Partnership

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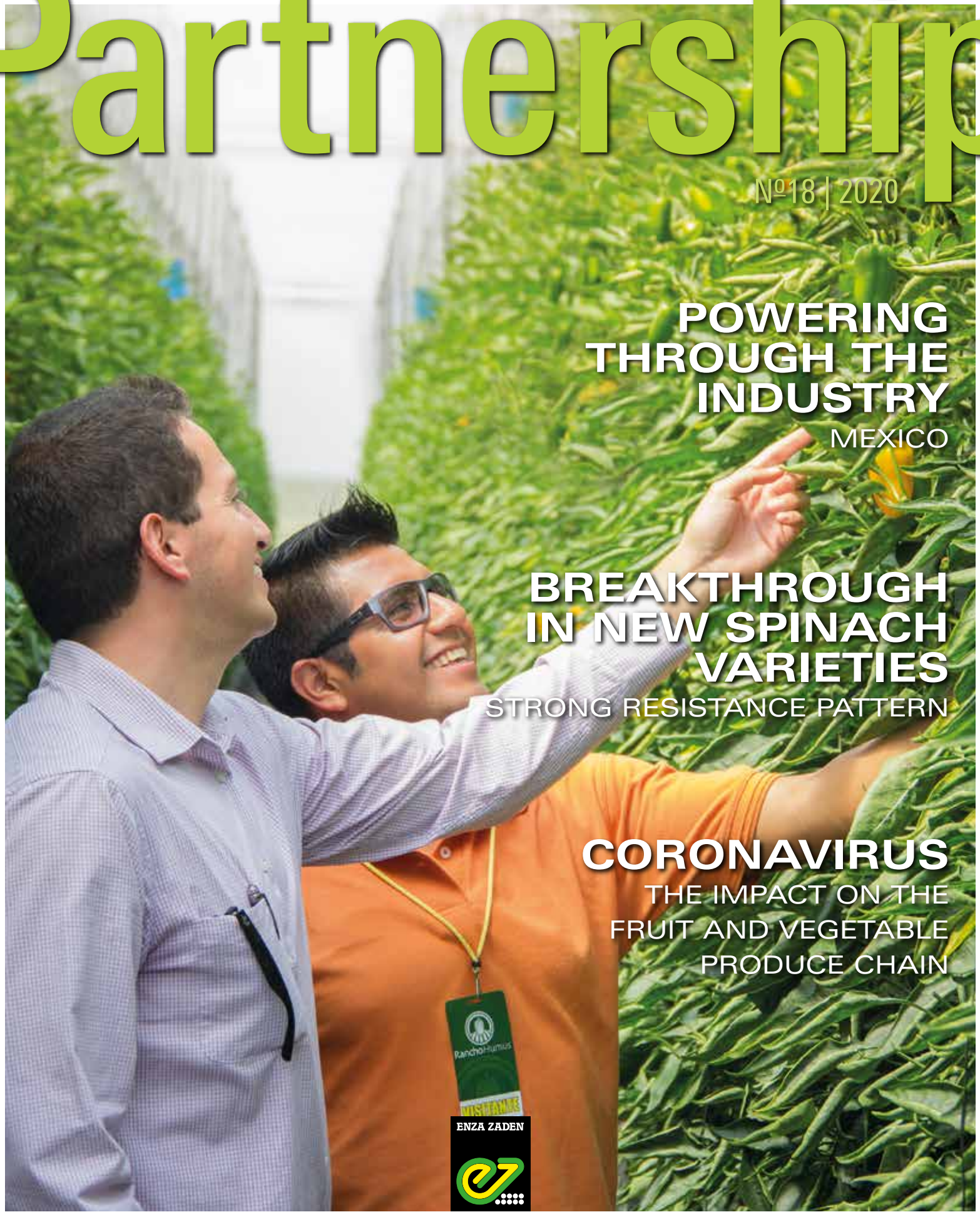


POWERING THROUGH THE INDUSTRY
MEXICO

BREAKTHROUGH IN NEW SPINACH VARIETIES
STRONG RESISTANCE PATTERN

CORONAVIRUS
THE IMPACT ON THE FRUIT AND VEGETABLE PRODUCE CHAIN

Dear reader, dear partner,

Welcome to the 18th edition of the Enza Zaden 'The Partnership' magazine!

These are historic times. In a single season the virus called Covid-19 attacked our health, our social life and our mobility. Governmental interventions aimed at stopping the exponential infection rate had and still have a severe impact on the way we are working and living. Our vulnerability became obvious.

Connecting, collaborating and improvising are essential during such disruptive circumstances. Thanks to our committed employees, partners and our multi-local approach we were able to act quickly and effective to the changes.

That allowed us to continue doing what we always do: providing you with new genetics to improve your business operations. This results in new varieties delivering better yields, new traits or consumer benefits like taste and shelf-life. Because we always realize; only if your business does well, Enza Zaden's business does well.

Together we can do more for an even better future. That is why you can count on our Enza Zaden colleagues to go the extra mile to stay connected to you. During good times and even more during challenging times.

Stay safe!

Jaap Mazereeuw

The Partnership

Cover: Herlindo Martinez, Sr. Sales Representative Central Mexico (right) and Edson Ayala, Owner of Greenova. Location: Greenova at Queretaro, Mexico.

Breakthrough in new spinach varieties with strong resistance pattern

Enza Zaden has a **long history in spinach breeding** but played until recently a modest role in the spinach market. Field expeditions to its areas of origin yielded a great deal of material, expanding the genetic basis for breeding. Several varieties with an improved resistance pattern against downy mildew (Peronospora effusa), among others, are now doing well in the United States.

Spinach is a delicious, sought-after and extremely healthy vegetable. It is also an interesting product for Enza Zaden, although it was never a dominant crop for them. In the past ten years, targeted investments have been made and the extra efforts are now yielding results. Trinette van Selling, Crop Breeding Manager for leafy products, highlights the most important developments. “Our varieties did well with the established players, but other businesses tended to be faster with breeding on resistances,” she said. “The push for improvement came in 2008, when we participated in an initiative of the Centre for Genetic Resources at Wageningen University & Research.”

That year, a team of botanists travelled to Central Asia to collect wild spinach plants. Three years later there was a similar expedition to the Caucasus. Most of the wild species grow in these areas of origin, and there is a lot of genetic variation present. “This was also true with regard to resistances and resilience to pathogens such as downy mildew," notes the Crop Breeding Manager. “There was an urgent need for ‘fresh DNA’ to bring our resistance breeding to a higher level.”

Constant arms race

In many leafy crops, downy mildew is notorious for its ability to develop new strains or physiological races, and to overcome mostly monogenic resistances in plants that are the result of crossings. Lettuce, in fact, has more than 20 known physiological races; spinach has around 17. Growers have no use for varieties that quickly succumb to downy mildew. As a result, spinach breeding has always been highly resistance-driven.

Van Selling: “Whenever a new physiological race shows up, and resistant varieties turn out to be susceptible again, a new genetic response needs to be found and crossed in. Of course, it has to include all the other positive traits that a grower expects from varieties. It is a constant rat race between mutating pathogens on the one hand, and our breeders and other specialists on the other.” In 2015, the breeding programme was given an extra boost, thanks to the combined efforts of the new spinach breeder Jan Dijkstra and molecular biologist Faira Zuidgeest. With the benefit of the breeding work that had been done in previous years, they were able to make rapid tangible progress. This resulted in several new varieties, which have been tested extensively in the past two or three years and measure up well against competitors. Two of these are now on the rise in the Southwestern United States.

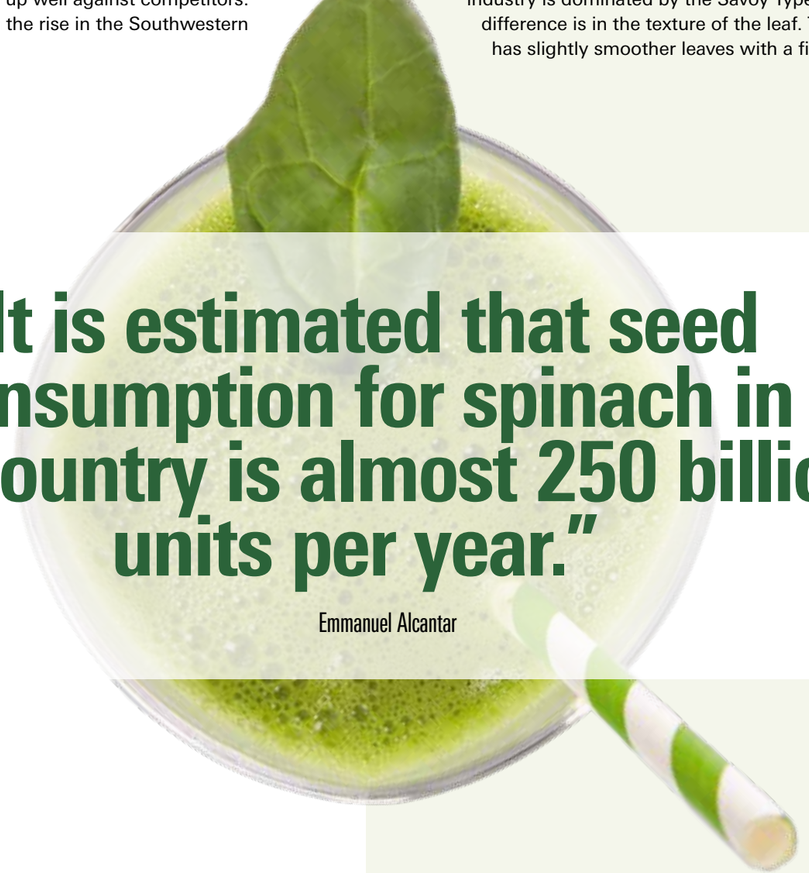
Small plant, big crop

“Spinach is a very important crop here,” explains Sales Representative Emmanuel Alcantar from California. “The main production areas are California in spring and summer and Arizona in the winter period. Some 70,000 acres are cultivated every year. Due to the early harvesting stage, seeds are sown very close together. It is estimated that seed consumption for spinach in our country is almost 250 billion units per year.”

That sounds attractive, but a logical consequence is also that it should be inexpensive and perform well. In addition, all those seeds must be produced first. This means that varieties can be successful only if they perform well in long-term seed production, in addition to having an excellent practical value for growers, processors and consumers. In that respect, resistances to the diverse leaf and root diseases are even more important.

Market segments

Depending on the targeted use, we broadly distinguish between two types of spinach. The Smooth Type is the norm for the fresh market, although the demand for savoy types in this segment is increasing. Cultivation for the processing industry is dominated by the Savoy Type. Alcantar: “The difference is in the texture of the leaf. The Smooth Type has slightly smoother leaves with a fine texture that are very tender. The Savoy type is somewhat coarser, which is no problem at all for the processing industry. It also has a higher yield, so the yield per acre is a lot higher. Most of the commercial varieties are suitable for both fresh-cut and processed market segments.”



“It is estimated that seed consumption for spinach in our country is almost 250 billion units per year.”

Emmanuel Alcantar

Nature remains fickle

Based on the excellent results of the field trials in 2018 and 2019, last winter and spring Enza Zaden launched two new varieties (Trail Boss and Crosstrek) with an improved resistance pattern. Since then, these have been picked up by multiple growers. The Sales Representative expects that this demand will only increase for the time being. In the meantime, it has become clear that varieties, originating from a seed company with an excellent reputation in spinach breeding, has proved to be susceptible to a new physiological race of downy mildew in the winter-spring growing season. “Those varieties probably has little resistance to a new physiological race of downy mildew, while our new varieties do have resistance,” Alcantar explains. “It is actually really sad to see. All at once you have to write off fields of spinach with large percentages of diseased plants. Of course, it is wonderful that our varieties do seem to be resistant to the new strain of mildew. So far we are not seeing any damage in California. We’ll have to wait and see how they do in Arizona, but it does build some confidence.”

Alcantar points out that nature is fickle, and it is impossible to predict whether you will be able to repeat this year’s success next year. “The fact remains that Enza Zaden has established itself very well this year. As a result, I expect we’ll gradually be able to expand our market share - all the more since there are a few bright stars in the current trials again. We would like to introduce the first one very soon.”

Organic and indoor farming

In the United States, organic cultivation is gaining ground in many crops. When asked if this also applies to spinach, Alcantar says: “I would estimate the share of the organic cultivation at about 40%. You have to get to know the varietal material really well before you can get a good seed crop. That takes time. But we are of course working on that together with our organic subsidiary, Vitalis.”

For now, the priority in spinach breeding is expanding the existing portfolio. "There is a great need for fast-growing winter varieties, so we are focusing especially on that," says the Crop Breeding Manager. “We are also seeing an increasing demand from indoor farming. Plant factories with artificial light are not a large market yet but are definitely a rapidly expanding segment - with its own very unique needs and challenges. Now that we also have good research facilities for this market, we can and will respond even more effectively.” ■

Powering through the industry

Enza Zaden Mexico continues to grow alongside country's horticulture expansion

Imagine a country almost as big as the European Union, stretching from Russia to Portugal and from Latvia to Tunisia. Imagine this country with a geography and climate similar to Spain, nestled between two bodies of water and two countries, **one of which possess over 15 trillion USD** in purchasing power and has over 320 million inhabitants. This is how big Mexico is and how it relates to its most important customer: the United States.

The North America Free trade agreements and the increasing consumption of vegetables in the US market are the main drivers of the Mexican produce industry growth in the past years; it is clear that Mexico has risen to the challenge of providing a consistent supply of high quality, tasty produce to its biggest consumer, year round.

Solid agriculture industry

Among the products Mexico exports: cucumbers, sweet peppers, hot peppers, tomatoes, avocadoes, berries, tequila and beer. Up to 50 % of fresh tomato consumption in the US comes from fields and greenhouses established in Mexico, that has an export value of over $2,000 million dollars and nearly 4 million metric tons.

"We have the infrastructure, the territorial space and expertise that at this moment cannot be compared with," comments Juan Labastida, Marketing Specialist at Enza Zaden México. "The professionalization and adoption of technology that the Mexican producer has gone through in the past two decades gives the country an incredible competitive advantage in North America. This results in the possibility to compete worldwide."

Mexico's differential advantage

Mexico is not only expansive, but it also has a variety of climates and topographies that allows it to be a year round provider of a wide variety of vegetables and fresh fruits. Vegetable varieties need to take into account the microclimate characteristics of the target growing regions within the country. For example, the northern part of Mexico is more desert-like: dry and hot – perfect for growing peppers, tomatoes and cucumbers in shade houses carrying over 4,000 annual hectares.

Larger growers are capable to move from one region to another in order to diversify their year round offerings, can take advantage of the country's geography to do just that. Antonio de Sainz, General Manager at Enza Zaden México explains: "Production in the Northern states is halted during the summer months when temperatures are too hot, and relocated to more compact, cooler regions in the centre of the country."

According to De Sainz, it is relatively easy to expand throughout the different Mexican regions, as long as water availability is taken into account, alongside with vegetable variety adaptability and the required technology investment. "Most of the growers producing for the export market understand that the technology they use in the North will not be the same technology they will need in Central Mexico. They know that if they move to Central Mexico to grow sweet peppers, they will need a different type of greenhouse. But technology starts with the seed," Labastida explains.

“We understand what the market wants, the challenges growers face and how our varieties can help their business grow.”

Antonio de Sainz

Partners in success

It is in this dynamic, ever-improving, consumer and technology driven environment that Enza Zaden Mexico has found its sweet spot. In the ever-changing world of horticulture, Enza Zaden understands what the market wants, what challenges the Mexican grower faces, and genuinely accompanies him throughout the journey.

“We know what the end consumer expects when purchasing fresh produce; we know our growers need to deliver not only on quality and taste, but shelf life as well. And their buyers need to know that they can be counted on to be year round providers,” De Sainz adds.

Enza Zaden’s goal of gaining Mexican grower’s trust is paying off. The company has a research station in Culiacán where it displays its hybrid’s performance under organic and conventional settings, as well as under shade houses and polycarbonate greenhouses. Growers are encouraged to ask questions and learn how to optimise a variety’s potential.

Growers gradually try out Enza Zaden varieties in their production. As they reap the benefits of handling the variety appropriately through the guidance of Enza Zaden’s team, they add plants to their production. “Growers see us sharing our knowledge with them and genuinely leading them through the process. We listen to their needs and the challenges they face. We understand how our varieties can help their business grow and we bring this knowledge to their fields. This relationship is what has helped us grow in Mexico,” explains De Sainz.

Labastida adds: “For the past ten years, Mexico’s horticulture industry has grown at an average of 5 -6 % annually and we have taken advantage of this national growth by overgrowing the market at an estimated annual 10 % base. Our competition works hard, but we have been able to expand our reach and take advantage of this natural growth in the industry.”

Growing together

In the past seven years, Enza Zaden Mexico has seen its vegetable varieties cover more and more Mexican acreage, surpassing the growth of its competitors. Nonetheless, growth is expected to slow down as markets mature and certain geographical areas can no longer accommodate greenhouses. “The goal is to gain greater grower participation inside their existing acreage,” affirms Labastida.

Strengthening relationships has allowed Enza Zaden to develop alongside its growers. When producers are looking to expand into other regions of the country, they ask their Enza Zaden representative to connect them with local representatives in the target area they will be investing in, to ensure they choose a vegetable hybrid that possesses the right adaptability qualities needed for the area. “This is where the importance of having a close relationship with the grower stands out. We grow alongside their production, as they expand to other areas,” De Sainz adds. Consequently, as companies move throughout Mexico, they end up contributing to the transfer of knowledge and technology throughout the country, creating jobs, and eventually increasing and strengthening Mexico’s food production industry.

Mexico has the capacity to produce and export large volumes of high quality, tasty produce year round. It has been investing in the professionalization of its horticulture industry, and continually adapting to market trends and demands. Regardless of what the future holds, Mexico possesses the inner strength and business flexibility needed to surpass expectations. Enza Zaden Mexico will tag along the journey and see its investment reap benefits for years to come.

Sources: The Packer, CIA Factbook, U.S. Census, Interviews.

Herlindo Martinez, Sr. Sales Representative Central Mexico (right), and Edson Ayala, Owner of Greenova.

Did you know?

50%

of fresh tomatoes eaten in the USA are produced in Mexico.

- Sweet peppers are not very popular in local Mexican cuisine. Probably because they are not very spicy.
- Roma tomatoes, originally considered a ‘Mexican tomato’, is now overtaking the U.S. market due to its size, shape, flavour and cooking adaptability which reduces waste.
- 90% of Sweet Peppers grown in Mexico are exported to USA and Canada.
- Slicer type cucumbers are a very popular healthy snack in Mexico.
- About 50% of local lettuce being eaten in Mexico have Enza Zaden genetics. ■

Coronavirus affects society, consumption, sales channels and supply chain

"The coronavirus is a disruptive phenomenon," says market analyst Hans Verwegen. "Trends that were always perceived as relatively stable have been or are being broken. We need to get used to a new reality which is slowly but surely taking shape." In this article we look at **the impact the coronavirus is having** on four areas relevant to the fruit and vegetable product chain: society, the consumer, sales channels and the supply chain.

Society

Among other things, Covid-19 has resulted in a new or increased awareness of the vulnerability of our own health and that of other people. "With social interactions restricted, we have literally been confined to our own immediate surroundings," Verwegen explains. "We have suddenly been confronted with the negative consequences of globalisation. You can't look at the rapid and ferocious spread of the coronavirus in isolation from our strongly globalised society in which people and goods move across large distances rapidly and in huge numbers. By focusing more on what is nearby and familiar to us, we can keep alien threats at bay for longer."

Companies and organisations are now also paying more attention to their vulnerabilities in times of pandemics. How do you organise your work if many employees are forced to stay at home or if your customers can no longer visit you in person, or vice versa? What partners should you choose to ensure you are less at the mercy of border closures? What do official measures mean for your sales channels and how can you anticipate them?

Consumer

One of the most visible and immediate consequences is consumers' shopping behaviour. "People are shopping more carefully. We aren't going to the shops as often as we did, we are buying larger quantities at each visit and we are looking out for special offers more. Online shopping has been given a massive boost, particularly in the under-45 age group. Unsurprisingly, older people are changing their buying behaviour less."

With many people having to sit at home for several months – even if they are continuing to work – people are spending more time cooking healthy meals from scratch. If you can't go out to eat, this is a good way of combining providing quality food for the family and spending quality time with them. "This has given sales of fresh produce a boost, both via physical channels and in particular online," the market analyst notes. According to Kantar, 13.5% of fruit and vegetable sales in the UK in July were online. This could have been even higher had the supply capacity kept up with the sudden change in demand. "Frozen food is also selling well. With people going shopping less often, sales of more perishable

leafy vegetables and pre-packed salads will focus increasingly around varieties with a longer shelf life – an important aspect in the breeding of these crops that Enza Zaden has been looking at for some time through post-harvest research."

Some trends that were already becoming evident, such as local-for-local, more demand for organic products and renewed interest in typical seasonal products, are growing as a result of the coronavirus pandemic. "The need for convenience products will continue to exist, but something is inherently changing," Verwegen continues. "Instead of ready meals, the consumer is now looking for more pre-prepared semi-finished products that still require some cooking at home. People have more time for that now."

It is not yet clear what the consequences will be for demand for packaged or non-packaged products. Although packaging extends the shelf life of products and gives a stronger sense of safety than fruit sold loose in the supermarket, non-packaged products have a cleaner, more sustainable image.

Sales channels

Supermarkets – both physical and online – have the wind in their sails. Other sales channels, such as hospitality, have been hard hit by lockdowns and customer hesitancy the world over. The growth experienced by supermarkets has, of course, been strongest in countries in which eating out of home is common, such as the US. According to IRI, year-on-year sales of vegetables in the US grew by more than 20% from April to June this year and were still up by 15% from July onwards. The figure in fruit was around 10%, although fruit is eaten out of home less often. The same also applies to organic products.

"Work canteens, catering companies and their immediate suppliers such as the fresh-cut industry are also having a tough time," says Verwegen. "And therefore, so are the vegetable producers that sell via these channels. A substantial number of products are mainly sold via the out-of-home channel, varying from exclusive micro vegetables to plain and simple loose, round tomatoes. Producers may well be wondering whether it is wise to limit themselves to one single product segment or one type of client. Differentiation could be a sensible solution." Another way of spreading the risk is to work with other producers in cooperatives or growers' associations. Specialists working together can then continue to provide specific market segments and customers with a bespoke service and take steps together when circumstances cause a segment to drop out for a short or long period of time.

Supply chain

A link has thus been forged to the supply chain for our production column. How has the coronavirus impacted on this? The market analyst: "What the coronavirus has made clear is that long, cross-border supply chains are particularly vulnerable. Where do you get products from if flights are grounded and sea or road transport suddenly takes a lot longer because of restrictions and additional formalities? How do you ensure you have enough people at harvest time if freedom of movement is restricted or more people are off sick? Or when migrant workers can no longer cross borders? It is crystal clear that mechanisation and robotisation can provide a substantial boost in this area." We take a closer look at this in the Technology article in this magazine.

In addition, more attention will have to be paid to ways of shortening supply chains. This benefits the local-for-local trend. And it will also play a role in the further development and growth of PFALs (plant factories with artificial light) in and around large population centres.

"We need to get used to a new reality."

Hans Verwegen

What are you seeing?

The precise consequences for individual regions and countries will of course differ, but in general terms new trends are already appearing on a global scale. Below, some colleagues answer the question as to what developments they are seeing in the areas in which they work.

Young Han, Area Manager Korea & Japan - "COVID-19 made some changes in our society and in fresh market trends. The most important change is the boost in online shopping, because people are avoiding crowded areas. The fresh vegetable market appears to be in good shape and the demand for leafy products is even growing. People are looking for more healthy food. The main issue in production areas is labour shortage. Korea and Japan depend on a South Asian work force and travel restrictions because of the Covid-19 situation prove to be a real bottle neck."

Heverton Teixeira, Commercial Manager, Brazil - "Covid-19 is a promotor of changes in the vegetable and fruit chain. An example are the groceries Hortifruti Natural da Terra and Oba Hortifruti, which responded to the consumer's change in shopping behaviour by instantly launching online ordering applications and expanded services. We also notice a growing and much broader demand for healthy fresh fruits and vegetables that were formerly out of reach for the poorer part of our population.

Prudencio Olivares, Regional Sales Director, Spain - "When disruptions occur, opportunities appear. We just have to anticipate, identify and grab them, like good breeders have been doing for decades. I am optimistic because of the growing demand for fresh, healthy vegetables. Especially amongst the younger generations. They are also open minded towards innovations like non-traditional products and web shops. ■

Horticultural varieties, value chain and innovation

Melon House Fair Spain

The melon market is in a state of constant flux, in terms of both technical production and consumer demand. It has responded to these changes by adapting varieties and concentrating on genetic improvements. This is how Enza Zaden is **making its contribution to the economic system** of melon production and cultivation.

Genci Armero Roca, Sales Manager Iberia and Bernardo Santiago, Crop Specialist Melon.

In order to endow the plant with the characteristics or 'drivers' that determine its success on the market, fluid communications are essential for the parties involved in the value chain. Events such as the 'Melon House Fair', recently held in the Enza Zaden trial field in Murcia, Spain, ensure effective communication.

The melon market

European melon production – excluding watermelon – is dominated by Spain, Italy and France, with Spain being the main exporter in Europe. The chief destinations are Germany, France and the United Kingdom. This was clearly explained by Dr. Hans-Christoph Behr, director of the German agricultural market research firm AMI (Agrarmarkt Informations-Gesellschaft GmbH), in the webinar he presented at the Melon House Fair. He stated that the new melon consumers in Northern Europe are part of young population groups, living in small, even one-person, households. This has led to the development of round, lightweight melon varieties – approximately one kilogram in weight – suitable for fast consumption.

Deseasonalisation

Melon demand is seasonal: it is a refreshing fruit, mainly enjoyed in summer. But a trend for deseasonalisation could be detected, extending consumption for weeks outside the usual season. Mr. David Molina (Ahern Seeds, Honduras) discussed the importance of the very early or late melon varieties in countries exporting out of season in order to extend production schedules.

Adapting to the needs

Three points where plant breeding and varietal improvement plays a decisive role could be identified: agronomic characteristics, postharvest aspects and those affecting the consumer. Those involved – both producers and marketers of seed and fruit – agree with each other in highlighting the significant points showing that the varieties developed by Enza Zaden are adapting to the needs of growers and consumers.

Vicente Marín, representing FRUCA Marketing, a Murcian horticultural production and marketing company, refers to the three points mentioned above. He highlights the introduction of significant phytosanitary resistance in the new varieties. This feature affects production and opens up the possibility of successfully using these varieties in organic farming. It also extends the post-harvest shelf life, which is valuable domestically and indispensable for export. Another improvement is the sweetness and enjoyable texture of the fruit, sought by consumers.

David Molina pointed out that the Galia variety Abisal, for example, combines characteristics that make it versatile in relation to different ecological conditions – it is a strong, disease-resistant plant with a long post-harvest shelf life, advantageous for export, and produces high quality fruit, reflected by consumption.

Targeting the entire value chain

Beatriz López Reyes and Giuseppina Inturrisi, experts in Marketing Intelligence and Client Marketing, respectively, from Enza Zaden Spain, explained how the company's commercial policy meets the needs of its customers. This policy targets the entire value chain, although it does concentrate on the wishes of the end consumer. The minimum requirements of product quality are indisputable: if a variety does not meet them, it is automatically excluded from the programme. Postharvest and agronomic characteristics are added to those of consumer preference and convenience.

Digital communication: here to stay

This review cannot be concluded without making special mention of the digital communication format introduced at the event. This format was structured in such a way that it maximised interactions under the conditions imposed by the current pandemic.

Giuseppina Inturrisi pointed out that during the meeting, 160 digital contacts were made – including with participants located abroad – and 90 face-to-face contacts. The virtual procedure was introduced in response to the difficulties with personal interaction caused by the pandemic. But "the result has been amazing as our customers' reaction has been very positive."

David Molina described his virtual experience: "45-minute meetings were organized in a virtual room with customers, and the company presenter arranged a 'tour' to show the varieties on display. This meeting was linked to a presentation in the field, where the cultivars planted were talked about. The trial material was the topic of discussion in both the room and the field. Brilliant! Although the face-to-face option is irreplaceable, Enza Zaden's pioneering presentations are here to stay, and we hope that they will be developed in the future to directly provide the end customer with product demonstrations."

In short, the communication effort made by Enza Zaden throughout the entire value chain is clearly appreciated by the parties in this chain, offering major advantages to all of them.■

Health of plants and humans calls for smarter working methods

Our sector is currently battling two destructive viruses: ToBRFV and coronavirus. Both are having a major impact on the way we do business. Viruses are emerging as a catalyst for the digitalisation of processes and working methods, both here at Enza and within the fruit and vegetable chain as a whole. For many, this is taking some getting used to. The good news is that **this technological (r)evolution also offers new opportunities and benefits**.

They may both be viruses, but that's where the similarity ends. Tomato Brown Rugose Fruit Virus – a member of the highly persistent Tobamo family – and the far less persistent coronavirus, which is responsible for Covid-19 in humans, have very little in common. Nonetheless, both are making their mark on the way we organise our business processes, go about our work and interact with each other and our external partners. To protect our plant capital and ourselves from viruses, we are taking strict hygiene measures, limiting access to greenhouses and crops, and keeping our distance from each other.

Risk management

The two latter aspects in particular are directly affecting the way we work. Datalab Manager Liesbeth Fijen and Program Manager Technology Nanne Faber know all about that. They are closely involved in coming up with, developing and implementing digital innovations that will allow us to perform better despite – or perhaps even thanks to – the many limitations almost all of us at Enza Zaden are facing.

"It's all about risk management," says Nanne Faber. "The Tobamovirus was already making trials harder to evaluate. And then the coronavirus hit us. When it is no longer responsible for several people to evaluate crops together or meet up, you have to come up with solutions that will help you overcome these problems as best you can. Some of them are there already, and all we have to do is reach out and grasp them. For example, there are already robot trolleys with cameras driving around in greenhouses and drones flying over trial fields. And there are more to come."

Observations Without Borders

Two recurrent themes running through all the initiatives are robotisation and digital support. Both of these can help us to evaluate trials remotely and generate data (for example for phenotyping), process it and share it with each other and our clients. To get this digital transition operating in a structured and fruitful way, the Datalab together with Breeding and Marketing & Sales, came up with the Observations Without Borders idea (original title: Breeding Without Borders), which has been awarded the 2020 Enza Zaden Innovation Award.

Faber: "Essentially, this boils down to collecting crop data in principle using vision technology, sensors, drones and robots. To make all the data accessible, link it to other existing data and present it in a way that will support decision-making. Basically it provides users across Enza Zaden worldwide with a dashboard representing all possible internal and external data for efficient decision making, but also sharing data with our worldwide customers if desired."
"The basis is already there but there is still a lot of development work to be done," says Liesbeth Fijen. "For example, by developing data definitions and validation standards, we can get tools working even better and produce the right insights."

"By making the right tools available, we can look inside greenhouses and at trial fields anywhere in the world."

Nanne Faber

This will ensure all processes at Enza Zaden run more smoothly and will enable us to optimally connect the expertise of all departments, such as breeding, seed production, sales and other disciplines. Marketing & Sales will be able to watch breeding trials directly, for example. "You can also have customers and producers from all over the world watching digitally," the data specialist adds. It works the other way round as well, of course. "By making the right tools available, we can look inside greenhouses and at trial fields anywhere in the world, and we can check the data collected against local standards and needs."

Field events and trade fairs go online

Due to the coronavirus, group meetings and events such as open days and trade fairs are a thing of the past for now. This situation presents a tough challenge for an organisation like Enza Zaden, for whom personal contact with customers is key. But our communications department quickly picked up the gauntlet and is now working on relevant digital events with local marketing and communication specialists.

Varied programmes

"In the current circumstances, digital events are necessary if we are to continue to run our field days and showcase and profile new varieties," Communications Manager Edith Bakker explains. "We create online options for organising field days. We want to work together internationally in this area. There will be digital campaigns around an event or theme, with plenty of digital contact points with our customers, and if possible physical ones too – although the possibilities for those will be very limited. We will be aiming to present varied and exciting programmes with personal presentations from different locations, video content and graphics. Naturally, participants will have plenty of options for sharing their feedback and asking questions."

Personal contact

Does the switch to online mean that personal contact is now a thing of the past? "Definitely not," Bakker emphasises. "After all, personal contact with customers is one of our distinguishing features. We want to keep it that way, but we will have to organise things differently – more one-on-one. I can definitely see added value in online events for keeping customers and prospects informed on a large scale and involving them in our activities. The internet and digital collaboration can't replace everything, but it does give us opportunities to reach out to our stakeholders in a smart, interactive way. The fact that everyone can visit online events from their home or workplace also has practical benefits, of course, as it saves a lot of time and money." ■

Hybrids

More complex | More complete | And more added value

When breeders produced the first varieties by cross-breeding back in the early 20th century, they discovered that they often performed better than the true-to-type cultivars in use at the time. It would be another 50 years before these hybrids gained **widespread acceptance in agriculture and horticulture**, but since the 1950s they have gone on to become a permanent fixture.

In a nutshell, growers of a true-to-type – i.e. open-pollinated (OP) – variety, use seed from the previous harvest for their next production. A hybrid, on the other hand, is a cross between two true-to-type, fixed parent lines. The result is a uniform variety with significant added value. "With a hybrid, 1x2 doesn't make 2 but 3 or more," says Wouter Lindeman, Crop Research Manager Pepper. "That comes from the heterosis effect, in which traits in a hybrid are expressed more strongly than in either of the two parent lines. Because a hybrid obtains the genetic properties of both parents, it combines more traits and therefore more genetic variation than an OP variety." This enables breeders to combine resistances in a single hybrid which could not be combined in a true-to-type variety. This not only applies to disease resistance genes but also to a large number of other traits, such as improved resilience to abiotic stress factors e.g. the ability to perform well in both wet and dry climates and on saline soils. Thanks to this environmental resilience, they are better able to cope with climate change. All in one single variety!

Complex and labour-intensive

Because of the crossing work involved, breeding F1-hybrids is even more complex than the already time-consuming selection process for true-to-type (i.e. open-pollinated) varieties. Lindeman: "First we have to develop uniform parent lines and fix them, in order to produce hybrid seed the following year. These test-crossings are trialled for two years before varieties with added value reach the commercial stage. Producing large quantities of seed for commercial sales requires large numbers of crossings and is therefore very labour-intensive."

In our breeding work, to avoid manual emasculation and thus simplifying the crossing procedure, we are increasingly focusing on varieties of which the mother lines don't produce pollen and are therefore male sterile. That saves us having to pollinate manually for seed production because we can leave the pollination to insects.

When it comes to seed quality, the choice of mother plant is crucial. After all, the seed of the hybrid is harvested from the mother line, so breeders prefer to select a mother line with the capacity to produce a lot of high-quality seed.

Challenges

A hybrid variety therefore offers many agronomic advantages, but is complex and presents quite some challenges, both for breeding and seed production. For example, the female and male

lines might flower at different times meaning that the female line is ready for pollination while the male has already or still hasn't flowered. This can result in suboptimal or minimal seed production. The breeder therefore has to make sure the two parent lines are properly synchronised.

Therefore, seed production of F1-hybrids is more challenging and time-consuming compared to OP varieties. For some crops, such as lettuce, it is not viable, and may not even be possible, to develop hybrids. Growers of these crops therefore still use true-to-type varieties.

Biotechnology in development of hybrids

As mentioned above, a breeder of a hybrid is bringing multiple traits together because the genes of two parents are being combined. More genetic variations therefore means more properties to select on and to take into account, making the process more wide-ranging, more complex and therefore more time-consuming. Lindeman: "One parent will have the one trait we want and the other parent will have the other. We have to do this for dozens of traits in a single variety. And as mentioned before, we are not just talking about a single resistance, but several different ones and colour, shape, flavour and abiotic factors such as resilience to salt, drought or wet conditions."

How do we tackle tasks on this scale and with this complexity in a quick and convenient way? Unlike breeders in the early 20th century, these days we have techniques at our disposal for things like introgression of traits or producing uniform parent lines more quickly. We can already use marker technology to select for the presence of specific properties in seedlings, which allows breeders to process larger populations without having to grow the plants on to the adult stage. This saves a significant amount of time in the breeding process and makes our work much more targeted and more efficient.

Straight from gamete to embryo

In many crops, the use of doubled haploids, or DHs, also speeds up the process because the lines made using this technique are immediately completely uniform. In this technique, a pollen cell or egg cell, which only contains one copy of each chromosome, is used to produce a plant with two copies of the same chromosome. Because the copies are identical, any variation in the line has been eliminated and it can be used immediately as a potential parent line of a hybrid variety. "This technique also simplifies the fixing of complex traits where many genes are involved," explains Manager Research & Applications Xana Verweij. "This makes it possible to continuously improve the fixed parental lines that generate the hybrids. In this technique, we put the gametes under stress, for example under the influence of heat. The cell's survival mechanism kicks in and the cell can therefore suddenly do something completely different from what it is used to doing, such as develop into an embryo and duplicate its chromosome number. To do this, we have to apply the right stress factors at exactly the right time. We are undertaking research to identify which stress factors induce double haploids in various Enza Zaden crops."

"The use of Double Haploids makes it possible to continuously improve the fixed parental lines that generate the hybrids."

Xana Verweij

Reflections

The combination of the marker technology and DHs therefore enables us to efficiently combine a large number of traits in a hybrid variety, which ultimately results in a hybrid that performs better and produces higher quality seed. But the quality comes with a higher price tag than a self-propagated, true-to-type strain. In addition, growers are unable to produce hybrid seed themselves and are therefore in a sense dependent on seed companies. Lindeman: "Also, it is often said that replacing local true-to-type varieties by hybrids will be at the expense of genetic diversity. That is true if no additional measures are taken. But seed companies have an interest in this diversity, and public authorities are also aware of how important it is. Action is therefore being taken across the globe to collect and preserve this diversity in gene banks."

The advantages of hybrid varieties are considerable for growers. They therefore switch to hybrids whenever they have the opportunity and can invest in them.

Future and challenges

And what of the future? Of course, it remains to be seen how the process of developing hybrid varieties can be made increasingly more efficient and quicker, for example by getting plants to flower earlier, including outside their normal flowering period. Plants would then be generative more often throughout the year. "It would also be useful to get a better understanding of the heterosis effect and to be able to track and predict it with genetic markers," Lindeman adds.

Doubled haploids is a technique in which a pollen cell or egg cell is used to produce a plant with two copies of the same chromosome. This uniform line can then be used as a potential parent line of a hybrid variety.
The picture shows an anther (male reproductive organ) encasing pollen cells from which a haploid plant develops.

Choice for organic growers

Organic growers across the globe are increasingly switching to modern hybrid varieties, although open-pollinated organic varieties are still grown on a large scale. "We give organic growers a choice," says Marcel van Diemen, Senior Breeder at Vitalis. "For example, we have noticed that certain true-to-type varieties - such as the red Uchiki Kuri pumpkin - are still very popular with organic growers because of their outstanding resilience, even alongside the hybrid variety Orange Summer. And not just because of the seed price, but also because it is a very reliable variety that grows well under certain difficult conditions. In addition, biodynamic growers prefer true-to-type varieties because they want to be able to make further selections themselves from the varieties they grow. That's much more difficult with hybrid varieties produced from male sterile plants." ■

A fresh approach to 'GRAND FRAIS' produce

"In the world of distribution, Grand Frais is regarded as a fresh food specialist, in contrast to traditional European large-scale retail outlets," says Anthony Escoffier (A.E.), Purchasing Manager of this rather atypical French chain. "Our stores have a commercial area of approximately 1000 m^2, divided into five departments: fruit and vegetables, dairy, meat, fish, and groceries."

"Grand Frais has a fantastic image," adds Hervé de Saint Pierre (HdSP), General Manager of Enza Zaden France. "It is one of the very few chains still growing significantly. Producers certainly appreciate the fact that their buyers are genuine product specialists who really care about quality."

Four years ago, Grand Frais and Enza Zaden formed a partnership for the production and distribution of two specific tomato varieties. We have been speaking to the two managers to discover more about this cooperative relationship.

How is Grand Frais positioned on the (international) market?

A.E. "We now have 240 stores in France, one in Belgium and two in Italy, in Turin. We wanted to test our concept in Italy before expanding further into the Italian market. The two stores in Turin are proving very successful, and we plan to open new stores in Italy over the next five years."

What has been key to the success of Grand Frais?

A.E. "Grand Frais quickly understood that the space left in the market by Large Scale Distribution was very tight. So, we decided to take a completely fresh approach to our work and our customer service rather than adopting the standard system proposed elsewhere. We encourage our customers to ask questions when they shop. They might, for example, inquire how to use a product, what it tastes like, or how long it will keep. Within the chain, we have developed partnerships with suppliers all over the world. Fostering these relationships with producers and customers creates a win/win situation, with the emphasis on absolute transparency."

HdSP "Grand Frais works closely with their suppliers, especially their growers. This strong relationship enables them to offer their customers high-quality products at a reasonable price. Grand Frais shops are often located next to large hypermarkets. They also sell specific products you are unlikely to find in other outlets."

How has Enza Zaden contributed to this success?

A.E. "Enza Zaden promoted a three-way discussion between the grower, the retailer, and themselves - the breeder. Enza Zaden was quick to realise that this approach appealed both to us and our growers. This new way of thinking lends the growers more job satisfaction and at the same time makes our regular customers happier."
HdSP "We gave them the varieties they were looking for. We also offered to do specific follow-ups with the growers to make sure the crops were successful."

How did this cooperation start?

A.E. "A few years ago, we started to explain our new approach – i.e. strategy - to Enza Zaden and other major breeders on the market. We had heard that a new, promising tomato variety called Avalantino was being trialed in Switzerland, and we decided to visit the grower. In the meantime, we had an opportunity to talk with Enza Zaden and they immediately proposed a straightforward collaboration for this new variety."

HdSP "In 2016, Grand Frais was looking for good quality, tasty tomatoes, and we offered them the exclusive for both Avalantino and Campari in France."

What is the added value of this relationship for Grand Frais?

A.E. "We can offer our customers a product that is really different, and we also benefit from our close relationship with the growers!"
HdSP "Grand Frais is making a long-term investment in Avalantino since they have exclusive rights to it. They have been promoting this variety heavily on the radio, and Campari is now sold in their outlets under the SAVEOL brand name 'Les authentiques'. With these two varieties, Grand Frais can offer good quality, tasty tomatoes at a reasonable price. I am quite sure that some consumers are now going to Grand Frais just to buy their Avalantino tomatoes."

What has changed over the years?

A.E. "The mutual trust between all stakeholders and the willingness to be creative."
HdSP "The total production area has grown enormously. We meet at least once a year to discuss other crop opportunities, and we also feel more confident."

What developments are on the horizon, and what does your joint future look like?

A.E. We are keen to source other new varieties for exclusive use and to develop new ways of thinking about our collaborations."
HdSP "We want to improve our contact with the chain and gain a better understanding of their needs and the way they work. We had a global meeting – growers, Enza Zaden and Grand Frais – to discuss Grand Frais' expectations - quality, taste - and to offer our growing advice. On this occasion, growers were able to visit Grand Frais and better understand their expectations.
Grand Frais is opening 20 to 30 stores each year and Avalantino is available in all their stores. So, total production capacity should grow around 15% a year. Our partnership is based on confidence and mutual understanding: Enza Zaden France's challenge is to present new, interesting varieties to Grand Frais. We are thinking about the Orange Summer pumpkin, as well as specific cultivars of other crops."

The growers are the link between Enza Zaden and Grand Frais: what has this partnership brought them?

A.E. The growers have a real sense of being part of a team; they no longer feel left out of the process. They are involved in the development strategy for our joint project. In this situation, they pay more attention to new cultivation strategies for even better quality and taste. At the same time, they have the opportunity to exchange their cultivation expertise and practical experience with other growers by comparing and evaluating each other's work." ■

The value of partnerships in a digital world

Jan Panman, Regional Sales Director Enza Zaden Export

In February 2020 our worldwide Export team came together in Almeria, Spain. We had our quarterly sales meeting at the premises of Enza Zaden Spain in El Ejido. During this week we visited the demo greenhouses with our breeders to see the latest tomato and sweet pepper materials and travelled to Murcia for an open field leafy day. Together with lots of international visitors and many distributors from different countries.

This week in Spain early February had become an essential week in the year: it was the moment to see our colleagues from different continents, have coordinated discussions, interact with breeders, product managers and invite key customers to show our materials and create partnership. It had become a tradition and a strong team building exercise during the last 15 years.

Our world has changed since then: closed borders, no international travelling, Covid-19 had and has a huge impact on our private and professional lives. We were worried: how would an international team like our Export team handle this, how could we maintain contact with our distributor networks and customers worldwide? And of course: would everybody and their families remain healthy and safe, in Guatemala, Brazil, Jordan, South Africa, India or Korea, to name a few countries where Enza Zaden is present?

Now, in September 2020, we realize how important online communication has become: web meetings are essential for team cohesion, to intensify our customer contacts. We also realize how important all our local teams on the ground are! Maintaining the flow of variety trials, in field meetings with our customers, supporting breeding programs and information flow. The contact with our distributors worldwide has become stronger, more frequent.

Vegetables are essential in our diets and worldwide the vegetable production areas are still increasing and professionalizing. Enza Zaden has a great, continuously improving product assortment, and fantastic teams and partners throughout the world.

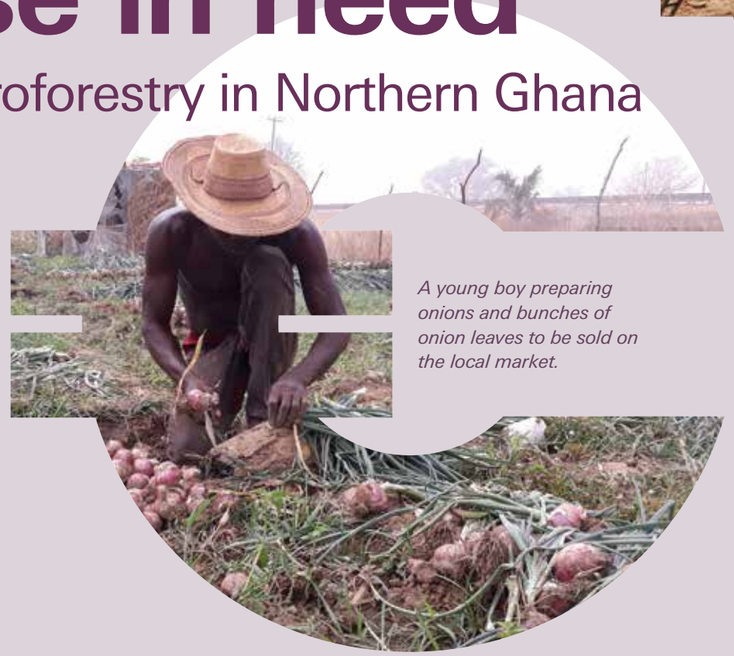
People, Product and Partnership….together.

Jan Panman works for Enza Zaden for more than 23 years. He is an experienced Export Sales Director skilled in Life Sciences, Vegetables, Tropical Farming and Marketing & Sales. Jan has a M.Sc. in Tropical Agronomy from Wageningen Agricultural University. Before the corona crisis he travelled around the world to meet colleagues, growers and distributors and connect with them. He believes that investing in true partnerships results in a strong basis you need in challenging times like this.

Financial support to help those in need

Drip irrigation and agroforestry in Northern Ghana

Can Enza Zaden support our project in rural Northern Ghana where people suffer from hunger and the burden of poverty? This question came from Ghana Organic Agricultural Projects (GOAP, or ELPG in Dutch), a Dutch NGO that aims at environment-conscious agricultural projects for the people of rural Ghana. This organisation planned an extensive project with the objective to improve the health and the economic capacity of people in thirty households.



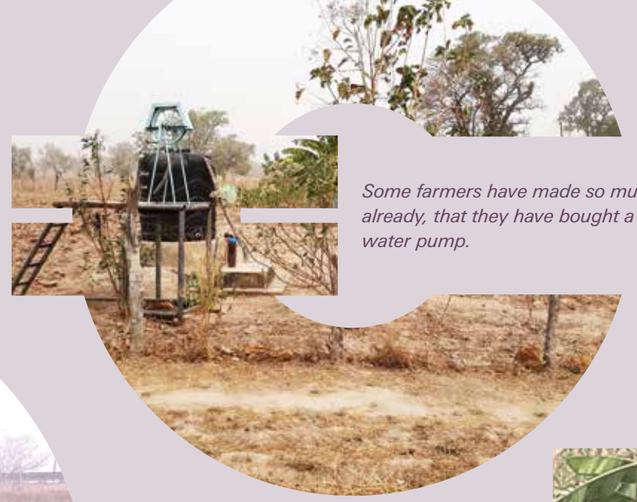
A young boy preparing onions and bunches of onion leaves to be sold on the local market.

Insufficient knowledge, poverty, a non-supporting government, and a changing climate resulting in erratic rainfall and long dry spells, are the most important reasons that rural households in Northern Ghana cannot produce enough food for the growing population. The solution to this is as simple as it is effective: increase water supply by small scale irrigation technology and agribusiness training facilitate the set-up and start of small household managed irrigation farms. “In 2016 we started a pilot with another Dutch NGO,” says GOAP Chairman Kees van Veluw. “Together, we helped two households consisting of 54 members. Their water supply increased enormously as did their net income, thanks to a 3 to 4 times increase of yields. We have now scaled-up this project to 30 households - with about 25 member each - in the West Mamprusi Municipality. All these households are characterized by insufficient water supply in the dry season. Moreover, they are vulnerable and affected by food and cash insecurities and since March this year, as an extra hurdle, the corona crisis.”

Future proof

Initially, these people did not have clean drinking water. As this had been arranged quite well a couple of years ago with simple rope pumps, the next step could be taken: pumping water for irrigation of small gardens of around 0.4 ha. Northern Ghana has a long dry season from November up to May. 15 to 20 years ago, the rainy season started, quite reliably, late May and continued up to end of October. But that has changed tremendously. The rains may start in June and stop in September, are completely failing in the middle of the growing season or may fall so erratically that floods are washing the crops away. Agriculture based on rainfall becomes more and more unreliable and farmers are looking for other ways of producing food. Farming based on irrigation is a good alternative but to start up, investments and training are needed.

Counterpartners Issifu Sulemana and Yussif Abdul-Rahaman state: “With a rope pump for every household and thirty small-scale drip-irrigation plots, we want to improve food and cash security in these households. In addition to drip irrigation, an agroforestry system is applied, at the request of the local farmers themselves. This agricultural system - a combination of (low) vegetable crops and fruit trees such as cashew and mango trees - resist the expected climate extremes much better and is therefore more future proof.“



Some farmers have made so much profit already, that they have bought a solar water pump.

Subsequently, the farmers are trained on crop production with drip-irrigation systems, cashew plantation, compost making, animal keeping and agribusiness. Several hundred farmers have already been trained for this.

COVID-19 crisis

The COVID-19 crisis has even boosted the request of farmers for organic farming techniques such as compost making, botanical pest control, own seed production and agroforestry. Due to the pandamic the transport of agricultural inputs such as chemical fertilizers and chemicals and improved seeds has stopped completely. And what is coming to the North, the government has decided that first the commercial farms should be provided and not the small farmers who mainly produce for themselves. Rural households expect famine because of a much lower food production. Issifu and Yusif are at the moment overwhelmed with farmers who especially want to learn how to make compost. Compost make their livelihoods less dependent on external inputs and drip irrigation makes them less dependent on rainfed agriculture. Large scale agroforestry projects could even make the rainfall more reliable again, but agroforestry is also a new technique for Ghanaian farmers.

Sustainable

“We liked to support these GOAP irrigation projects as it focuses on improving small farmers’ food security and income security in a sustainable way,” explains Yann Delmas, member of the Enza Zaden Corporate Social Development committee. “Enza Zaden can help to really make a difference here. A big plus is the choice for organic farming methods and the agroforestry system with the combination of vegetables, trees and animal raising.” Delmas also points out that the ingeniously easy water rope-pump system ensures the sustainable character of the project as this pump system can easily be repaired locally when needed. “This project model can be well reproduced in other local communities of Northern Ghana and in general all over the Sahel area. Moreover, as the local farmers also financially invest in the irrigation system, we have the guarantee that only motivated farmers are involved. That considerably increases the chance for a success of this project.”

Mr. Apaya, a proud farmer benefiting from his drip-irrigation. On the background, growing banana trees. That is quite rare in Northern Ghana, but thanks to drip-irrigation the trees produce bananas!

Good news, counterpartner Issifu Sulemana recently informed that some farmers produced so much vegetables for home consumption and onions for cash that they could buy a pump on solar power. The rope pump is sold to new drip-irrigation farmers!

Even greater benefits

The project is expected to improve the health of the people through the consumption of potable water and all year-round availability of food in the right quantities and quality. The benefits of more food and clean water may be even greater than the initial plan of a healthier way of living. Van Veluw: “Several times during our visits, people mentioned that more food security also means less violence in the households. Women tell us: ‘Since we have more food in the house, our husbands are beating us less! Moreover, more food and even some products to sell, gives us possibilities to send our children to school and pay the hospital bills if needed.’” ■

EVENT CALENDAR

2020/2021 ◂ OCT NOV DEC JAN FEB MAR APR ▸

44	45	46	47	48	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
OCT	NOV	NOV	NOV	NOV	DEC	DEC	DEC	DEC	JAN	JAN	JAN	JAN	FEB	FEB	FEB	FEB	MAR	MAR	MAR	MAR	APR	APR	APR	APR	MAY	MAY

OCT WEEK 44 — Indagra
Bucharest | Romania

OCT WEEK 44 — Kiemstra
Cheonan-si | South Korea

OCT WEEK 44 — Brassicas Local Seminar ●
Charsznica region | Poland

OCT WEEK 44 — Field Days online ●
Online | Argentina

NOV WEEK 45 — Expo Agro Irapuato 2020
Irapuato | Mexico

NOV WEEK 45 — Leek Local Seminar ●
ŁĐczyca region | Poland

NOV WEEK 46-48 — House Fair Spain ●
Almería | Spain

NOV WEEK 47 — Asia Fruit Logistica ON
All digital edition

NOV WEEK 47 — Sweet Pepper and Tomato seminars ●
Online | Korea and Japan

NOV WEEK 48 — APSA
Shenzhen | China

NOV WEEK 48 — Growtech Eurasia
Antalya | Turkey

NOV WEEK 48 — Exhibition OP&PL crops ●
Krasnodar | Russia

NOV WEEK 48 — Cucumber Local Seminar ●
GrudziĐdz region | Poland

DEC WEEK 49 — Pepper Local Seminar ●
Radom region | Poland

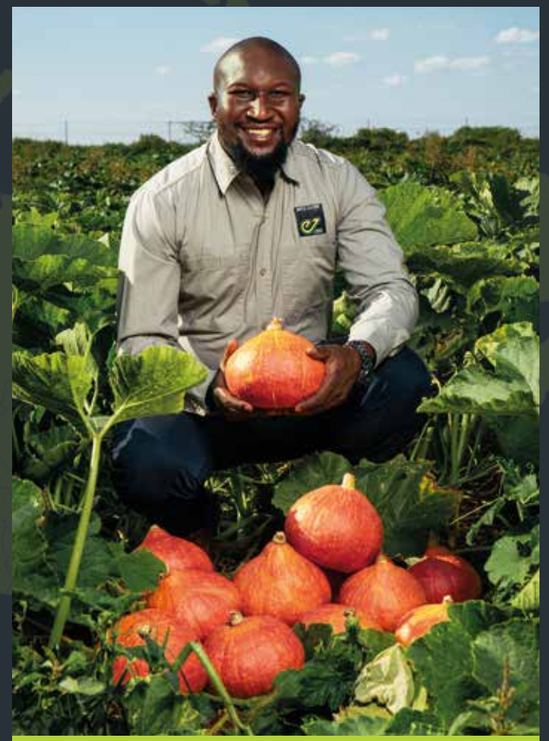
DEC WEEK 48-49 — Online Field days/Demos ●
Online | Brazil

DEC WEEK 48-49 — Online Field days/Demos ●
Online | South Africa

DEC WEEK 50 — Onion Local Seminar ●
Kujawy region | Poland

DEC WEEK 50 — Leafy & OF House Fair ●
El Albujon (Murcia) | Spain

DEC WEEK 50 — Sweet Pepper and Tomato demo ●
Online | Jordan



Due to the coronavirus, events may be adapted to meet local regulations. Please contact your local Enza Zaden contact person for actual information.

More information about our events on enzazaden.com

● = Organized by Enza Zaden

Colophon

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