Fuji and Toshiba. Such cultivation systems are entirely dependent on software and electronics."

High risk

This technological dependence is both the greatest strength and the biggest weakness of those systems. Whether or not they are successful depends on the reliability of the employed technology. A sudden failure in the lighting or irrigation system that can't be quickly repaired can make an entire crop worthless.
Van Kuijk: "Traditional cultivation methods always have a certain buffering capacity. Whether a plant grows in the soil, in containers or in substrate slabs, it will always have a supply of water and nutrients. And there will always be daylight. The day length and intensity of the light may vary, depending on where a crop is grown. They are factors that you consider in determining which varieties to grow. Low light intensities or short days can be partly compensated with grow lighting, as is indeed often done in today's high-tech greenhouse horticulture. In the event of a failure, the crop will then have to temporarily make do with the natural light. That will of course have a slight impact on the crop's production, but at least such a failure won't be fatal."

Bitter experience

Han and Van Kuijk can quote numerous examples of companies that enthusiastically invested in multilayer cultivation only to go bankrupt within one or two years. In almost all cases the system was insufficiently robust to realise good cultivation results time and time again. And that is necessary, because a PFAL involves high investments. So then you're really learning by bitter experience, and not everyone has the patience or resources for that.

"Enza Zaden is also investigating such a system on a small scale in the Netherlands," says Van Kuijk. "We're learning a lot, and in that respect it meets our expectations."

Always spring

Even so, a growing number of companies seem to have overcome the teething problems and to be capable of ensuring systematically profitable cultivation in a PFAL. And not only in Japan.
This phenomenon is also becoming more established in Europe and in the United States, where multilayer cultivation is used mostly for babyleaf products and young curly kale. The same holds for the Gulf states in the Middle East, where resources are available and such cultivation systems are considered rewarding investment projects. They offer the population and tourists fresh, locally grown vegetables and reduce the countries' dependence on import.
On top of that, the products that are offered for sale in shops or on the market are much fresher.
"If the technology is reliable enough, such systems offer you the most fantastic production figures," Van Kuijk readily admits. "Because you can always create ideal growing conditions for your crop. In most PFALs it's always spring, because that is the period in which most leafy crops develop fastest. Our spring varieties are very popular among these companies."

Different recipes

But these cultivation systems should not all be lumped together, the Product Specialist warns. For a start, there are substantial differences in the employed technology. Some crops are grown under LED lamps, others under strip lighting. The colour, duration and intensity of the lighting vary, as do climate conditions and fertilisation schedules. So a single lettuce variety can be grown according to many different recipes, depending on the grower's conditions and personal preferences. The harvesting stage also varies from one country to another, and from one company to another.
"This multitude of variables makes choosing a variety more difficult than you may think, also because crops have never before been grown under constant conditions. In our own research into multilayer cultivation we aren't always able to predict the results beforehand either. What certainly help are sound knowledge of the system and a good understanding of the growers' requirements. So our advisers invest a lot of time in that."

Many more

In spite of the great risks and the failures in the recent past, Young Han also believes that PFALs will come to play an ever greater part in global high-tech horticulture. "Investments are being made in new, more reliable technology on all fronts," he states.
"By technology and energy companies in Japan, by companies such as Philips Lighting, and by European and American companies with experience in greenhouse construction and measuring and control technology. There is a strong desire to make progress, and the money needed to facilitate it is available. Under the motto 'Once you've got it to work, it will work anywhere' several Japanese system designers are now also focusing on countries outside Japan. There's not yet a great run on them, but I wouldn't be surprised to see many times the present number of PFALs across the world in ten years' time." ■

Setting trends in leafy products & herbs

Bakkavor is the number one producer of fresh prepared foods for the UK grocery retail market. Its success is underpinned by its ability to respond quickly and effectively to new developments, working closely with its customers and suppliers. Bakkavor's relationship with Enza Zaden focuses on the dynamic market segment of leafy products & herbs.

Bakkavor is a leading manufacturer in the UK's fresh prepared foods market, supplying private label products to all the major grocery retailers. However, its roots lie in Iceland, where it was established in 1986 by brothers Ágúst and Lýdur Gudmundsson as a fish-processing company serving the Scandinavian market. Ten years later Bakkavor had a workforce of 65 and was supplying its fish products to customers in Europe and the United States. Its turnover then amounted to around five million pounds.

The focus of its activities shifted to fresh prepared foods in 2000, with the UK as its main target market. Between 2000 and 2001 the company acquired a dips and dressings business and a large ready meals and Greek dips business. These acquisitions marked a major change in the company's course. In 2003 Bakkavor decided to sell its fish-processing activities and in 2005 it acquired Geest plc, the largest fresh prepared foods business in the UK.

UK, USA and Asia

Over the past few years the USA and Asia have become new growth markets for the enterprising company. Today Bakkavor has 47 production sites in the UK, USA and Asia, where 18,000 employees produce around 5,000 different fresh products every day. Among its customers are the largest retail grocery retail chains in the world, including almost all the well-known supermarkets in the UK. In 2015 Bakkavor realised a turnover of more than 1.7 billion pounds.

Portfolio management

Lorraine Shaw, responsible for development of the product group leafy products and herbs, has personally witnessed a large part of the history of this dynamic company which is celebrating its 30th year in 2016. Lorraine started working for Bakkavor (then Geest) as an independent consultant in 2001. In 2008 she joined the company as a full time employee, to manage the further development of its portfolio of leafy products and herbs for the British market. Her work involves keeping in close contact with the sales, marketing and product-development departments at the various production sites where the leafy products and herbs are processed, with the growers who cultivate the products both in the UK and abroad, and with breeding companies such as Enza Zaden.

Interaction

"Seed companies are an important source of information on new developments and provide inspiration for new mixtures and applications," says the produce technologist. "And vice versa. Our requirements in terms of shelf life, colours, taste and processability help direct the focus of the breeders and seed producers. This mutual interaction is very important, especially as our aim, as a market leader, is to lead the way in product innovation. Enza Zaden is well positioned in my product group. I have come to know the organisation as a progressive, accessible breeding company that welcomes cooperation."

Over the years, Shaw has worked closely together with many of Enza Zaden UK's employees. After Alan Cresswell (now General Manager at Enza Zaden UK) and Ian Botes (now Senior Portfolio Manager Lettuce in Enkhuizen), Sales Representative Holly Russell is currently her main contact.
"Ian involved us in the development of the Eazyleaf® concept from the beginning," Shaw recalls. "For that project, we visited trial fields in France, Germany and Spain. Through the hard work of Ian and the rest of the Enza Zaden team, and with a little bit of help from ourselves, the Eazyleaf® range is now well established. With Holly and our growers we are now looking at ways of optimising various production methods."

Consistent product quality

"A consistent product quality all the year round is our primary aim," says Holly Russell. "Bakkavor processes a wide range of our babyleaf and rocket varieties. They are grown in several countries, under different cultivation conditions, depending on the time of year. That makes ensuring a consistent, high quality quite a challenge." Enza Zaden contributes towards the optimisation process in several ways – by providing the contract growers with useful advice on cultivation methods and the differences between individual varieties, and by constantly investing in ever better varieties.

Dynamic portfolio

Shaw has observed a substantial change in both the volume and the range of leafy products and herbs over the past fifteen years. When she started working for Bakkavor in 2001 the market for fresh prepacked leaf was still enjoying good growth. The market was dominated by prepared bags of sliced iceberg lettuce and prepared bags of continental lettuce types, such as Lollo Rossa, Oakleaf and Batavia. These products can still be found in chilled sections today, but in recent years, especially in the UK, they are accompanied by a much larger and wider range of multi and babyleaf products in bags and plastic trays. A wide variety of dressings, fresh herbs and other seasonings such as croutons and pine nuts offer consumers more choice than ever.

Bakkavor has played a pioneering role in that development, and continues to do so now, "the total market volume in the UK is no longer growing as much as in the past; the market has matured and has become much more competitive compared with the early years," says Shaw.

The produce technologist says that the strong growth in multi and babyleaf products has now levelled off, whilst the demand for spinach is still increasing. "Spinach has good health benefits, a slightly different texture and colour and is easily recognisable by consumers," she explains. "I see good prospects for rocket and various coloured leafy products in mixtures, but the demand for iceberg lettuce, frisee and chicory is clearly decreasing. The range is constantly changing. Our greatest challenge is how to remain a leader in this market, instead of becoming a follower. This of course calls for efficient co-ordination and co-operation with our growers."

Continuous innovation

What Holly Russell appreciates most of all in her relations with Shaw and Bakkavor is the combination of sincere commitment, innovativeness and openness. "Fresh food processors give us a lot of insight into the market for ready-to-eat fresh products, which has grown tremendously over the past ten years," says Russell. "Bakkavor is a leader in these products and very well represented at the high end of the market. The company continues to innovate. It's wonderful to be able to support Lorraine in achieving her goals, however small our role in that respect may be. The importance of that shouldn't be underestimated. Innovative relations such as these keep us on our toes and help us to keep innovating for the market as a whole." ■

Column

Partnership in a **start-up subsidiary**

On 14 June, Enza Zaden Brazil celebrated its fifth anniversary since the official opening in 2011. Enza Zaden Brazil is a clear example of how relevant a partnership is: it is the basis for a solid and consistent business settlement in a foreign country.

As most people are aware, Brazil is not only a large territory – twice as large as the whole European Union – it also deals with huge cultural differences and it is quite diverse in terms of climatic conditions: equatorial, tropical and sub-tropical. Brazil is still emerging economically. Compared with its South American neighbours, this country has the largest and most active internal market – with over 200 million habitants – next to an increasing foreign trade in fresh and processed food. To be able to settle under such conditions, strong relations were crucial to be assertive and become a solid organisation.

Perfect match

Despite being a relatively new subsidiary, our research and commercial activities have been present for over more than fifteen years in the country. Back then, our first and most solid partnership was set with a local seed company called Agristar, one of the top professional and structured national seed organisations with a vast knowledge and deep understanding of the vegetable market. The perfect match between Enza Zaden's drive for breeding and innovation and Agristar's assertive market vision and sales force made our efforts worth combining. Such strong synergy not only allowed the development of a solid portfolio like our short day onion range, but also paved the road for further steps.

Right choices

Looking back on these recent years since our own Enza Zaden structure was established, it's evident how fundamental it was to make the right choices. We are showing to be not only one of the most innovative companies in vegetable breeding, but also a flexible, focused and long-term strategy driven organisation. Most of all, the loyalty to our values, to our past history and to the partnerships that we continuously build around us, remains the key to our successes. Enza Zaden Brazil is presently active in all major areas where vegetable crops are professionally grown in our territory, represented by a large number of specialised local dealers and continuously expanding our portfolio of the most relevant crops.

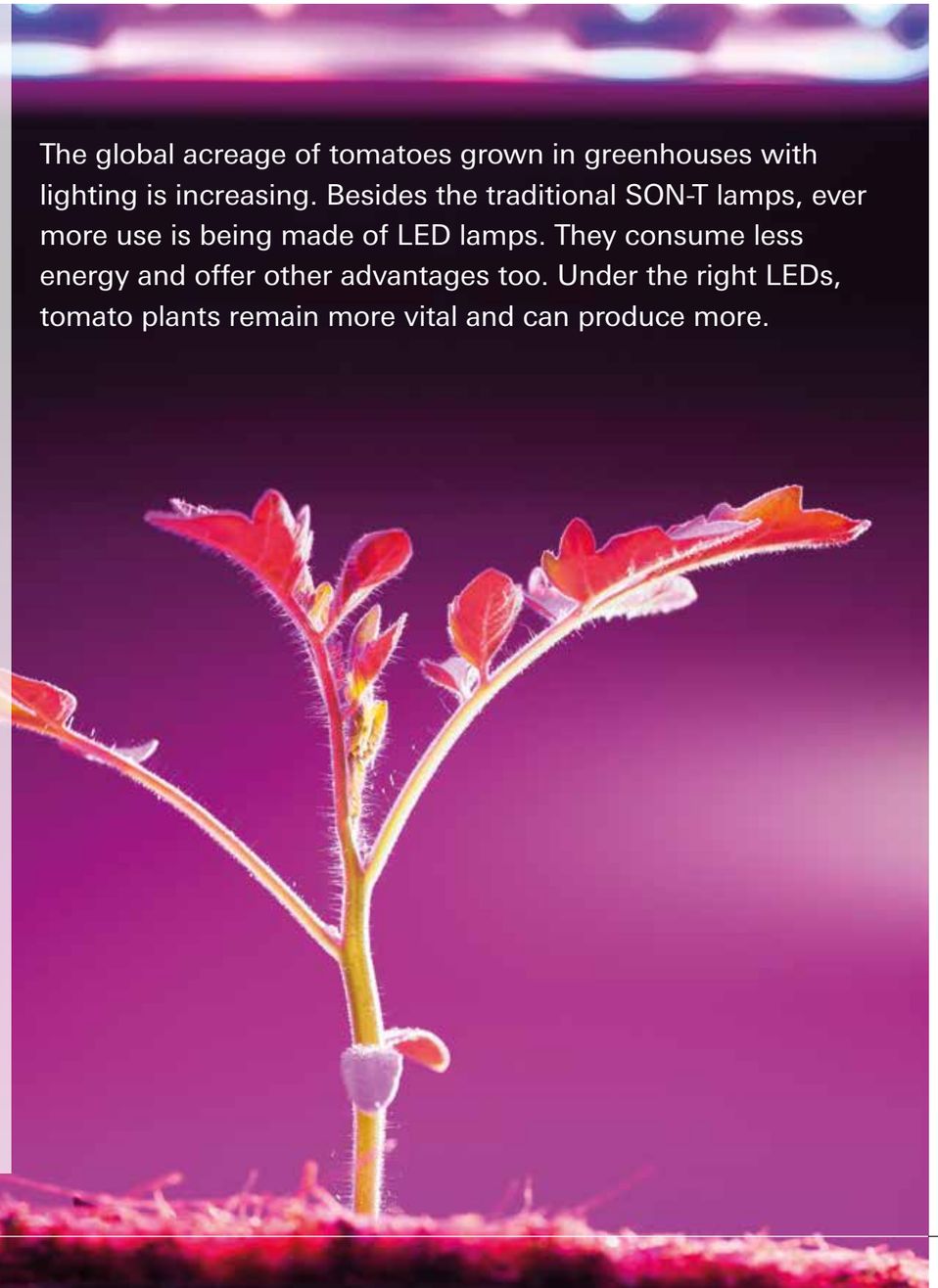
The more we expand our activities and increase our team, partners and commercial network, the less limited we are for the future and the more opportunities seem to appear on our radar.

Jean-François Hardouin has worked as General Manager for Enza Zaden Brazil since December 2010. He believes that loyalty to the corporate values, to the past history and to the partnerships that are continuously built, are the key to success. Strong relations are crucial to be assertive and become a solid organisation.

Green light for LEDs in the cultivation of tomatoes

Specific spectrum

LED lamps enable you to offer your crops a very specific light spectrum in periods in which they may benefit from some extra light. The ideal recipe in terms of spectrum and the duration and intensity of the lighting varies from crop to crop and is partly dependent on the time of year and the stage in the plants' development. Most crops, including tomato, exploit red and blue light in particular for their photosynthesis. Light of other colours is used much less for that purpose.
So it's not surprising that LED systems intended for horticultural use almost always consist of combinations of (many) red and (a few) blue LEDs. LED lamps moreover need less energy to produce a certain number of photons than SON-T lamps, making them more efficient on two fronts.



The global acreage of tomatoes grown in greenhouses with lighting is increasing. Besides the traditional SON-T lamps, ever more use is being made of LED lamps. They consume less energy and offer other advantages too. Under the right LEDs, tomato plants remain more vital and can produce more.

The acreage of tomatoes grown in greenhouses with LED lighting is still fairly modest, but is expanding every year. In many cases – especially in North-West Europe and North America – LED lighting is used to supplement SON-T lighting. Such systems, with SON-T lamps above the crop and LED lighting between the rows of plants, are also referred to as 'hybrid lighting'.
"So far, hybrid lighting has led to the best cultivation results under the natural light and climate conditions prevailing here," says Crop Specialist Tomato Marc Mens. "Besides light, SON-T lamps also emit a lot of heat radiation, and plants really enjoy that heat coming from above. It also enables you to set your heating pipes to a lower temperature, which may imply extra advantages. Under 100% LED lamps, plants receive enough light, but it may be a bit colder in the top part of the crop."

Year-round production

One of the tomato growers using hybrid lighting is Wim Peters from the Netherlands. At his modern 16-ha farm he grows Enza Zaden's highly appreciated tasty tomato Campari in just over 5 ha. Part of the acreage is grown with lighting to enable Peters to guarantee his customers a product of a uniform quality all the year round.
"We use grow lighting in 7 ha, for both our plum tomatoes and our Campari, which we market under the brand name Tasty Tom," says the grower. "We initially used only SON-T, but two years ago and then again last year we installed LED lamps between the rows. In my experience, different varieties respond differently to such lighting. The positive effect is more pronounced in a relatively vegetative variety than in a generative variety. We are now growing Campari with hybrid lighting for the second year, and the yields are better than we expected."

More vital and more productive

Peters believes that his crops clearly benefit from the LED lighting between the rows of plants. This way larger parts of the plants receive light of the right composition and intensity to keep their photosynthesis going. The lighting systems also have a favourable effect on the greenhouse climate, keeping the plants vital for longer. "You see the difference especially in spring, which is the most difficult time for plants that were planted in August," says the grower. "Thanks to the LED light they are then still vital and productive enough to produce attractive, large enough clusters of tomatoes. Without LED lighting the plants would be exhausted sooner."

Also 100% LED

In areas with a milder climate, such as northern France, the heat radiation of SON-T lamps does not have so much added value for crops. There, growers could use only LED light. Marc Mens: "I know a French farm that successfully uses only LED lamps in 2 ha. A British farm is even doing so in 2.5 ha. A lot of experimenting is currently being done elsewhere in Europe and in North America, so I expect the acreage of tomatoes grown with LED lighting will increase substantially the coming years. What are still holding back many growers – even growers who are already using SON-T lamps – are the costs involved. You have to carefully weigh up the investment costs against the lower energy costs plus higher yields."

Market leader

Philips Lighting is the undisputed market leader in LED applications for horticulture. Product specialist Frank van Holsteijn focuses entirely on this promising market segment, in which he sees tremendous growth potential. "Interest and enthusiasm are growing every single day," he says. "That's always very clear to me during the excursions that we have been organising for our customers and prospective customers for the past three years. On those excursions we have visited farms and research centres in the Netherlands and the UK. We recently also went to Scandinavia. One grower up there even uses only LEDs because he wants to achieve such a high light intensity that SON-T lamps would generate too much heat. He does have heating pipes at the top of his greenhouse, to enable him to melt snow from his roof when necessary."

Van Holsteijn continues: "Worldwide our LED systems are now being used in a greenhouse acreage of 50 ha for the cultivation of fruit vegetables, mostly tomatoes. In the Netherlands that's just over 20 ha, but growers in other countries are evidently also coming to appreciate the added value of LED lighting. And as far as the costs are concerned: new progress is constantly being made in technology and we make continuous investments to improve our LED lamps' performance and make them even more efficient. The prospect of greater yields for less energy is bound to lower the threshold for many growers. In principle it doesn't make any difference to us whether growers use our SON-T lamps, LED systems or combinations of the two. As for how things will develop in the years to come, I tend to believe that LEDs will ultimately prevail." ■

Event calendar

SEP WEEK36	Asia Fruit Logistica (E)	Hong Kong | Hong Kong
SEP WEEK36	Field Day Germany, 8 September (FD)	Dannstadt-Schauernheim | Germany
SEP WEEK37	Field Day France, 15 September (FD)	Allonnes | France
SEP WEEK38	Field Day Brazil (FD)	Brazil
SEP WEEK39	Field Days Vitalis, 27-30 September (FD)	Voorst | The Netherlands
OCT WEEK 40	Expo Los Reyes (D/FD) in joint attendance with seed dealer Semillas Martinez, Puebla	Mexico
OCT WEEK 40	Fruit Attraction (E)	Madrid | Spain
OCT WEEK 40	Fresh Cut/BBL (FD)	Battipaglia | Italy
OCT WEEK 41	Ahern's Tomato field day (D/FD)	San Quintin, BC | Mexico
OCT WEEK 41	PMA Fresh Summit (C)	Orlando, FL | United States
OCT WEEK 41	Agriworld 2016 (E)	Makuhari Messe | Japan
OCT WEEK 42	Mold Expo, Farmer and Mold tech (E)	Chisinau | Moldova
OCT WEEK 43	KazAgro/KazFarm (E)	Astana | Kazakhstan
NOV WEEK 44	Carolina Sustainable Agriculture Conference (C)	Durham, NC | United States
NOV WEEK 44	Lettuce field day (FD)	Izmir | Turkey
NOV WEEK 44	KIEMSTA, 2-4 November	Cheon-Ahn/S | Korea
NOV WEEK 44	Indagra, 2-6 November	Bucharest | Romania
NOV WEEK 45	APSA, 7-11 November	Incheon | Korea
NOV WEEK 45	Field Days Greece, 7-11 November (FD)	Crete | Greece
NOV WEEK 45	Agriteck Shymkent	Shymkent | Kazakhstan
NOV WEEK 45	Expo Agro Alimentaria Guanajuato 2016	Irapuato | Mexico
NOV WEEK 45	Expo Agro Alimentaria (D/FD))	Irapuato | Mexico
NOV WEEK 46	House Fair Spain (E)	El Ejido, Almería | Spain
NOV WEEK 47	International agricultural YugAgro (E)	Krasnodar | Russia
NOV WEEK 48	Growtech Eurasia, 30 November - 3 December	Antalya | Turkey
NOV WEEK 48	Fresh business expo (E)	Kiev | Ukraine
DEC WEEK 50	Leafy House Fair Spain (E)	Albujón, Murcia | Spain

C = Conference | D= Demo | E = Exhibition | FD = Field Day | M= Meeting

The Partnership
news and views from Enza Zaden

next edition

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Colophon

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the power of healthy food

Added value is the key
At every link in the chain.

Visit our booth at the Asia Fruit Logistica and discover how you make a difference in your market with the Enza Zaden product range. Both conventional and organic.

Organic
Food safety becomes more and more important for consumers worldwide. Therefore the organic market is growing. Vitalis, a subsidiary of Enza Zaden, is the global leader in organic breeding and seed production. Combining Enza Zaden's expertise in breeding and seed technology with Vitalis' experience in organic selection and seed production, results in first-class products.

Visit us
At our booth you'll find a great selection of the Enza Zaden and Vitalis product range. We are happy to talk about this in person. Please visit us and see, feel and taste these products. Our chef will serve you some delicious bites.

the power of healthy food
the power of Enza Zaden