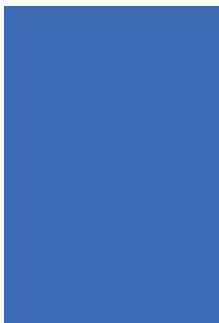


China:

# How do you feed a fast-growing world power?

*How Dutch knowledge and innovative technology  
help China with sustainable and safe food production*



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## 1. China:

# an efficiency gain in food production should help to feed the urban population

China has the world's largest population. The country has experienced incredibly rapid development over the past thirty years. This developing country's transformation into a developed and highly industrialized country resulted in a mass migration from the countryside to the cities. China has therefore subsequently become a country of 'mega-cities'. Dozens of cities now have more than five million inhabitants. It goes without saying all of this massively impacts the need for a good food supply. There's now also an increasing demand for safe and healthy food as a result of the rapidly growing urban population and especially because of the rising average income.

A middle class has now emerged in China which has money left over for fresh and high-quality fruit and vegetables. Food safety and food security play an important role here. Healthy living and healthy food are both gaining importance, especially among young people.

As the rapid urban growth is devouring more and more of the agricultural land, producing efficiently and sustainably on any of the remaining available land is an absolute must. Dutch solutions for covered crops are now becoming more popular in order to realise this ambition. Current traditional agriculture and horticulture in China result in relatively low levels of productivity per hectare. High water consumption and heavy industry have resulted in a deterioration in water quality.

The Chinese government also deems becoming more self-sufficient where the food supply is concerned to be of crucial importance for social stability. The Covid pandemic, climate change, and the war in Ukraine have further reinforced this realisation. Increasing its own food production has been one of the Chinese



government's spearheads for some time. It has already identified the agricultural sector as a focus sector for the second time in its Five Year Plan, with plenty of attention devoted to high-tech solutions.

### Specific challenges

Suitable soil, which isn't too far removed from the sales market, is needed in order to effectively and efficiently produce vegetables, fruit, and other horticultural products. Sufficient and clean water and sufficient



*“China needs to be able to educate and train its local employees, who can then eventually take over the modern horticultural companies’ business operations.”*

workers with cultivation knowledge and skills are also an absolute must. Rapid urbanisation, industrialisation, and increasing prosperity are putting all of these factors under immense pressure.

Building modern greenhouses is one thing, but growing high-quality vegetables, flowers, and fruit under glass is perhaps an even greater challenge. Producing good food in a more intensive and technological manner demands a great deal of expertise. There’s currently a major shortage of this in China. There were often very one-sided views where technology was concerned in the past and people didn’t immediately think about putting a greenhouse into operation once it was built.

That’s why Dutch horticultural suppliers are now devoting a great deal more time and energy to sourcing and training Chinese horticultural staff. “Providing customers with training and an excellent service is always important, in addition to building physical cultivation systems,” according to Fulco Wijdooge from Ridder. He is the General Manager at the Chinese branch of the energy screens and climate systems supplier.



Wijdooge: “At the start of projects, the management of the greenhouse is sometimes also provided or supported by Dutch companies. This is because knowledge and experience of operational management are still inadequate in China but is becoming an increasingly important factor. China needs to be able to educate and train its local employees, who can then eventually take over the modern horticultural companies’ business operations.”

## **Investors and project developers invest in greenhouse complexes**

The Chinese government is so focussed on the production of fresh horticultural products that it’s encouraging all kinds of companies from other sectors, as well as project developers,



to build greenhouses too. It’s attractive for investors from sectors like real estate, building materials, or ICT to invest in a greenhouse complex. They’ll sometimes also have to do this in order to obtain goodwill and permits to develop their projects.

“The investments in high-tech horticulture made by these project developers are often ‘compensation’ in return for being able to carry out their actual plans. The ‘return on investment’ in horticultural investments is currently still too uncertain for investors to choose this as the main goal,” according to Gert Dral, the Chinese advisor for Dutch Greenhouse Delta. “We’re expecting this to become a much more popular choice once the returns start to increase due to more and better cultivation knowledge.”

## 2.

# The Dutch horticultural cluster and Dutch Greenhouse Delta help China to sustainably secure its own production

**China has the world's largest area of covered cultivation. The majority consists of poly greenhouses. Approximately 10,000 hectares of the covered surface area includes glass greenhouses and another 500 hectares are added to this every year (measured in 2021). Only a small part of this is comparable to Dutch standards. Not all high-tech greenhouses are being optimally used.**

In the past, people didn't particularly think about a greenhouse's operation once it had been built. One of the reasons for this was the fact that many investors didn't have any kind of horticultural background. "The required greenhouse complexes have already been built near major cities like Shanghai, but some are still under development too, like in Beijing. This ensures the food miles are kept low and the chains short, resulting in the ability to effectively guarantee food quality and food security," according to Gloria Zhang, Ludvig Svensson Climate Screens' General Manager for China. China is looking for partners who can offer advanced and high-tech solutions, in order to become self-sufficient in food production. The Dutch horticultural cluster is a global leader in food and greenery production under controlled conditions. This cluster, therefore, has all the necessary in-house knowledge and solutions to help the Chinese to efficiently, sustainably, and safely design their food production. But the Netherlands must continue to distinguish itself and operate as one unit as much as possible in order to fulfill that role.

"Countries like France, Israel, South Korea, and China are also developing excellent technological solutions themselves, but the strength of the Dutch 'horticultural ecosystem'



lies in the integrated process approach. The ability to look beyond disciplines and to establish connections between different disciplines and parts of a project is what makes the Netherlands truly stand out," according to Gert Dral. "Dutch suppliers can effectively oversee, prepare and manage a process, thanks to the excellent collaborations and a multitude of international experience."

## A key role for Dutch Greenhouse Delta

It's crucial for Dutch horticultural partners to work together, making sure they can optimally respond and rise to the challenges in China. Suppliers, the Dutch government, and



knowledge institutions can profile themselves much more effectively than individual parties by joining forces, which will ultimately result in the high-quality total solutions truly standing out. Dutch Greenhouse Delta will play a key role in this. This is evident, for example, in how clients are approached. The Chinese government plays a major role as an initiator and lender, such as in granting approval for land use. DGD's added value is that it's seen as a neutral and objective platform on the Chinese side, representing the sector and recommending targeted solutions. With its own representative in the field, this opens doors for both companies and government authorities. "DGD can initiate

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horticultural projects for clusters of horticultural suppliers by networking locally and exploring possibilities", Fulco Wijdooge explains.

This will inevitably result in new projects. The Jiashan Sino-Dutch Agropark, which is to expand to 450 hectares, is an example of this. This Agropark demonstrates how Dutch horticultural knowledge and technology can offer an integrated solution for growing sufficient fresh and healthy vegetables for the Yangtze River Delta population.

### **A need for mid-tech solutions too**

Making sure Chinese horticulture can take rapid steps forward isn't just about coming up with modern total solutions for safe and secure food production. Dutch suppliers of greenhouse horticulture solutions have noticed that capitalising on opportunities in the mid-tech segment is also important and offers many short-term opportunities. From low-tech to mid-tech often represents a smaller step. The covered cultivation of vegetables, fruit, and flowers is going through some major changes all over China. "This varies from very large-scale high-tech greenhouses to small-scale companies which are experiencing strong technical developments. High-quality Venlo greenhouses are emerging, but the total area of tunnel greenhouses for the cultivation of soft

fruit, for example, is still growing rapidly," says Fulco Wijdooge.

Chinese horticulture will soon be able to take a huge leap forward if the many existing, smaller horticultural companies, of one to three hectares in size, manage to improve their business operations with relatively simple forms of technology - like a simple climate computer or irrigation unit. "These will certainly be very welcome tools where there currently isn't a great deal of knowledge and automation", according to Fulco Wijdooge.

## Partnerships

Dutch Greenhouse Delta started a PIB (Partners for International Business) in China in January 2021, together with the Netherlands Enterprise

Agency (RVO). This public-private partnership is called the 'NL Protected Agri Alliance China'. Its aim is to position the Dutch greenhouse horticulture sector in China as a partner for the development and realisation of integrated and sustainable high-tech greenhouse horticulture agro parks near urban areas and agglomerations. The entire chain needs to be mapped out in order to realise sustainable success and the process from investment to the sale of the end product needs to be supervised, often supported by the Dutch government. A large number of technology suppliers and complementary partners with horticultural knowledge have joined forces in this Chinese PIB. And very successfully too: the first project is the construction of Yu County, an agro park in the Hebei Province. The construction of five hectares for lettuce cultivation on water starts here in late 2022. Further growth is in the pipeline once the formula has proven itself.

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*'DGD can initiate horticultural projects for clusters of horticultural suppliers by networking locally and exploring possibilities.'*



## About Dutch Greenhouse Delta

Dutch Greenhouse Delta (DGD) is a powerful international platform that was founded to globally promote Dutch horticulture and to work together with stakeholders in the global food transition.

A unique 'ecosystem' of growers, suppliers, greenhouse builders, installers, seed breeders, research institutes, and universities has allowed DGD to contribute to the realisation of the Sustainable Development Goals (SDGs), as determined by the member states of the United Nations.

The focus is on the water, energy, supply chain, autonomous greenhouse, human capital, and indoor farming themes.

China, India, the Gulf region, and North America are DGD's focus areas.

Mr. Gert Dral is DGD's Advisor for China. He's been actively involved with developments and projects in China since 2004 and has established a large network both at home and abroad (Public and Private). In China, DGD is represented by Mr. Michael Min. His role is to initiate new projects and promote the Dutch horticultural sector by organising seminars and meetings with interested authorities and companies.





### 3.

# Solutions for the food challenges faced by a tempestuously growing world power

## Agroparks

China is characterized by rapid urban expansion, with large development companies investing in real estate with government approval. These days they're also investing in 'agro parks' near metropolises, which serve as a springboard for other construction activities. Agroparks are often planned or already built close to new housing estates and form a combination of the cultivation of vegetables, fruit, and flowers, and facilities for leisure activities. This can include restaurants, shops, sports venues, and facilities for educational purposes. "These complexes often aren't limited to primary production only. The combination of vegetables, fruit, flowers, but also tropical plants and 'leisure' is very normal," Fulco Wijdooge indicates.



One specific strong feature of an agro park is that it's close to the sales market, which means it forms part of a sustainable concept. "A high production of safe and efficiently monitored food per meter is realised in high-tech parks like these, close to demand. This inevitably

also results in a limited number of food miles. Plus it shows off the horticultural profession's innovative character to the public", according to Gert Dral.

So far the development of agro parks has seen a cautious start, but it's definitely continuing. It usually starts with a small acreage, with a much larger rollout in the offing if the project proves successful. Dutch suppliers have the ultimate knowledge and technology at their disposal to develop these agro parks in an integrated manner. Clusters of complementary Dutch companies are being formed to realise these types of projects, partly under DGD's direction.

## Knowledge and staff

The fast-growing horticultural sector in China is facing a major problem: there is a serious shortage of personnel with the skills and knowledge required to manage high-quality cultivation systems. This unfortunately results in some projects not doing particularly well after completion. Cultivation management is therefore often supported by the Netherlands during the initial phase. There are now certainly much better possibilities on offer for this, for example through online dashboards and the use of Artificial Intelligence.

But China desperately needs its own knowledge, given the (future) size of high-quality horticulture. Training and service are therefore becoming important services provided by Dutch suppliers, in addition to the construction of

physical cultivation systems. One example is Ridder, which is investing more and more energy in sourcing and training Chinese horticultural personnel for secondment in China. They train local people, allowing them to ultimately take over the business operations themselves. Hoogendoorn Asia also wants to contribute to this knowledge development. Benjamin Devillard, General Manager at Hoogendoorn Asia, tells us: "Hoogendoorn as a solution provider wants to support partners to achieve their vision. Customers such as flower company Newgreen in Lanling and tomato company Shounong Cuihui near Beijing want to become academies where Chinese growers can share their knowledge, allowing them to take their cultivation performance up to a higher level. Hoogendoorn proactively sets up training and events that help growers to achieve their goals."

## Energy and water

The efficient use of raw materials and auxiliary materials such as energy and water is a challenge for greenhouse horticulture right across the world, including China. Heavy industry has polluted much of China's water, so the decontamination and reuse of water in horticulture are absolutely essential. The Dutch horticultural cluster is particularly well suited to the realisation of the most efficient production systems, equipped with climate control and advanced water systems. Gert Dral: "China is still having to deal with high levels of water consumption in its food production, while much of the water has become significantly contaminated as a result of the rapidly growing industry and cities. Disinfection and reuse of irrigation water in modern greenhouses is therefore hugely important."

The efficient use of energy resources is also high on the list of priorities. The Chinese government is currently implementing plans to reduce its CO<sup>2</sup> footprint, making China less dependent on coal and oil. High energy prices

are currently weighing heavily on corporate returns. "The energy price has increased a lot since the beginning of 2021. As most high-tech greenhouses in the country are heated by gas, this obviously creates a heavy burden", according to Gloria Zhang. "Energy costs can be reduced by up to 60 percent by, for example, using two layers of screens', plus insect netting



can limit the influx of insects and pests, allowing entrepreneurs to optimise their production and use fewer pesticides. This also allows them to work in a more sustainable manner," Zhang explains.

"LED lighting can also play a key role; LEDs are much more energy efficient than HPS lights. They also give off less heat, which means the vents don't need to be opened as often and less CO<sup>2</sup> is released into the air," explains Sylvia Xu, Horticulture LED Solutions Business Development Director for Asia.

Dutch climate control solutions and systems help to reduce the carbon footprint. The latest climate computers are equipped with custom software that contributes to optimal energy management in the greenhouse. Hoogendoorn is one of the companies which offers these solutions. "We can help growers to use energy and water as efficiently as possible, by using the IVO climate computer, which is combined with the support of a selected team of engineers who work with local partners from other domains to provide the best solutions. Our latest system has been used, for example, in the Honghua project's semi-closed greenhouse", according to Benjamin Devillard.

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*“A high production of safe and efficiently monitored food per meter is realised in high-tech agro parks. Agro parks are close to the sales market, which means it forms part of a sustainable concept, because of the limited number of food miles.”*



## China:

# Projects in China

The challenges in China require specific solutions, which the Dutch horticultural cluster can most certainly offer. These are some of the projects Dutch suppliers are involved with in China:



- **YouYou group, Shanghai (Chongming island)**  
*High-tech cultivation of tomatoes, cucumbers, peppers and lettuce in a 20 hectare semi-closed greenhouse.*



- **Kaisheng Hofeng, Shandong Qingdao-Laixi**  
*A project measuring fourteen hectares, where various types of tomatoes are grown in a modern, climate-controlled greenhouse.*



- **Linxia International Flower Port, Linxia, Gansu**  
*A project focused on the cultivation of cut roses.*



- **Haisheng, Shaanxi Haisheng fresh fruit juice project Pingliang**  
*A 12-hectare high-tech greenhouse horticulture project, where vine tomatoes are grown in a semi-closed greenhouse.*



- **New Green and Beijing Cuihui**  
*A flower greenhouse where Hoogendoorn will be setting up an academy to create a community among Chinese growers.*



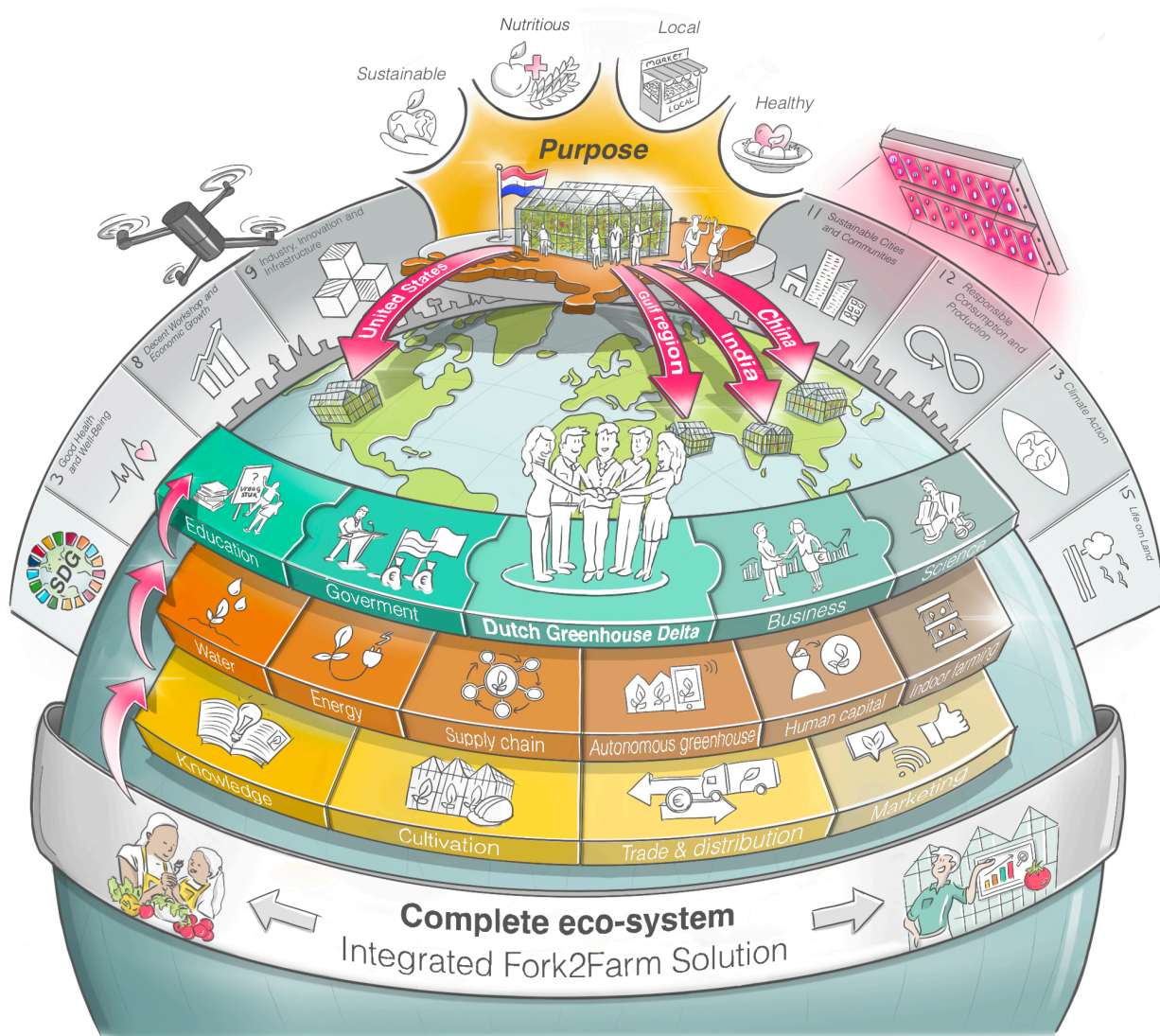
- **Baiyin City, In Jingtai County, Gansu province**  
*A cherry tomato company, which is heated by the hot water from the nearby power plant.*



- **Haoyu project In Ju County, Rizhao City, provincie Shandong**  
*Semi-closed intelligent glass greenhouse, where cherry tomatoes are grown.*

#### Photo credits:

- YouYou group, Shanghai (Chongming island) - Svensson
- Kaisheng Hofeng, Shandong Qingdao-Laixi - Ridder
- Linxia International Flower Port, Linxia, Gansu – Signify
- Haisheng, Shaanxi Haisheng fresh fruit juice project Pingliang – KUBO
- New Green and Beijing Cuihui – Hoogendoorn
- Haoyu project In Ju County, Rizhao City, Shandong province - KUBO
- Baiyin City, In Jingtai County, Gansu province – KUBO



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