

# MADE IN HOLLAND

## SEED VALLEY

Leading the world of plant breeding

the multilocal strategy of a family business • sustainably improving agricultural productivity • seed technology provides demonstrable added value • the logistical challenge of global operation • biotechnology for a global industry



Pioneers in international business



# Welcome

Welcome to Seed Valley, the global hub for plant breeding, seed cultivation and seed processing for the professional horticulture industry. In this small region north of Amsterdam, the purposeful hybridisation and selection of seed varieties has been the focus for generations. Initially this was done on a small scale by growers who wanted to improve the yields of their vegetables and ornamentals. Their successes were the prelude to far-reaching specialisation, increases of scale and internationalisation. Successful seed companies also arose elsewhere in the Netherlands in the same way.

The function of the Netherlands as a hub - with Seed Valley as the radiant core - continues today. Today, in 2014, mergers and acquisitions have coalesced many of those former family companies into larger concerns. Some are now part of multinational corporations with a broader focus on life sciences, while others continue to grow on their own.

From this small, fertile country, dozens of breeding companies - supported by specialised service providers and suppliers - are delivering their knowledge, expertise and products to farmers and growers around the globe. They derive their strength from a host of factors, such as entrepreneurship and work ethic, the innovative and highly export-oriented Dutch horticulture industry, the excellent knowledge infrastructure and a government that adequately facilitates the horticulture and seed industries.

Yet this does not diminish the challenges. The world population is growing faster than ever, while fertile agricultural land and clean water are scarce. Meanwhile, farmers and growers must improve the sustainability of their production methods. The Dutch seed industry willingly provides them with the right starting material and the knowledge to use it effectively. Welcome to the world of Seed Valley!

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Enza Zaden:

## The multilocal strategy of a family business

Enza Zaden celebrated its 75th anniversary in 2013. Each of the more than 40 subsidiaries and joint ventures marked the occasion in its own way. "We feel strongly connected to our employees, wherever they are", says general manager Jaap Mazereeuw, who represents the third generation at the family company. He argues that Enza Zaden is not a multinational but rather a multilocal. "As a true family business, we are committed to the customer", he explains. "That is why we prefer to develop new varieties in local markets with local people. They know the market best and are given considerable freedom to pursue their own initiatives."

### The best of both the centralised and distributed approaches

While the breeding and production of vegetable seeds takes place at various locations in different climatic regions, the seed processing, research and support services are centralised in Enkhuizen. This also applies to quality control: both the inside and outside of each seed is scanned with high-tech equipment before it is approved and may be sold.

### Investing in people

Enkhuizen is also home to Enza Academy, offering tailored education and training programmes for young talent, managers and senior managers. The courses are developed in cooperation with renowned French business school INSEAD. "Investing in new knowledge, new products and entrepreneurship also means investing in people", explains managing director marketing & sales Hein Bemelmans. "We do so at all tiers within the company, in various ways and at numerous locations. Employees can always continue to develop and grow towards positions that match their interests and abilities. This explains, in part, why our staff turnover is so low. We have people who have worked here for more than forty years, and we also have employees who are following in their parent's footsteps. So, you see, the Mazereeuw family is not the only one that has become entwined with this company."

### The power of...

The strong interconnectedness resounds in the slogan "The power of...", which Enza Zaden uses in its communications worldwide. "We say what we do and do what we say", asserts Jaap Mazereeuw. "Close to the customer and with respect for local cultures. Now in India, too, where local people are currently establishing our latest branch."

Syngenta:

## Sustainably improving agricultural productivity

For the Swiss multinational Syngenta, the Netherlands is the centre of expertise for vegetables and ornamentals. In addition to new varieties and seed technology, the company also develops integral strategies for crop protection. "Our mission is to improve global agricultural productivity in a sustainable manner", says general manager Michael Kester of Syngenta Nederland. "Genetics, biological crop protection and – where necessary – chemical correction go hand-in-hand to supply the growing world population with food and ornamental plant products. A major part of our vegetable breeding takes place in the Netherlands."

### Four focus areas

Syngenta spends around 1.5 billion euros per year on R&D, which is the full-time task of 20% of the company's personnel. "Breeding is truly a priority area", continues the CEO. "Our company is currently focused on four areas. The first is extensive utilisation of resistant genes, to make the primary production process less dependent on chemical inputs. We also invest heavily in specific seed treatments, which provide the high-grade seed with extra protection against pests and diseases in the seedling stage. Biological control forms the third pillar of our policy, and chemical corrective measures the last. Our objective is the continued shift away from chemicals and toward genetics, because this is the best way to facilitate sustainable agriculture and horticulture."

### Unique infrastructure

According to Peter van der Toorn, global head of breeding for vegetables, the Dutch activities remain crucial to both his vegetable group and Syngenta's ornamental horticulture programme. "Although we operate globally, the Netherlands has a unique infrastructure in terms of knowledge, technology and high-quality services. We are talking 'top tier' in each of these areas. Moreover, the climate for limited collaboration with industry peers is outstanding. This is also reflected in the work of the Seed Valley Programme, which is supported by the entire seed industry."

### Grower the focus

Van der Toorn stresses that the focus remains on the grower. "We strive to provide growers with what they need in order to grow good products locally, do so in a sustainable manner, and get them to consumers. Production, resilience and shelf life are all important aspects. Of course we also work on characteristics important to consumers, such as taste, colour and freshness. To have these products available year round, you must also produce and breed in various climate zones. Ours is truly a global business."

# HOLLAND

Leading the world of plant breeding

The Seed Valley companies occupy around 370 hectares of space in North Holland, divided over 28 sites.

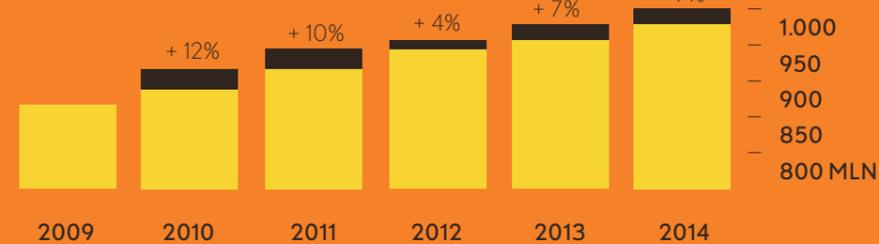


**40%**  
GREENHOUSES

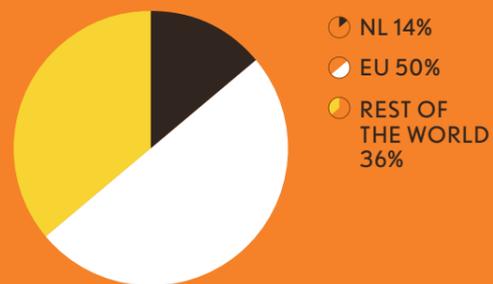


**40%**  
TEST FIELD

## TURNOVER



## EXPORT



Exports form the basis. The growth in turnover outside the Netherlands (2011: +10%) is stronger than the growth within the Netherlands (+3%).

## INNOVATION



**16%**

On average, 16% of the turnover is invested in research and development, with peaks of more than 20% for certain companies.

The total Dutch business sector devotes 1.84% of the GDP to R&D. Source: TNO / HCSS report 'De staat van Nederland Innovatieland 2012' (The state of the Netherlands as a country of innovation, 2012)

**1,84%**

...the annual turnover for starting material in the Netherlands exceeds

**2.000.000.000 euros**

and, of this, 1.8 billion euros is for export sales

...vegetable seeds represent more than half of the turnover for Dutch starting material

...the Dutch breeding industry is responsible for **46% of the global export value** of starting material for vegetables, ornamentals, potatoes and grasses

...**70%** of the vegetable seed used worldwide can be directly or indirectly traced to Seed Valley or breeding companies located elsewhere in the Netherlands

...Seed Valley has endowed an applied genetics chair at the University of Amsterdam since 2013

...the Dutch seed industry is active in more than **100 countries**

...the Dutch seed industry offers excellent career opportunities for young people with relevant training, both within and outside the Netherlands

...the Seed Valley foundation, in collaboration with training institutes, offers courses at various levels

Incotec:

## Seed technology provides demonstrable added value

In 1963, the company then called Royal Sluis (today Seminis/ Monsanto) of Enkhuizen had a world first with the 'Split Pill®': seeds wrapped in a protective jacket, which quickly fell apart after sowing in moist soil. It was the start of a new revolution in seed technology, which provided farmers and horticulturalists with greater assurance that their precious sowing seed will do what it should do: germinate and grow homogeneously to become a healthy, productive crop.

### Spin-off

Seed technology is pre-eminently the domain of Incotec, which began in 1968 as a spin-off from Royal Sluis and in 1989 became independent and got its current name. Under the leadership of general manager Jan Willem Breukink, who was succeeded by former Nunhems CEO Douwe Zijp on 1 March 2014, the company grew to become a globally-operating, independent service provider for the seed industry.

We are not involved in breeding but rather the development of techniques which make it possible to improve the quality of seeds after production. We do this in a number of ways, including selecting seeds on the basis of quality, pre-germinating seed so that they germinate faster and more homogeneously, removing pathogens from seeds, and/or by giving them a coating which includes agents to protect the plant against disease and stimulate its growth, Breukink says. "This now also includes genetic analyses and quality inspections. We offer these services from 13 locations around the world. More than half of our 500 employees work in the Netherlands, and nearly a hundred (85) of them are involved in R&D."

### Demand continues to grow

Until a few years ago, such treatments were usually reserved for relatively expensive horticultural crops for reasons of cost. According to Breukink, there is a clear trend towards using more and more of these high-quality seed treatments and coatings in agriculture as well.

"The demand for quality seed continues to grow", he explains. "Starting material which is less susceptible to pests and diseases and that develops more homogeneously into a highly productive crop is also worth a somewhat higher price. Incotec has much to offer in this regard and we continuously invest in the development of new technology. One of our latest techniques is the disinfection of seed with hot, moist air. It is very precise work, because seed is very sensitive to environmental factors."

### Contact with growers

That the emphasis on R&D is paying off is evident from the impressive sales growth of 15 to 20% per year that Incotec has been achieving since 2009. "Managing the growth is one of our biggest challenges", says the company's founder. "At the same time, we have to keep in touch with the growers. After all, the goal is to make the harvest as successful as possible."

Bejo Zaden:

## The logistical challenge of global operation

The founders of Bejo Zaden began as growers at the end of the 19th century with the breeding of vegetable crops. In 2014, the company has around 1,200 employees, spread across 30 subsidiaries, involved in research, breeding and selection, seed production and processing, quality control, sales and cultivation support.

### Local for local

"In the Netherlands we have two locations, with a total of 450 employees", says CEO John-Pieter Schipper. "All the seed processing and a major part of the research take place at our headquarters in Warmenhuizen, which is located in Seed Valley. This is also where we run the overall business." Like most seed companies, Bejo uses a multilocal approach. "To know and serve the market well, you need to be active locally", explains Schipper. "Preferably with local workers, who are familiar with the local culture and speak the language. So that is how we operate. This applies to the breeding and selection as well as for seed production, which continue non-stop in both hemispheres."

### Central processing

Sooner or later all the produced seed reaches Warmenhuizen, where it is subjected to strict quality controls. If it passes the quality control tests, the seed goes to a large, climate-controlled storage warehouse. From Warmenhuizen, it is then coated or primed if necessary and put in the proper packaging, after which it finds its way to professional growers in more than 100 countries.

### Everything under control

The internal logistics of seed companies is extremely complex and requires careful organisation. Many employees are needed just to keep everything moving in the right direction and keep track of it all. Schipper explains: "The interesting thing about this industry is that we have the entire process under our control, from the first cross-pollination to the sale and cultivation support. First and foremost this requires foresight, as a breeding process takes years. New technology has greatly accelerated the selection process, but vegetable crops remain natural products that require time to demonstrate their value. And the logistics are, indeed, a challenge. Apparently we do well in that regard, because we continue to realise growth every year. As an outsider, I see it is a privilege to be able to run this wonderful family business."

Keygene:

## Biotechnology for a global industry

In 1989, Dutch breeders established a service company that focuses entirely on precompetitive DNA research. Twenty-five years later, Keygene of Wageningen is one of the largest and most influential biotech companies in the world in the field of plant genetics.

CEO and special professor Dr Arjen van Tunen explains: "The tools we develop enable breeders to work more quickly and effectively. Initially, we worked exclusively for our shareholders, such as Enza Zaden and Rijk Zwaan. We are now beyond that stage. Keygene serves the entire global seed industry for both horticultural and agricultural crops." The company does this with 130 employees who work at the headquarters in Wageningen (NL), a branch in Rockville, Maryland (USA) and a joint lab attached to the Shanghai Institute for Biological Sciences in China.

### Markers, mutations and fingerprinting

Biotechnology is not always understood by the general public and is often viewed with suspicion. "I would like to emphasise that we do not focus on the genetic modification of organisms with species-foreign DNA", says Van Tunen. "Our people analyse the DNA of species and individual plants, create gene maps, induce mutations that could have also arisen naturally and develop marker and fingerprinting technology to make genes and gene combinations recognisable."

### Bioinformatics

A discipline that is growing in importance is bioinformatics: bringing order to the overwhelming amount of genetic information that Keygene, its clients, and universities obtain and providing practical means of accessing this information for research and plant breeding purposes. At crop level, Keygene refers to these information catalogues as 'cropedias'.

### Breeding by design

Keygene has developed hundreds of markers that enable breeders to make specific chromosome properties visible – properties that determine the shelf life of a cucumber, the colour of a carrot or sweet pepper, or resistance to a particular disease, for example. "Marker technology, fingerprinting and bioinformatics remain important fields of research", says the CEO and professor. "At the request of our clients we are also focusing on an increasing number of crops, including important agricultural crops. An area in which we certainly plan to develop further in the coming years is research into phenotyping – that is the outward expression of genes and gene combinations – and mutagenesis. As we continue to increase our knowledge of DNA and learn to better exploit it we come ever closer to the ideal situation: breeding by design."

# The driving force of the Triple Helix

Two driving forces behind the success of the Dutch agricultural sector, including the seed industry, are the unique knowledge infrastructure and the close public-private collaboration. The lines of communication between government, research institutes and the business community are strong and form the cornerstone of a decades-old alliance known as the Triple Helix.

## Life sciences from A to Z

"The public-private collaboration in the Dutch agricultural sector is close and serves to give direction to the research", says Ernst van den Ende, general director of the Plant Sciences Group at Wageningen University & Research centre. "In addition to education and knowledge transfer, the government facilitates both fundamental and applied research, while industry focuses on research into practical applications. Our work also brings both aspects together. We cover the full breadth of life sciences, primary production systems and food processing, ranging from molecular biology and genetics to organic farming systems. I know of no other knowledge centre in the world that embraces this full spectrum of domains. For some crops, including tomato, potato and cabbage crops, Wageningen UR is the world's leading knowledge and expertise centre."

## National and international projects

Other universities also leave their mark on breeding research and seed technology. Van den Ende specifically mentions the University of Amsterdam, where Seed Valley established a plant genetics chair a few years ago, as well as the universities of Leiden and Utrecht. Wageningen UR is increasingly collaborating with these partners and other institutions abroad for large-scale projects, such as genome research. "Determining the precise genetic structure of crops is a huge task, yet one that is of great importance to global food production", he continues. "And for the breeding companies that serve as the suppliers. Thanks to this research they can more efficiently cross and select for characteristics such as disease resistance, yield and resistance to abiotic stress factors such as drought."

## Sector association Plantum

The vast majority of the dozens of breeding, propagation and production companies in the Netherlands are members of sector association Plantum, which is highly regarded internationally. Plantum promotes the general interests of its members in the Netherlands, the European Union and – through the International Seed Federation – even globally. "When we say 'general interests' we are talking about matters such as free trade, phytosanitary and certification issues, international training courses and intellectual property", explains director Niels Louwaars. "There are few countries where plant-based starting material represents such a sizeable economic interest that a heavily staffed sector association like Plantum justifies its existence. The Netherlands is certainly one of them. Vibrant clusters such as Seed Valley effectively complement the (inter) national representation of the sector."



source Beautiful Minds

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