

OVERVIEW OF THE FLORICULTURAL SECTOR IN CHINA, 2018

December 2018

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Executive Summary.

- *China's economy* is growing at 6 to 6.5% per year. Many of its 1.4 billion people have entered the middle and higher income classes and can afford cut flowers and pot plants. Ornamentals, especially *flowering pot plants*, are highly appreciated. *Cut flowers* are a relatively new, 'luxury' phenomenon.
- *Statistics* for 2016 show a total acreage for all ornamental crops of 1.34 mln hectares. Cut flowers cover 64,500 ha, pot plants 106,000 ha and trees & shrubs 770,000 ha. In 2017/18, total acreage has stabilized/grown slightly. Total domestic wholesale value in 2016 was € 18 bn, exports € 525 mln. For 2017, the total *retail* value of the ornamental market is estimated at € 26 bn.
- The Government's *13th Five Year Plan (2016-2020)* aims to maintain the planting area at 1,4 mln ha, and create some 30 "mega flower enterprises".
- The sector faces many *challenges*: small size of land holdings, competition by food crops, rising cost prices for quality inputs and labour, lack of knowledge at many levels, not enough investments in infrastructure and the cold chain, and serious PVP issues (China has joined the 1978 version of the UPOV treaty, not the 1991 version) resulting in an 'old' assortment.
- The *China Flower Association (CFA)* is very active in promotion, information exchange and organizing of professional flower exhibitions.
- *Main cut flower crops* are rose, carnation, lily, gladiolus, chrysanthemum and gerbera. With its favourable climate, *Yunnan Province* dominates cut flower production, followed by provinces and regions near major wealthy cities.
- *Main pot plant crops* are bromeliads, anthurium, cymbidium, caladium, rhododendron, Chinese orchids, phalaenopsis and pot chrysanthemum. *Booming* newcomers are succulents, pot rose, calla lily and kalanchoe. Pot plants are grown all over the country, species/varieties vary with the climate.
- *Cut branches and cut foliage* are still a small sector, mostly in Yunnan and the southern (sub-) tropical regions of Hainan, Guangdong and Fujian.
- The market for *trees and shrubs* is dominated by government buying and production, though some private companies are doing well. Most species and young materials are local, imports do occur but face strong quarantine laws.
- Traditional, government-run *wholesale/retail markets* are still the main distribution channel for flowers and plants. Their infrastructure needs improvement; new investors in the sector organize their own 'cold chain'.
- *Other channels* are still rare: reportedly there are 200,000 flower shops in China, including life style stores combining fresh produce with luxury goods. Supermarkets and megastores like IKEA are not or barely active in ornamentals.
- *E-commerce is booming*: in 2017, 50,000 online stores were selling cut flowers. In pot plants, mostly *succulents* are sold via e-commerce.
- *Imports of fresh cut flowers* are on the rise: quarantine and other barriers are reduced. Dutch and other traders' business grows, and they open offices in China. Royal Flora Holland (RFH) Shanghai office is a catalyst in this.
- *Breeding and propagation* of cut flowers and pot plants in China faces large issues in Plant Variety Protection / lack of a functioning royalty system. Foreign breeders like Anthura and Dümme Orange engage in variety testing, controlled propagation, import and sales. Demand for new and better varieties and species is large, breeders are reluctant to supply them.
- *Flower bulbs* are a huge Dutch export article to China: Estimates for 2017 indicate a total of 535 mln bulbs. Tulips (parks, flower shows) and lilies (cut flower growing) are leading, followed by gladiolus, hyacinth and iris.

- *Flower and plant theme parks and 'agri-tourism'* form an interesting market for Dutch and other suppliers. "Flower villages" are popular with investors in hotels and real estate projects. A more professional approach is developing after a shaky start.
- The market for *technology, equipment and supplies* attracts many Dutch suppliers; a growing number are setting up establishments in China. Key sectors are greenhouse construction, cultivation systems, heating, cooling, irrigation & fertilizing, substrates, bio-pesticides and IPM, and post-harvest handling items like preservatives, cold storage and refrigerated transport. For flower and plant *packaging*, China is an important manufacturer.
- *Training, education and consulting* services are a growing sector: the government and investors realize the importance of training, especially to increase practical skills in greenhouse operation and flower and plant cultivation. Many Dutch institutions are active in China, at university and vocational college level. Private consultancy firms also encounter a growing market, and 'Dutch farm managers' are in high demand at high-tech projects.
- *Legislation and phytosanitary issues* still form barriers for further development; according to Chinese PVP law (based on the UPOV-1978 version), growers are allowed to self-propagate protected varieties, and government authorities may grant compulsory licenses to propagate protected varieties to third parties. Legal procedures to demand compensation for PVP infringement do exist, but they are lengthy and costly. Plant quarantine regulations are very strict, especially the 'ban on soil' for imports of cuttings and young plants. For cut flower imports, procedures are becoming easier and waiting times at customs are being reduced.
- A *SWOT Analysis* shows the growing economy and consumer demand, new high-tech investments, booming e-commerce and government support as *strengths* of the Chinese market. *Weaknesses* are unpredictable government policies, less governmental consumption (austerity), lack of knowledge at all levels, insufficient distribution systems, small size of farm holdings and PVP/royalty issues. *Opportunities for Dutch* input are in the field of cut flower trade, greenhouse technology and cultivation systems, cold chain distribution and training and education. *Threats* are (again) unpredictability of policies, PVP issues and copycat competition, priority for food crops over ornamentals, unclear priorities among investors and lack of a coordinated approach on the Dutch side.
- Finally, the following sectors are considered especially promising for Dutch suppliers to, and investors in the Chinese ornamental market in the near future:

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| <ul style="list-style-type: none"> - Cut flower imports to China from The Netherlands, Africa, Latin America and other areas, especially in 'new' species and varieties. - Greenhouse engineering and construction (with Chinese partners/sourcing of certain materials in China). - Cultivation technology for greenhouse production. - Heating, cooling and climate control equipment for greenhouses. - Flower bulbs and other planting materials, especially for landscaping, gardening and theme parks (commercial cut flower and plant growing is also on the rise, but PVP issues are still a major issue here). - Training, education, cultivation management and consulting services. |
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1. Foreword.

The present market research report is an update of a report published in October 2008. Since then, many things have changed in China, also in the flower and plant market. This past decade has *not* been a period of only linear or exponential growth, but of ups and downs, transformation of supply chains and changes in the importance of different end user groups.

The report contains an Executive Summary, a number of chapters describing developments and trends in the sector in recent years and expectations for the future, a chapter with conclusions and opportunities and several annexes with factual data and names of major players in this dynamic market.

Targets.

The present report is an analysis of the actual situation (by mid-2018) of the floriculture market in the People's Republic of China. Although the necessary figures and other quantitative data are given (see note below on Statistics), emphasis has been put on *qualitative aspects*: trends in assortment and consumer preferences, changes in distribution and sales systems, and expectations for the short and medium term. A SWOT Analysis is included, focusing on the outlook for Dutch market players to enter or expand their position in this dynamic and still rapidly growing market. Finally, some general conclusions are drawn and recommendations given on strategies to build up long term success in China, especially for Dutch/Western companies in the ornamental sector.

Methods

This report was prepared and co-ordinated by CoHort Consulting (Amsterdam, The Netherlands), with the very valuable assistance of Chinese-born market researcher Ms. Li Zeng and input by dozens of persons and companies from CoHort Consulting's network in China, The Netherlands, Japan, South Korea, ASEAN countries, Africa and Latin America. Interviews with key players and experts (names are mentioned where applicable) contributed to the preparation of this report. Furthermore, targeted visits to key regions as well as visits to trade fairs, exhibitions and seminars were very useful to complete market views as illustrated in the report.

Beijing, December 2018

Oscar Niezen,
CEO CoHort Consulting.

The **history** of China spans 5.000 years and can't of course be even summarized in this report. Still, it is a main source of present-day government policies and the economic behaviour of consumers and companies. For Dutch and other actors interested in the Chinese market, some study of Chinese history is therefore recommended.

2.2 Economy: developments in recent years.

In current IMF rankings of the world's largest economies, China is now placed second - after the US. China's economic growth is still mostly export-fuelled, and the country's international financial reserves are estimated at around US\$ 3,000 bn.

Total economic growth in 2017 has been approximately 6,5%, in line with government policies. Currently, China's national debt is estimated at 250% of GDP; a large part is found at local governments and State-Owned Enterprises (SOE's). Recently the government has been 'transferring' more and more of this huge debt to the banking sector.

As growth can't be realized anymore by low-cost production, export to world markets and investments in infrastructure, the government is now developing a new growth model. The economy should be transformed to one of high added value, and this is stressed in the current 13th 5-year plan (2016-2020). Innovation is being promoted, state-owned enterprises face reforms, and Chinese companies are encouraged to engage in mergers and acquisitions abroad.

Legal and political issues.

The 19th Party Congress of October 2017 confirmed China's 'new normal' situation, meaning the country has entered a period of lower economic growth. After more than 35 years, GDP growth is no longer the paramount goal in China's development, and the importance of qualitative factors like division of wealth and the quality of the environment has risen. This opens up possibilities for suppliers (also foreign) of "quality of life" products and services: flowers, plants and trees are in that category, but also landscaping, design of agritourism parks and "eco-resorts", and training of Chinese managers and employees working in these sectors. In this report these products and services will be further identified.

2.3 A few economic indicators.

Most important trading partners of China.

Export partners in 2016	<ol style="list-style-type: none"> 1. United States 2. Hong Kong SAR 3. Japan 4. South Korea 5. Germany 8. The Netherlands
Import partners 2016	<ol style="list-style-type: none"> 1. South Korea 2. Japan 3. United States 4. Germany 5. Australia 30. The Netherlands

Source: World Bank

Development of bilateral trade CN-NL, in goods.

Billion Euro	2011	2012	2013	2014	2015	2016	2017**
NL import from China	30,9	31,9	31,8	35,4	32,4	32,6	29,7
NL export to China	6,7	7,6	7,7	7,9	8,5	9,7	9,4
Trade Deficit	-24,2	-24,3	-24,1	-27,5	-23,9	-22,9	-20,3

Source: The Netherlands Central Bureau of Statistics (** by ultimo October)

Global Competitiveness Index 2017-2018 (ranking of 137 countries).

The Netherlands : 4
China : 27

Source: World Economic Forum

2.4 Ornamentals and Chinese culture.

Flowers and plants have always had an important position in Chinese society. Writers and painters use flowers and plants for their symbolic meaning. Also in (Buddhist) religious and other rituals (marriage celebrations, funeral ceremonies, Chinese New Year and other festivals), specific flowers and plants have been used throughout the country's long history.

In the last five years, a shift has been seen from *institutional use* (buying by government organizations and companies, stores etc., for opening ceremonies and other celebrations) to *consumer use* (use of plants and flowers for the home, balconies and gardens and as gifts for birthdays and other festivities). Where 10 years ago governmental bodies were still the main buyers, the shift to consumer use was highly accelerated by the increase in Government austerity measures from late 2012. In a document on "*the Eight-Point Regulation of the CPC Central Committee*", President and Communist Party General Secretary Xi Jinping stipulated a set of 8 directives to all local

governments and ministries to 'keep things simple': leaders must maintain close contact with the grass-roots level, meetings and major events must be efficient and strictly regulated, paperwork and issuing of documents should be reduced, official visits to foreign countries should only take place when absolutely necessary, traffic should be closed down as little as possible for official motorcades, the media should reduce reporting on politics, leaders should limit their own publications and work with dedication, following all relevant regulations.

In the first of these Eight Points, the text literally states: "For official visits, there should be no welcome banner, no red carpet, *no floral arrangement* or grand receptions for officials". This measure alone resulted in a temporary market collapse for ornamentals, especially for flowering pot plants. The market for pot-anthurium, bromeliads and other famous ornamental plants shrunk by more than 30% in a single year (2013), and many growers sought to shift to organic vegetables or 'new' ornamental crops like succulents and orchids. Two to three years later, by the end of 2015, total market volume had been restored by the growth in consumer spending, and it keeps on growing at a steady pace. The shift (or rather *transformation*) from a government-dominated market to a consumer and leisure market has had serious consequences for the assortment.

Whereas market growth in the period 2000-2010 had been mostly fuelled by government spending and financial support (as ornamentals were seen as the most lucrative crop for growers, with export potential), we now see a more market-driven growth, more specialization and a (slow) increase in quality and variety of the final product.

With the growing numbers of wealthy and middle-class Chinese consumers, another phenomenon is on the rise, alongside with the 'traditional' consumer- and institutional markets for flowers, plants and trees: *Agritourism and (Holland-) Flower Theme Parks*. Recent years have shown a real 'boom' in this form of "green and colourful entertainment", and Dutch companies are already successfully involved in this. Parks and flower shows are added to real estate projects (holiday resorts, villages for the elderly), and these 'green oases' offer visitors a brief escape from their city life. More information on this new and promising trend will be given in Chapter 7.

3. The Chinese Market for Ornamentals – Facts & Figures, and trends in recent years.

3.1 The market – Acreage, Production and Value, Developments in the last decade.

The latest available statistics from the Ministry of Agriculture have been published in 2017 and describe the situation in 2016. Ornamental products were then cultivated on a total of 1.33 million ha, with total domestic (wholesale) sales of 139 billion RMB, or slightly over 100,000 RMB/ha. This comes down to approximately € 12,500.-/ha.

The acreage has roughly *doubled* in comparison with 2006, when it was 722,000 ha. Since 2016, acreage and sales volume are reported to have remained stable or grown only slightly, partly due to the impact of government austerity campaigns mentioned in § 2.4. After a first (partial) collapse in 2013/14, the market recovered and has now picked up slight growth again.

Apart from domestic sales, an *export* value of 617 million USD (€ 525 million) has been noted for 2016. One fast-growing ornamental export is that of cut chrysanthemums to Japan, and in the pot plant and tree sectors certain 'typical' products like ornamental bamboo and maple (*acer bot.*) also find their way to The Netherlands, other European countries and the US.

Table 1: The Chinese Ornamental Market: Total & Main Crops – Cultivation Area, Production and Value - 2016

Crop	Area (hectares)	Production (mln stems/pieces)	Value in mln € (Domestic, wholesale)	Value in mln € (Export)
ALL CROPS	1,340,000	x	18,000	525
Cut Flowers (All)	64,500	21,100	1,850	299
-Cut Flowers	50,500	18,500	1,660	271
-Cut Foliage	7,500	1,250	90	27
-Cut Branches	6,500	1,440	115	0.2
Pot Plants (All)	106,000	7,100	4,400	108
-Pot Plants	61,500	3,100	3,000	72
-Bonsai	18,500	231	750	35
-Bedding Plants	26,000	3,700	690	0.0025
Trees & Shrubs for Gardening & Landscaping	770,000	12,300	8,450	29

Source: Ministry of Agriculture, Beijing / AIPH International Association of Horticultural Producers, Didcot, UK

If we compare some of the crop figures with those of ten years earlier (2006), we notice that the cultivation area of "All cut flowers" (cut flowers, cut foliage and cut branches) has risen by 50% from 41,600 ha to 64,500 ha, and the domestic sales value has *tripled* (from € 605 million to € 1.8 billion). The "All pot plants" area increased about 50% from 73,000 ha in 2006 to 106,000 ha in 2016, and a near-tripling of sales value took place, from € 1.6 bn to € 4.4 bn.

The "Trees and shrubs for gardening and landscaping" category covers all green plants for garden and park use, as well as all trees, except commercial fruit trees which are categorized as non-ornamental crops. Buyers of these trees and shrubs are government green services and road/infrastructure development authorities, but also private real estate developers, other companies and consumers. As can be seen in the table, this category covers an enormous acreage: in fact, about *half* the acreage of all ornamental production in the country. In the Beijing city-province alone, 108 major nurseries for trees and shrubs cover more than 17,000 hectares. The same dominance applies to the total *value* of trees and shrubs: about € 8.5 bn out of 18 bn. Practically all sales are domestic, export figures are relatively small. If we compare 2006 and 2016 figures for these products, we see a near-doubling of total cultivation area (from 400,000 ha to 770,000 ha), and a more-than-tripling of their total sales value, from € 2.67 bn to € 8.45 bn.

Table 2: The Chinese Ornamental Market: Other Crops – Cultivation Area, Production and Value - 2016

Crop	Area (ha)	Production & Unit	Value in mln € (Domestic, wholesale)	Value in mln € (Export)
Flowers for Food and Medicine	265,000	212,000 tonnes	2,100	12
Flowers for Industrial Use	59,000	84,000,000 tonnes	377	45
Lawn Grass	50,000	1.23 billion m ²	468	0.025
Seeds	5,250	1.45 million kg	60	2
Cuttings	8,250	5.2 billion pcs.	260	27
Flower Bulbs	2,600	670 million pcs.	50	-
Dried Flowers	n/a	n/a	13	3

Source: Ministry of Agriculture, Beijing

In this table, the striking amounts of "Flowers for Food and Medicine" are noteworthy: 212,000 tonnes of production, with a value of € 2,1 bn.. This is of course a very 'Chinese' market, strongly influenced by the practice of Traditional Chinese Medicine (TCM) and difficult to enter for foreign suppliers. The combined figures of *Food & Medicine Flowers, Industrial Flowers, Lawn Grass (sod production) and Dried Flowers* showed a doubling in acreage from 183,000 ha in 2006 to 374,000 ha in 2016; its total domestic sales value increased from € 552 mln to € 3,300 mln – a flourishing sector indeed! As to (*flower & plant*) *seeds, cuttings and bulbs*, development since 2006 has seen a stable acreage for seeds (5,061 ha in 2006 and 5,250 ha in 2016), and a decrease in acreage for both flower bulbs (from 3,403 ha to 2,600 ha) and cuttings/seedlings (from 14,807 ha to 8,250 ha). For *seeds*, there has been a certain improvement in value: in 10 years, the value of the seed production rose from € 32 mln to € 60 mln. Value of *cuttings* rose from € 153 mln to € 260 mln, and that of *bulbs* dwindled from € 59 mln to € 50 mln. Export figures in these starting materials (not yet available in 2006) are negligible, also today.

These trends point to two phenomena:

- Production of *seeds and starting materials* for floriculture remains a very 'Chinese' affair, without the spectacular increases we see in the market for finished products. Undoubtedly this has a lot to do with quality problems (including sales of 'fake seeds') and issues concerning Plant Variety Protection / breeders' rights (see Chapter 10).
- Production of *flower bulbs* in China has proven *not* to be successful; this is illustrated by the rise in imports of bulbs from Holland (see § 4.8), and by the withdrawal of the only Dutch company that has been involved in a trial bulb production in China. Production of bulbs of sufficient quality turned out to be impossible, due to a combination of climate issues and organizational/management problems.

3.2 Government plans and support – Floriculture and the 13th 5 year-plan, challenges facing the sector.

Like for most sectors of the economy, also for Agriculture the Chinese National Government's current 13th Five Year Plan (2016-2020) emphasizes increase in quality, reduction of waste, less harmful impact on public health and the environment, innovation and better business practices. The main points on floriculture in the current Five Year Plan can be summarized as follows:

- The aim to maintain a total area of 1.4 million hectares for planting of ornamental crops.
- The creation of at least 30 "mega flower enterprises" with a cultivation output value of more than 100 million Yuan (€ 13 million) [*** Note:** *this is a typical Chinese phenomenon. Where in Western countries a lot of innovation -and eventually economic growth- is expected from creative start-ups and new forms of entrepreneurship, China has a "think big" attitude in its planning and government policies. A similar emphasis on size can be seen in the vegetable seeds sector and in the plans for huge "modern agriculture demonstration zones" where the best and the finest in horticulture, dairy production, rice farming, salt-water fish farming on-shore etc. will be combined and operated on a large scale*].
- Addition of 3 million new employees to the ornamental sector.
- Ensuring that 7% of the total workforce in horticulture will consist of "technical experts".
- Ensuring the "effective protection of existing flower germplasm resources" and the "substantial increase of the localization rate for varieties of flower products". [*** Note:** *this cryptic formulation seems to refer to an increased use of Plant Variety Protection (PVP) laws and measures -see also Chapter 10 -, but with an emphasis on local breeding and registration of "new, Chinese-bred varieties"; it still remains to be seen if and when China will fully join and enforce international agreements on PVP and other forms of intellectual property protection*].
- Creating "a sound system for flower and plant standards", and a substantial increase in the standardization of industries, i.e. improvement of product quality and striving for a more homogeneous product in the market for each crop.
- Implementation of management information systems in the flower and plant industry.
- Establishment of 50 "demonstration bases" displaying "flower culture with a national focus".

The wording of these plans and ambitions reflect a main **challenge** faced by the sector, and its governmental and industrial/private sector players: the situation of growers and farmers is precarious, especially due to *the extremely small average size of their land holdings*. The opening up of China under Deng Xiaoping from 1979 brought a nearly total conversion of all agricultural land to small, family-cultivated units. The State remains owner of all land in China, and farming families derive their income from plots of land that average one to two *mu* each, i.e. around 1000 m² per family. Initially, this policy was seen as a great success, because food production went up and there were no more shortages of basic food stuffs. More than thirty years onwards however, the small plot sizes form a huge obstacle for investment in mechanization and agricultural modernization.

3.3 Organization: China Flower Association, its regional branches and activities.

For many years, the most important government organization in the floricultural sector has been the *China Flower Association (CFA)*, founded in 1984 and having its head office in Beijing. The CFA is part of the National Forestry and Grassland Administration, and it has established provincial Flower Associations in Yunnan, Guangdong and many other provinces. The CFA presents itself as a non-profit trade association for floriculture enterprises, institutions (like research institutes) and individual growers, florists and others involved in the industry. The Association is organized in 13 'committees', focusing on *products and cultivation* (with departments for roses, orchids, main pot plants etc.), *industrialization* (market and company organization, training etc.) and *retail*. Most flower shops in China are members of CFA, and at this moment it's also developing a department for the fast-growing *e-commerce* trade (see § 4.4).

The CFA has formulated its main tasks and responsibilities as follows:

- Organization, coordination and application of research, science and technology in floriculture;
- Protection of legal rights of its members;
- Market research, training, exhibitions/trade fairs, information exchange, a/o by its own publications and website;
- Promotion of floriculture as a means to improve rural economies.

The Association is most well-known for:

- Its *Magazine*, which is published in Chinese every two weeks (!). On an alternating basis, the magazine either focuses on market developments and commercial subjects, or on technology and innovation in floriculture.
- The annual *Hortiflor Expo*, the oldest and still leading professional b-to-b trade fair in floriculture in China, since a few years associated with German 'IPM' (Messe Essen) but still completely controlled by CFA and its regular exhibition organizer. Hortiflor is organized in early May every year, by turn in Beijing (even years) and Shanghai (uneven years);
- The *China Flower Exposition*, a longlasting expo held every four years, not unlike the 'Floriade' Expo held in The Netherlands once every ten years. In past years this expo has been held a.o. in Chengdu (Sichuan Province), Changzhou and Nanjing (Jiangsu Province), usually from the end of September to early November. **[Note: from April 29th, 2019, a huge**

'International Horticultural Exhibition' will be held in this way in Beijing (Yanqing District, towards the northern district of Zhangjiakou where the 2022 Winter Olympics will take place). CFA is also strongly involved in this mega-project. After the Expo period of 5 to 6 months, many of the pavilions and gardens exhibited will be maintained as a park and leisure area for the residential expansion of Beijing planned for the district. The Netherlands will participate in the Expo with a 'Holland Pavilion'].

A note on statistics...

Finally, a point of attention for users of this report: in this chapter as well as in others, statistics have been used, as much as possible with indication of sources consulted. In general, by cross-checking and other means, numbers and developments portrayed are judged as reliable by the authors. However, in market research in China one often finds different or contradicting statistics about the same sectors or industries, depending if one consults national, provincial or local authorities, and some detailed statistics are only published once every four or five years. We are happy with the figures obtained, but -as indicated earlier- the main emphasis of the report lies on its *qualitative analysis* of trends, strengths, weaknesses and opportunities / challenges for Dutch participants in the market, rather than on providing 100% exact figures on (for example) cultivation acreages and products, which in the current situation would be a target too ambitious to be realistic.

4. Cut Flowers, Cut Branches and Cut Foliage.

Cut flowers are a relatively new phenomenon in average Chinese daily life. Traditionally, consumers and institutional buyers were much more familiar with pot plants, and especially the flowering ones (often called 'potted flowers' in Chinese English-language publications) have been very popular from pre-modern times, as they still are today (see Chapter 5).

Until recently, cut flowers were only used at special rituals like marriage celebrations. Also funerals and rituals associated with the dead and appeasing ancestors' spirits (like the yearly *tomb cleaning festival*) are occasions for buying (mostly white) cut flowers. However, with the growing prosperity of at least 500 million rich and middle-class Chinese, and the increasing adoption of 'Western' fashion trends and lifestyle, cut flowers are becoming appreciated as gifts (as an alternative for food and drink) and as an enrichment of the home for female office workers (the nr. 1 buyer group of cut flowers, see § 4.4) and middle-class families.

Although -like in any country- cut flowers remain the most 'luxury' type of ornamentals, which makes them highly vulnerable to downturns in the economy's conjunctural cycle, it is still expected that the most spectacular growth figures in Chinese floriculture in the coming decade will concern cut flowers for 'daily' use.

4.1 Major cut flower varieties and production regions.

Total figures for main crops (not per province/region) are available for 2016. The following comparison sees *the overall stabilising of cut flower acreage* (with slight growth for some species) for the main species in recent years:

Table 3: Production areas (in ha) of main cut flowers in China, 2014/2016

Growing Area (ha) China	Cut Rose	Carnation	Lily	Gladiolus	Chrysanthemum (cut)	Gerbera	Calla Aeth.	Tulip (cut)	Cut Anthurium
TOTAL 2014	14,350	3,325	9,000	3,300	7,500	5,750	65	425	175
TOTAL 2016	15,750	4,030	8,210	2,900	7,250	4,850	Un-known	Un-known	Un-known

Source: Ministry of Agriculture, Beijing

- Figures from 2014 may also have been influenced in a negative way by the "Eight Point Regulation" campaign started by the President (see § 2.4), even though flowering *pot plants* seem to have suffered more in that period than cut flowers.
- As always, we have to rely on statistics, so caution is recommended.

Note: in the following tables in this Chapter (cut flowers) and in the next Chapter (pot plants), we include figures *specified by species (rose, carnation etc.) and by province/region (Hebei, Yunnan etc.)*. These were only available for the year 2014. Today (2018) figures will definitely be higher, but the 'ranking' of species by cultivation area remains very much the same. These specified figures per region are published only once every five years.

Table 4: Production areas (in ha) of main cut flowers by province, 2014

Growing Area (ha) by Province	Cut Rose	Carnation	Lily	Gladiolus	Chrysanthemum (cut)	Gerbera	Calla Aeth.	Tulip (cut)	Cut Anthurium
TOTAL	14,350	3,325	9,000	3,300	7,500	5,750	65	425	175
Beijing	42	0	26	5	48	14	0	0	5
Tianjin	166	10	8	8	17	5	0	0	0
Hebei	570	67	140	85	270	82	0	0	0
Shanxi	7	6	2	2	3	2	0	0	0
Inner Mong.	5	1.5	41	0.3	5.5	0.5	0.1	0.2	0.1
Liaoning	1,050	14	3,000	325	135	650	0	200	0
Jilin	111	2	21	5	73	5	6	10	0.5
Heilongjiang	3.5	0	2.5	4	1	0	0.1	0.5	1
Shanghai	11	10	17	18	110	160	0	0	0
Jiangsu	740	17	960	40	1125	660	0	145	0
Zhejiang	135	1	360	2	210	800	0	0	0
Anhui	165	22	6	5	180	12	0	0	0
Fujian	365	8	325	15	230	525	0	0	0
Jiangxi	110	0.5	16	18	185	45	0	0	0
Shandong	8	0	12	0	90	155	0	0	0
Henan	360	30	80	10	100	70	0	0	0
Hubei	1975	351	1175	1975	1410	950	0	0	0
Hunan	240	90	55	41	225	21	0.2	16	2
Guangdong	1465	210	710	275	1300	800	0	0	0
Guangxi	225	50	90	17	266	62	0	0	0
Hainan	167	0	0	0	230	0	0	0	25
Chongqing	28	0	0	90	112	30	7	2	40
Sichuan	735	250	150	235	520	400	0	0	0
Guizhou	80	30	10	25	80	42	0	0	0
Yunnan	4900	2000	1750	80	300	235	0	0	0
Shaanxi	300	0	0	0	100	20	50	30	100
Gansu	360	60	85	50	93	25	0	0	0
Qinghai	50	3.5	35	14	34	20	0	15	0
Ningxia	3.5	190	23	4	8	12	0	0	0
Xinjiang	30	28	19	1	3	8	3	10	0.5
Tibet	0	0	0	0	0	0	0	0	0

Source: Ministry of Agriculture, Beijing

With the above remarks in mind, we can see which provinces and regions are the main centres of cut flower production. **Yunnan Province** dominates this production, firstly due to its favourable climate (Yunnan is often called “the land of eternal spring”; it does have definite dry and rainy seasons, in winter months some crops suffer from cold in unheated plastic tunnels, and in summer good ventilation is important because of high temperatures and high air humidity). Furthermore, since the ‘beginning’ of floricultural development around 1995, the Chinese government has always supported Yunnan with special measures or exemptions on strict regulations (for example, *imports* of flowers, plants, cuttings, bulbs etc. can be arranged much faster and with less quarantine hassle in Yunnan than in, say, Shanghai or Beijing, see Chapter 10). *Challenges* for Yunnan lie first of all in the field of *logistics* (geographically the province is very far from all main markets; even Guangzhou and Hong Kong are still ‘far away’ given the very limited availability of refrigerated storage and transport, see § 4.3). Yunnan’s second main challenge is the *lack of knowledge* of growers, and the absence of a structured training- and education system. Development in these fields remains slow.

Apart from Yunnan, other provinces and regions with serious acreage in cut flowers are *Hebei, Liaoning, Jiangsu, Zhejiang, Fujian, Henan, Hubei, Guangdong, Sichuan and Gansu*. Floriculture is interesting there because of the proximity of wealthy cities with millions of consumers and easy distribution. Even when climate is a negative factor (Guangdong and Hubei are mostly too hot, and winters in Hebei, Liaoning and Gansu are freezing cold), growing cut flowers - sometimes seasonal- can still be worthwhile. Also, growers with multiple locations shift production to southern regions like Hainan and Guangdong in the (dry and sunny) winter season, while growing in more northern and eastern areas in spring and summer.

4.2 Cut branches and cut foliage production.

As can be seen in Table 5 below, statistic information on 'cut branches' and cut foliage is limited.

Table 5: Production areas 'Cut Branches' and 'Other Cut Products' by province (in ha), 2014 (I)

Growing Area by Province	'Cut Branches'	'Others Cut Products'
TOTAL	300	4,700
Beijing	0	7,5
Tianjin	0	1
Hebei	0	0
Shanxi	0	0
Inner Mongolia	0.5	0
Liaoning	0	0
Jilin	1	80
Heilongjiang	1.5	1.5
Shanghai	0	140
Jiangsu	0	0
Zhejiang	0	0
Anhui	0	0
Fujian	75	0
Jiangxi	0	16
Shandong	3.5	0
Henan	0	0
Hubei	0	0
Hunan	2	15
Guangdong	0	1,200
Guangxi	0	91
Hainan	0	0
Chongqing	15	925
Sichuan	0	0
Guizhou	0	0
Yunnan	0	2,000
Shaanxi	200	200
Gansu	0	55
Qinghai	0	0
Ningxia	0	0
Xinjiang	1	17
Tibet	0	0

Source: Ministry of Agriculture, Beijing

While remaining cautious about the exactness of these figures, one sees that *Yunnan and the warm and humid, coastal southern and eastern provinces* dominate production in this subcategory. Given the nature of most cut foliage and cut branches (Leather Fern, other ferns, Cocos, Aralia etc.) this makes sense, as they are best grown in such a climate. The 'zero' values for *Hainan* in this table are definitely too low: we are aware that there are a number of (small-scale) cut foliage growers in that tropical island province. The position of *Shaanxi* (NW China) with 2 x 200 hectares is quite unique in this table; this is related to its position as the nr. 1 province for *cool and moderate season fruit trees and shrubs* in China (apples, pears, berries, but also citrus). As a side line, Shaanxi tree growers produce certain ornamental trees and branches -like *ornamental orange and mandarin*- which are symbols of good fortune and sell at sky-high prices in the Chinese New Year season, as complete 'miniature trees' and as fruit-bearing branches.

4.3 Marketing and distribution – the traditional wholesale / retail system.

One of the effects of the small scale ('family size') of >90% of Chinese farms and the very low yields per m² is that *production quantity per farm/ production unit is small*. Depending on the crop, daily production from a traditional family-owned greenhouse often fits in a minibus or a 'tractor tricycle', a common means of transportation in the Chinese countryside. Growers pack their flowers in a simple way and take them to one of the thousands of *flower markets* in the country. In recent years, the number of these markets has decreased slightly, from 3,220 in 2015 to 3,029 in 2016 and 2,980 in 2017, according to Ministry of Agriculture statistics.

Flower markets, usually funded and operated by the local or regional government, are mostly large concrete collection buildings with hardly any professional cooling or storage facilities. Open almost 24 hours, they are a meeting place for ALL players in the chain: growers, wholesalers, retailers (local florists drive by to pick up a few bunches) and consumers (individuals can buy a single bunch there, of course at a higher price than wholesalers pay for full truckloads). This typical mixture of wholesale and retail is incomparable with the strictly organised system of flower auctions in The Netherlands. Only the Dounan Flower Market in Kunming (Yunnan Province's capital) has a functioning auction clock system, but definitely not all plants and flowers are passing the clock. In fact, several larger flower growers in Yunnan (like Dutch-owned Van den Berg Roses, and the contract growers supplying to Flower Plus and other e-commerce retailers, see § 4.4) do *not* sell via the auction clock system but have their own direct sales channels. According to the management of the Kunming International Flower Auction (KIFA), 90% of *growers* in the region sell through the auction system; as to the percentage of *produce* passing the clock, this is estimated at 70 to 75%.

Traditional flower markets – Need for improvement.

In general, it can be stated that wholesale/retail markets in China lack *all* major advantages of the Dutch flower auction markets:

- They are *not* owned by (cooperatives of) their growers/members, but by local governments that deal with the markets as with other public real estate facilities;
- They do *not* have adequate cooling and storage facilities, resulting in heavy losses and quality problems, especially in summer periods;
- There is *no* independent quality control, leaving growers (99% of whom already have very little bargaining power due to their small size) at the mercy of traders, who only focus on obtaining the lowest prices and on efforts to monopolize parts of the market.
- In general, most players (including growers) do *not* have sufficient knowledge of post-harvest treatment and quality improvement methods, which has a negative effect on the products' reputation and pricing.

Nowadays, as we have seen during visits to Kunming and other flower markets, there is some improvement in treatment and packaging of cut flowers: storage on water, use of 'flower food' products and -very rarely- refrigerated transport are beginning to appear, as wholesalers start to realize the benefits of investing in facilities that will increase their profitability already in the short and medium term. These improvements are still rare however, and depend very much on the energy and creativity of individual flower market officials and/or traders.



Figure 2: Booth at Lai Tai Flower Market, Sanyuanqiao, Beijing.

The 'DIY Strategy'.

The usual way in which a number of *modern and larger-scale growers and production companies* respond to the very slow and bureaucratic processes at flower markets is "DIY": *Do It Yourself*. Growers take their production away from the auction or wholesale market, start up their own young plant nursery or tissue culture lab and their own cold storage, buy their own minivans with air conditioning or real cooling, employ own sales people who contact buyers at every level directly, start up their own E-commerce shops or join existing ones (see § 4.4) and even try to create their own *brand* in the market using websites and social media. This is a typical Chinese phenomenon, also seen in the value chains for vegetables, fruits and other agricultural products. It results in hundreds of 'mini-product chains', all controlled by a single company or conglomerate. Their -often poorly trained- employees see people from other chains/brands purely as competitors, with whom no information is shared. All in all, these are very labour-intensive exercises that put a burden on profitability and create confusion at consumer level: every 'chain' -of course- claims to be the best, and consumers have no way of checking these claims except by their own personal experience.

This 'DIY' strategy is hard to change, as it is firmly embedded in Chinese culture. The positive side is that some successful 'mini-chains' are growing fast, and serve as an example to others: we see this currently in fresh fruits and vegetables, and some new investors and existing growers in floriculture are also successfully investing forwards and backwards in the chain. The tendency to form 'DIY chains' is definitely something all international companies willing to enter the Chinese market should be aware of.

Retail outlets for consumers: flower markets and other options.

In most cities in China, wholesale/retail markets are still the main 'outlets' where consumers buy their 'green stuff': especially pot plants, but also cut flowers. *Florists* (flower shops) are rare, even in a metropolis like Beijing or Shanghai. The total number of flower shops reported for 2017 is 200,000. In recent years, we see the phenomenon of *pop-up flower & plant shops* in shopping malls and other busy areas, where *impulse buying* is encouraged by beautiful flower displays, often in small refrigerated glass 'show rooms'. In the same line is the appearance of *luxury lifestyle shops with flowers & plants*, where green and colourful living products are an extra sales item along with home decoration, gifts, small furniture, fabrics and clothing. An example of this is *The Beast*, originally an e-commerce flower start-up from Shanghai which has now evolved into a chain of lifestyle and gift shops across China. They still supply flower arrangements, but they don't come cheap: prices for a nicely arranged bouquet/table piece start at RMB 600 (€ 80).

At *supermarkets and 'megastores'* (like IKEA, B&Q etc.), flowers and plants are hardly sold at the moment, though this may become an interesting sales channel in the near future. The IKEA stores in Beijing and Shanghai sometimes offer some 'consumer size' flowering pot plants, and the most interesting trial in cut flowers has been the 2017-2018 promotion of 'cut bunches' of high quality imported flowers (lily, tulip, alstroemeria) by the Shanghai office of *Royal Flora Holland* (see § 4.5) at megastores of *METRO* (known in The Netherlands as *MAKRO*) in Shanghai. This project had a large *marketing* component: flowers were promoted with 'Holland images' of windmills and flowering bulb fields, and

'flower hostesses' approached METRO customers with information and promotional offers.

Apart from these relatively new types of outlets without real nation-wide coverage, most Chinese consumers turn to a *traditional flower & plant wholesale/retail market* in their city to buy both pot plants and cut flowers. As many cities have only one of these markets (bigger cities a few), buying a bunch of flowers can be quite an expedition, involving two hours or more of travel time. This rather rudimentary distribution system is now facing possible transformation by the comet-like rise of a new phenomenon in which China is further ahead than any other country today: *e-commerce*.



Figure 3: "The Beast", flower & lifestyle shop, Shanghai.

4.4 Consumption and new, direct B-to-C distribution systems: E-commerce, bouquet services, home delivery.

As we have seen in the introduction to this Chapter, for most consumers, use of cut flowers on a regular basis, for home use or to give as gifts at birthdays and social gatherings, is a relatively new phenomenon. Main buyers belong to the 'golden generation' that has grown up in the double-digit growth years (1990-2008); they usually are their parents' only child due to the One Child Policy (abolished only very recently), and are used to being pampered with luxury products. Now, most of them have relatively well-paid jobs in cities, are young parents themselves and don't have time for extensive shopping or extra travel. They also grew up with the Internet, so *e-commerce* is now their main channel for buying just about anything. *Tao Bao*, the Internet platform owned by mega-

corporation Ali Baba, enables consumers to check the offerings of countless 'e-stores', and order home delivery of almost all food and non-food products. Competing platforms like JD (*Jin Dong*) do the same, and these e-commerce giants invest some of their huge profits in setting up their own digital stores and even 'brick & mortar 2.0' stores, like Ali Baba's new *He Ma* outlet chain. Here people can look at, taste and feel the quality of products before ordering them for home delivery. Naturally, in these stores payment in cash is no longer accepted, even debit and credit cards are becoming obsolete and 99% of payments are made by smartphone systems like AliPay and WeChat Pay.



Figure 4: Luxury flower shop, Shanghai.

Much more than pot plants (that are considered low-value and low-margin products in relation to their weight and transport costs), *cut flowers are a hot topic* in China's booming e-commerce business. A Hong Kong-based market research bureau conducted a survey of this 'Budding Business' which was published in *Hong Kong Means Business* of 28th February 2018. The publication puts the total value of the Chinese ornamental market of 2017 at 200 bn RMB (€ 26 bn). **[Note: the difference with the figures of the Ministry of Agriculture over 2016 we quoted in Chapter 3.1 shows strong growth year-on-year, but it is partly caused by the fact that the Hong Kong publication uses estimated retail prices ("spend"), whereas MOA bases itself more on the 'wholesale/retail mix' as shown in annual results of flower wholesale markets, and most probably is less accurate on -or excludes- import figures].**

The **e-commerce** sector shows staggering growth. AliResearch (Ali Baba’s research bureau) states that “from 2014 to 2015, sales of fresh flowers, green plants and other horticultural items grew by more than 93% across all retail platforms operated by Alibaba”.

Specialist entrepreneurs jumped on this bandwagon; in Annex B, some leading e-commerce websites for ornamentals are indicated. Among the best known are Shanghai-based **Flower Plus** and Beijing’s **Huadian Shijian**, both of which have attracted start-up funding of more than RMB 100 mln (€ 13 mln). Fast developments in sales and payment systems for smartphones (like AliPay and Wechat Pay) have helped boost online flower sales. In the first two years of its existence, Flower Plus has served seven million customers; currently, this online store alone handles *more than two million orders per month*. For the year 2016, its turnover was RMB 300 mln (€ 39 mln), and in the first six months of 2017 this figure had already reached RMB 400 mln (€ 52 mln).

According to a survey made in the first quarter of 2017, China’s e-commerce fresh flowers market in 2016 was worth RMB 16.88 bn (€ 2.2 bn) and it is expected to exceed RMB 60 bn (€ 7.8 bn) by the end of 2019 [**Source: iMedia Research, Hong Kong**]. For 2017, the China Flower Association reported a total number of 50,000 ‘online flower shops’.

A word of caution: Money Games.

The above figures are definitely spectacular, but -as also confirmed by sources in the Chinese flower business- a word of caution is appropriate here. Companies like Flower Plus and Huadian Shijian are funded by venture capital (VC) from financial investors, and in many cases their aim is to go public (register at a Stock Exchange in China or abroad) within the typical VC-horizon of four to five years. In order to reach this goal (which will make the companies’ founders multi-millionaires and result in huge cashing profits for the venture capital-financiers), spectacular growth has to be realized and annual figures need to double each year, at all cost. In some cases this his can lead to artificially inflated sales figures and other irregularities.

Market analysts recommend to look cautiously at spectacular growth figures of start-ups and new ventures, also in the flower and plant business.

Growing imports; challenges and expectations for the near future.

Of course, this flower bonanza has been noted overseas, and sales are definitely not limited to domestic product. More and more foreign suppliers enter the market, either as suppliers to Chinese online stores or by setting up their own offices or trial projects (see § 4.5 and 4.7).

Table 6: Main import countries and regions – cut flowers E-commerce.

Top import countries/regions for Chinese online flower sales channels	Top import species
The Netherlands	Tulips, Hyacinths, Roses
Africa (Kenya, South Africa)	Roses, Lilies, Protea and other ‘exotics’
South America (Colombia, Ecuador)	Roses, Lilies

Home delivery of delicate products like cut flowers demands sturdy and reliable packaging; therefore the *assortment and product range* on offer are also influenced by the rise in e-commerce and the stabilization (and sometimes slight decline) in traditional market sales. Emphasis is put on smaller, more easily packable products rather than on bulky and cumbersome flowers and plants.

As with all 'sudden booms' in China (like the 'shared bicycle explosion' all over the country in 2016-2017), the flower e-commerce boom is expected to slow down and the market to consolidate in the coming two to three years, with financially strong and innovative companies remaining and prospering, while opportunistic newcomers unfamiliar with the sector will disappear.

A *challenge* still faced by all channels in China's flower and plant market, so also by new e-commerce suppliers, is *the irregular supply and often substandard quality of the domestic product* (see also Chapter 4.6). China still lags way behind countries like The Netherlands, Germany, Colombia and the US in terms of product uniformity, quality, shelf life and other essential features, mostly due to growers' lack of knowledge and of means to invest in new technologies. Yunnan province, as largest sourcing area for new e-retail giants like Flower Plus, is a good example of this challenge. E-commerce leader Flower Plus follows its own 'DIY Strategy' (see Chapter 4.3): it has set up its own (contract) production at specific growers, it owns more than 5 square kilometres of land for cultivation of 'rare varieties', and it has invested in a 5 hectare big processing facility in Yunnan. Moreover, it has set up seven cold storage centres in major markets like Beijing, Shanghai and Shenzhen. From there, further transport is carried out to 186 cities in mainland China.

Marketing and pricing strategies used by online flower sellers in China focus on *female office workers*, as this category is responsible for 90% of all online orders. Customers are often tied to suppliers by (short term) *subscriptions* - for example: four fresh-flower deliveries in a four-week period, for a total price of RMB 169 (€ 22). As in many other sectors, also here one notices the Chinese *over-emphasis on pricing as a marketing tool*: dominant players sometimes seem to sell at or even below cost price, only to frustrate and hopefully 'kill' their competitors, thereby starting a 'race to the bottom' in a market where higher prices can be paid for quality and service. This strategy is another important reason for the slow pace of quality improvement in Chinese floriculture. Fortunately, some 'niche players' and trial projects, partly initiated by foreign players like Royal Flora Holland (see Chapter 4.5) put less emphasis on rock-bottom prices and more on quality and an innovative assortment. In major cities like Beijing, Shanghai and Guangzhou this has already resulted in the creation of a loyal customer base, and it is hoped that these examples will be followed by mainstream operators in the coming years.

4.5 Imports of flowers for retail use; new players enter the market.

In recent years, there has been an increasing shift in the Chinese cut flower market's assortment. Traditional species (rose, chrysanthemum, carnation, gerbera, lily, gladiolus) and colours (bright red and yellow, white) are still grown and sold in large quantities, but they are joined by newcomers. As to *species*, we see more lysianthus, calla, tulip, cut anthuriums and cut orchids (and a start in alstroemeria and many other 'new' flowers), and in the *colour* range, young consumers are attracted to 'pastel' colours like pink and light orange, and - notably in lilies- to spectacular multicolour flowers in pink/white, purple/pink etc. These new preferences can't immediately be met by local production; they often involve new and protected varieties that aren't made available for China by

breeders because of royalty issues (see Chapter 10), and in some cases the flowers are completely new to Chinese growers and cultivation is either impossible or very difficult and risky. This opens possibilities for *imports of cut flowers* from Europe, Africa and South America.

The above trend is further facilitated by an apparent change in Chinese government policy concerning quarantine and import restrictions. Imports of 'strategic crops and products' like grains, vegetables, fruits, animal feed components etc. are still highly restricted by quarantine- and other regulations. For many years, imports of cut flowers were also suffering from quarantine regulations and from cumbersome paperwork at airport customs that effectively made flowers unsuitable for selling before reaching the market. This practice seems to be changing now. Flowers are seen as a luxury product and are therefore less 'strategic', and the government seems less anxious to protect China's own growers at all cost, and more willing to allow international market forces to operate in the country.

Until recently, limited amounts of cut flowers were imported by Chinese trading companies that often also import flower bulbs, cuttings, seeds and other floriculture items. A new trend is now visible: international flower trading companies (or *exporters*, as they are called in The Netherlands) establish their own offices in China, to be closer to the market and offer added value to their existing customers or agents. Recent examples are given in Annex A. Dutch companies are establishing offices in Shanghai or Beijing, and organize imports of cut flowers from The Netherlands, Kenya, Ethiopia and other countries, using direct flights or routes via Dubai and other international hubs.

A special initiative in this respect is the project initiated by *Royal Flora Holland (RFH)*, the cooperative owners of the Dutch flower auctions at Aalsmeer and Naaldwijk (Westland), and by far the largest flower trading organization in the world. Since late 2015, RFH runs a representative office in Shanghai, from which a Dutch General Manager and by now 20 Chinese staff are actively importing, marketing and selling cut flowers to the Chinese market. Approved by the Dutch RFH Board and its Members, the China project aims to "improve access of Dutch-controlled produce (grown in several countries but with a Dutch quality image and branding) to the Chinese market, ultimately to the benefit of all its member growers and exporters".

Activities of the RFH office in Shanghai include:

- *Imports of cut flowers* from The Netherlands, Kenya, Ethiopia and some other countries, customs clearance, cold storage, preparation of bouquets and flower arrangements and sales, using a Holland/RFH brand.
- *Negotiating reduction of waiting times in customs.* a very important topic. In the past a main bottleneck for exporting flowers to China was the long and cumbersome procedure at Customs and the Plant Quarantine Service (see Chapter 10. This year [2018], both the Quarantine Service and the Ministry of Agriculture are being radically transformed by the central government, the final organizational chart is not yet complete). The RFH Shanghai office has managed to reduce quarantine waiting times for cut flowers from one or more days to just *two hours*, an important achievement. The procedure in Shanghai has been duplicated in Beijing and Guangzhou, so also there cut flowers can

now pass customs quickly, provided the right paperwork is done in advance.

- Furthermore, RFH Shanghai has set up *its own E-commerce* shop on Taobao, the Internet platform developed by IT giant Alibaba where Chinese customers can buy anything. The web-shop serves a sales and marketing purpose, and brings insight in consumer behaviour and preferences.
- Another marketing project has focused on the *supermarket* sector: at the Shanghai, Beijing and Guangzhou establishments of the international METRO-wholesale and retail chain (known in The Netherlands as MAKRO), fresh bunches of imported flowers were offered by sales hostesses to shoppers, and information on the origin and flower care was made available from a "Holland Shop-in-Shop" within the METRO shopping area. The project was well received and led to repeated sales and the building up of a new customer base, and was terminated after its planned trial period.
- Finally, RFH China engages in *marketing and sales to florists and other distributors*. Retailers were attracted by the speedy clearing process, the products' quality and shelf life, and the 'modern' way of doing business practiced by these Dutch newcomers.

After its Trial & Inception phase, the RFH project is now consolidating its services focusing on two models: the *service model* and the *sales model*.

In the *service model*, RFH establishes direct contact between (member) suppliers and Chinese buyers, and then takes care of almost all services in the chain "from foreign farm to Chinese buyer": import, customs clearance, cold storage, quality control, domestic logistics and payment by purchasers in Chinese currency (RMB). After checking payments, the RFH office also takes care that Dutch (or African, Latin American etc.) suppliers are paid in hard currency.

In the *sales model*, RFH acts as a sales office for (member) growers in China. In due course this model will be integrated with the 'flower web shop', creating direct links between foreign flower suppliers and Chinese buyers. Finally, China will be an integral part of RFH's global digital platform, "the Digital Flower Auction of the Future".

In commercial terms, RFH China's business is growing fast, and the ambition is "to do 200 million stems in 2020".

4.6 Quality issues and other challenges for the cut flower industry.

It has been a recurring topic in this report so far: the ornamental sector in China is facing many challenges and setbacks, and improvement is visible but slow. In this paragraph we summarize a number of challenges specific to *cut flower* production, marketing, distribution and sales. Issues mentioned here also apply to cut foliage and cut branches.

Quality problems.

As we have seen in Paragraphs 3.2, 4.1, 4.3 and 4.4, flower quality of domestic produce needs improvement. Quality varies largely from grower to grower and from one shipment to the next. This inadequate balance is partly due to growing pains and infant diseases, as the whole ornamental sector is a relatively new

phenomenon in the Chinese economy. However, some problems are of a more structural nature and will persist if they are not properly addressed. In summary, flower quality is influenced negatively by the following factors:

- *Lack of knowledge at grower level (structural)*. Extension services are not effective in improving growers' knowledge, and the offer of vocational education in the ornamental sector is limited and mostly based on theoretical information and written exams. Suppliers are also often not able to help growers improve quality: either they lack the knowledge themselves, as their main interest is commercial, or they don't have time, manpower and resources to seriously engage in technical support. New initiatives in training and education (see Chapter 9) try to fill this void.
- *Small land holdings of >95% of growers (structural, under government investigation now)*. See Chapter 3.2: generally speaking, smallholder farms miss the knowledge and capital to develop into professionally managed production units. Therefore, flower quality is lagging behind. The government is now studying ways to form "21st Century Co-operatives" where groups of growers can jointly invest and obtain credit. Private investors are negotiating land and labour deals with entire villages or farmers' associations, in order to reach the economies of scale needed for feasible investments.
- *The inadequate organization of wholesale markets and distribution channels (structural)*. See Chapter 4.3. Wholesalers minimize their investments and are mostly interested in a low purchase price; there's a lack of independent quality control, little use of flower preservation methods and an enormous lack of cold storage and precooling facilities.
- *Poor and mostly absent cold storage and refrigerated transport*. The need for a real 'cold chain' is huge indeed. This shortcoming manifests itself in all wholesale/retail markets, in transport throughout the country (in summer months, losses of fresh crops between harvest in Shandong Province and sales in Beijing or Shanghai can amount to 40%), and in storage at distribution hubs, retail stores and home-delivery services. Short-term thinking in the transport sector leads to fear of investing in refrigerated trucks and Distribution Centres (DC's): worries about filling up trucks, price drops and unpredictable consumer preferences result in a vicious circle of working on the cheap, quality deterioration and losses. The DIY-way of working is often the only solution for investors with a broader vision.
- *Rising prices of essential inputs* also affect final product quality. As indicated in Chapter 3.2, inputs like seeds, young plants, cuttings, agrochemicals and fertilizers are gradually rising, as government subsidies decrease. Foreign breeders and suppliers are asking prices more linked to the world market, especially for new and highly demanded varieties and products. Growers who are reluctant to invest more in these necessities, or simply can't afford them, will continue working with old materials, propagating the same plants over and over again, select the cheapest but less effective crop protection products etc., again resulting in low flower quality and lower prices in the market.

Other issues.

As we have seen in preceding chapters, quality problems may be the largest challenge in Chinese cut flower production and marketing/sales, but they are not the only issue affecting profitability and growth of the sector. Certain economic and social/cultural factors also are of influence. The most noteworthy are:

- *Soil, water and air pollution* form a serious danger for all agricultural crops, including ornamentals. Farmers in China use more fertilizers and pesticides per hectare than any of their colleagues world-wide [*] **Note:** See the interesting article of Yiyun Wu et al., "Policy distortions, farm size, and the overuse of agricultural chemicals in China"- *Proceedings of the National Academy of Sciences (US)*, May 2018 – www.pnas.org/cgi/doi/10.1073/pnas.1806645115.
Not only do growers have to deal with heavily polluted and exhausted plots of land (leading to a surge in soilless growing and the need to invest in new cultivation containers, gutters, dripping lines etc.), but they also face stricter government regulations, which can sometimes drive them out of business. An example (caused by high levels of air pollution) is the ever-expanding *ban on the use of coal as fuel for heating installations*. This started in the inner sections of cities like Shanghai and Beijing, but the ban is spreading further. In Beijing's 'country districts' like Changping, growers who were using coal-fired boilers to heat their greenhouses are now forced to switch to gas or stop heating. Some growers manage to invest in the new, much less polluting installations (like the 'model' pot plant grower Haojing in Changping/ Beijing, see Chapter 5), while others stop growing in winter or abandon their cultivation altogether.
- *Rising labour cost* has been identified in Chapter 3.2. In general this factor influences the whole economy, but it may lead to shifts in growers' strategies. If the traditional way of growing certain cut flowers involves more labour per unit than growing pot plants or vegetables that roughly result in the same income, labour cost can be a reason for growers to change crop. The alternative, automation to replace labour by efficient machinery, is still only feasible for a small percentage of flower growers.
- Finally, the problem of *succession / finding a new generation of growers* presents itself in floriculture as in most other sectors of agriculture. Most growers in China today are middle-aged or older. The situation is not as extreme yet as in Japan, where the average age of farmers is 67 (and most farming is done as a part-time activity), but even among China's 1.4 billion people it is becoming hard to find young people wanting to work as *nong min*, farmers. The general image of farm work is bad; young people in rural areas often migrate to cities with many job opportunities, and prefer a job as a factory worker or office assistant over continuing their parents' farm.

It is expected that China will follow the path of all developed nations here: during the 'developing' phase, the percentage of the working population active in agriculture (all plant and animal sectors combined) drops from way over 50% to a much lower percentage, while total production output doubles or triples and product quality highly increases. However, this transformation (which has indeed started in China) takes decades, and its two key requirements for success are:

1. a very *active, visionary government policy*;
2. entry into the sector of many *modern, resourceful investors with a long-term view on profit and growth*.

China is now announcing its own road to transformation of the *Green Sector* (including floriculture), and both government and the private sector are starting to show the needed sense of urgency.

4.7 Breeding and propagation of cut flower starting materials.

Breeding and propagation of any type of planting materials for modern agriculture is closely linked to systems of *PVP (Plant Variety Protection*, the botanic variant of Intellectual Property Rights), which involve *royalty charges* by breeders to growers. In the Western world, the general consensus is that plant breeding programs -by universities, other government-funded institutions or commercial seed and plant companies- should be allowed to recover part of their costs (multi-million Euro amounts, in any sector) by charging royalty payments to users of their varieties (growers). Royalties are often included in the price of starting materials (seeds, cuttings, young plants) or charged as a percentage of the total amount of plants of the variety grown in a year or cultivation cycle. PVP and royalty systems are negotiated between stakeholders (including governments who need to enforce the systems in their territories) and laid down in the international UPOV Treaty which is renewed on a regular basis. For more technicalities on this, see Chapter 10.

In China however, plant breeders have very limited legal options to enforce royalty payment. Although these options may exist in some legislation, the government puts no priority in enforcing them. At the same time, Chinese universities and other scientific institutions are actively breeding and propagating all kinds of crops, including ornamentals, and distributing starting materials to farmers at rock-bottom prices. Finally, farmers and growers are used to multiply (propagate) seeds and cuttings from their own crops whenever possible, and only buy 'new' starting materials when their crop quality has decreased to unacceptable levels, or when they really need a new variety that will increase their farm's profitability.

Taken the above situation into account, it's no surprise that foreign and international breeding companies, either in field crops, vegetables, ornamentals or other crops, do *not* engage in fundamental and large-scale breeding programs in China. Many breeders have establishments in the country, and some of them do excellent business, but they focus mainly on the following three activities:

- *Variety testing* (comparing young material from varieties that are commonly used in China with limited amounts of 'new' varieties, while taking care that the new material is closely guarded);
- *Propagation (production)* of young materials of existing varieties under the best possible conditions, and sales of these young materials in China at relatively low, all-in prices;
- *Import* of starting materials (seeds, cuttings, flower bulbs) produced in other countries with better growing conditions and more control of production (Africa, Latin America), and sales of these materials to Chinese customers.

A fourth activity that some breeders are trying to engage in is *license production*: setting up of plots of so-called Mother Plants at the facilities of Chinese propagation companies, and working out agreements with these companies on technical support, royalty payments and sales of cuttings or seeds derived from the mother plants. In practice this kind of cooperation runs into various types of difficulties, and even Chinese growers often consider 'local license product' as *inferior* compared to imported materials or materials produced in China under complete control of foreign breeders.

Because the quality of imported or 'locally controlled-propagated' planting materials is usually better than cuttings or seeds taken from growers' own crops ('self-propagation'), growers are willing to renew their planting stock on a regular basis, and in this way foreign breeders and propagators can set up a reasonable business in China. However, the big bottleneck that is becoming visible as China's economy and its wealthy upper and middle classes keep growing is the *lack of a new and fast-developing assortment*. Breeders are reluctant to export their latest innovations, colours and species to China because of the risk of illegal propagation, so growers only have access to materials of well-known, in some cases really 'old' varieties, unless they make specific agreements with breeders and convince them that starting materials are 'protected' at their facilities. In practice, only large-scale, professional growers are able to conclude such agreements, and the average Chinese flower grower with two *mu* of plastic tunnel-greenhouses is still growing the well-known, common varieties.

Apart from local, typical Chinese or Asian flowers and pot plants (like 'Chinese orchids', peony, lotus, ornamental bamboo, bonsai etc.), *Chinese breeding programs* have so far not really produced spectacular innovations in major cut flower species. Therefore, foreign breeders and their varieties remain dominant in the Chinese cut flower market. Quite a few of these breeders have established their own facilities and/or long term partnerships with Chinese companies. Examples are (see also Chapter 5 and Annex A, in which leading local and foreign breeders and propagators are mentioned):

- **Anthura China.** Anthura China produces *anthurium and orchid* young plants for the Chinese market at their modern facilities in Songming, Yunnan Province. Most of the material is used for pot plant growing (see Chapter 5), as cut anthuriums and cut orchids are still a rare product in the market.
- **Dümmen Orange China.** This consortium of breeding companies has been drawing a lot of attention in the past 3 years. Dutch breeding company Fides (chrysanthemum, kalanchoe and other species) and its partners in Agribio Group started a sales office in China in 2011. Following a boost in their financial resources by international venture capital investors, this group, now called Dümmen Orange, acquired many other plant and flower breeders: Dutch Rijnplant (anthurium), Dutch rose breeder Olij Roses, the Hobaho flower bulb auction office, several American breeders of calla lilies (*zantedeschia*), Taiwanese orchid breeder Sogo and other specialized ornamental breeders. Dümmen Orange's ambitious aim is to create the first global multinational company in ornamental breeding and production of starting materials. From their Shanghai base, Dümmen Orange is selling cuttings and young

plants in China, mostly for pot plant growing (see Chapter 5). In cut flowers, their most important crops in China so far are *cut chrysanthemums* (cuttings are imported and partly produced under license in China) and *roses* (older varieties are mostly self-propagated by growers in Yunnan, and newer varieties may be included in royalty schemes, see § 10.1).

- **Hilverda Kooij / Kunming HAS Farm.** Dutch breeder Hilverda Kooij (carnation, alstroemeria, limonium, gypsophila, others) is active in cutting production in Yunnan (Songming), together with its partner HAS Farm, a Dutch-run company dominating flower production and trade in *Vietnam*. Under the name "Kunming HAS Farm Young Plants Co. Ltd.", they produce cut and pot carnation cuttings (3 ha., rapidly expanding) and have established a tissue culture lab for research and propagation.
- **Deliflor.** This Dutch breeder is world market leader in *cut chrysanthemums* and active in China via their Chinese importer known as Deliflor China. Their position is strengthened by the fact that their importer is the major shareholder in an e-commerce platform (*24 Hua*, meaning '24 flower'), which is marketing cut flowers grown by Deliflor customers.
- **De Ruiter Roses.** This Dutch *rose* breeder also has set up a facility in Yunnan, "Yuxi De Ruiter Flower Co. Ltd." in Yuxi town.
- **Schreurs B.V.** A major global player in *cut roses* but also known for *gerberas*, this Dutch breeding company is establishing itself in China (also in Yunnan) for propagation and sales of planting materials.
- **Interplant B.V.,** represented in China by Beijing Landsong Agricultural Development Co. Ltd. and specializing in breeding of *spray roses*, are also increasing their activities in China.
- **Armada Youngplants.** Recently (2018), this Dutch breeder of *cut chrysanthemums*, *pot chrysanthemums* and *pot roses* has established a sales office in Shanghai.
- **Flower seed breeders:** The most important breeders of cut flowers grown from seeds (bedding plants, perennials) who are active in China are the US giant **Ball Seed** and Dutch/Swiss breeder **Syngenta Flowers**. Both companies have research and propagation activities in the south of Liaoning Province, near the port city of Dalian. In certain species (lysianthus, many types of 'summer flowers'), Japanese breeder **Sakata Seeds** are also selling (imported) seeds in China, through their establishment in Suzhou, Jiangsu Province.
- **Cut foliage and cut branches:** as indicated in § 4.2, this sector is still relatively small and little developed. Foliage is mostly produced in the southern coastal provinces of Hainan, Guangdong and Fujian, and distributed throughout the country as a by-product in the considerably larger flow of cut flowers. Foliage growers are usually small and family-owned, and propagation mostly takes place on a local traditional basis using own cuttings and mother plants. This sector may also become

interesting for foreign suppliers of planting materials; first studies are being carried out now.

4.8 Flower Bulbs.

Especially for landscaping and “spring flower park” activities, Dutch flower bulbs have been exported to China for more than 25 years already. The yearly “Holland Flower Show” in Beijing’s palace gardens near the Forbidden City is a long-standing tradition, and over the years more and more city governments started planting imported tulips, hyacinths, narcissus and other colourful symbols of spring in parks, botanic gardens and other public spaces. Gradually, also production of cut bulb flowers has picked up: especially *lilies* are now grown in different parts of China, mostly in the favourable climate of Yunnan around Kunming. Bulb flowers are popular: the Chinese love taking *selfies* in flowering tulip fields, and cut lilies and other bulb flowers sell at high prices.

As to breeding and propagation: in § 3.1, statistics showed that flower bulb growing in China itself hasn’t been successful so far. This is confirmed by people involved in trials in this field; the best known ‘Dutch’ project, in a remote area of Yunnan, has been terminated. Today flower bulb trade in China is therefore heavily dominated by *imports*: Dutch bulb companies send containerloads of bulbs to China from Holland, and from their ‘counter season’ production locations in Chile and other countries in the Southern Hemisphere.

Figures on Dutch bulb exports are somewhat indicative, a/o because sometimes ‘rerouting’ of shipments takes place (whereby bulbs destined for other locations in Asia are transhipped to China). A fair indication is given in the table below; names of main players in the Chinese bulb market can be found in Annex A.

Table 7: Exports of Dutch Flower Bulbs to China (in million bulbs, indicative)

SPECIES	2015	2016	2017
Lily	242.3	256.5	281
Tulip	128	163	193
Gladiolus	10	12.6	23.2
Hyacinth	38	23.6	17
Iris	2	1.2	6.1
Narcissus	2.3	3.2	2.9
Zantedeschia (Calla Lily)	0.8	1.3	1.3
Crocus	0.7	1.8	1.2
Dahlia	0.3	1.6	0.7
Amaryllis	0.2	0.3	0.7
Other Bulbs	8.6	10.2	8.7
TOTALS	433.2	475.3	535.8

Sources: iBulb Flower Bulb & Bulb Flower Information Centre / Netherlands Central Bureau of Statistics, The Netherlands.

As shown in the table, there is a steady growth in exports of Dutch flower bulbs to China in recent years, with *lilies* (mostly used for cut flower production) and *tulips* (mostly used for parks, gardens and flower shows) as absolute top species.

Totals have surpassed half a billion pieces in 2017, and the trend is likely to continue.

In late 2017/early 2018, a number of Chinese importers of flower bulbs (including some leading ones) got into difficulty when they were prosecuted for financial wrongdoing; some businesses were closed or temporarily suspended by Chinese authorities. This caused quite a stir in The Netherlands as well (delayed payments, cancellation of orders), but as the legal issues had nothing to do with the nature of the product, trade is expected to continue as before and follow the upward trend shown above.

4.9 Lawn Grass.

Lawn grass (turf grass) is also a product in which The Netherlands have a long tradition. In China it is mainly bought by government landscaping services, real estate developers and other institutions. As few people own a private garden, consumer sales of grass seeds or sods are limited. *Barenbrug BV*, a Dutch breeder and producer of grass seeds and the largest in its field world-wide, serves the Chinese market from a sales & services office in Tianjin (see Annex A).

5. Pot Plants.

In contrast with cut flowers, *pot plants* have been a part of Chinese daily life throughout most of the country's history. Especially *flowering* species like pot anthurium, bromeliads, cyclamen and orchids (also called 'potted flowers') are highly appreciated as decorations for home, balcony and courtyard, and seen as symbols of good fortune. Plants are presented as gifts on many occasions, from the all-important family event at Chinese New Year / Spring Festival (every year in the period late January-early March) to festive openings of offices, shops and government buildings. Flowering pot plants are grown all over China, while cultivation of 'green/leafy pot plants' like ficus, draecena etc. is more concentrated in the (sub-)tropical provinces in the south where they can be kept outside all year round.

With the exception of the Dounan Flower Market in Kunming, nearly all local 'Ornamental Wholesale and Retail Markets' in Chinese cities (see description in § 4.3) are dominated by pot plants in all shapes and sizes. Quality levels vary greatly; unlike in the case of cut flowers, imports are practically non-existing, so buyers have little material to compare. In recent years however, the market has seen some important shifts which will be described in this chapter.

5.1 Major pot plant varieties and production regions.

Total figures for most important species.

Just like for cut flowers, we compare *total* production figures for the most important species for 2016 and 2014.

A general remark about the figures below: in the year 2014, especially the pot plant market had not yet fully recovered from the 'partial collapse' after the start of the Central Government's austerity campaign in 2012. The situation has been improving as consumer markets kept on growing. Today figures are definitely higher in most major growing regions, but we also see *stagnation or even decline in cultivation acreage of 'traditional' species like bromeliads, anthurium and rhododendron*. With 'Chinese cymbidium orchids' and Phalaenopsis as exceptions, growth in acreage is mostly caused by 'new' species like *succulents, begonia and kalanchoe*, that are developing rapidly. When we look at total figures for the most important 'Group A' species from 2016 compared to 2014 (Table 8), we see this process quite clearly.

Table 8: Production areas (ha) of main pot plants in China, 2014 / 2016 (A)

Growing Area (ha), all China	Bro-meliad	Orchid (Cymb.)	Anthu-rium	Calad-ium	Rhodo-dendron	Chi-nese Orch.	Phalae Nopsis	Pot Chry sant.
TOTAL 2014	5,400	11,000	2,750	6,700	1,240	753	506	490
TOTAL 2016	4,350	12,600	2,750	6,100	1,250	1,800	610	*)

*) For Pot Chrysanthemums, no 2016 figures were available. Acreage is reported to grow.

Source: Ministry of Agriculture, Beijing

For the secondary 'Group B', no total figures over 2016 were available. For the 'specialty Group C' however (bonsai and bulbs-on-pot), we can compare total figures of 2014 and 2016 again, showing a *stagnating* cultivation area:

Table 9: Production areas (ha) of main pot plants in China, 2014 / 2016 (C)

Growing Area (ha), all China	Major Bonsai	Flower Bulbs on Pot
TOTAL 2014	5,645	1,070
TOTAL 2016	4,980	910

Source: Ministry of Agriculture, Beijing

Figures per province.

The table below ("Pot plants – A") contains production areas per province for the most important pot plant species grown and sold in China until today.

Table 10: Production areas (in ha) of main pot plants by province, 2014 (A)

Growing Area (ha) by Province	Bro-meliad	Orchid (Cymb.)	Anthurium	Caladium	Rhododendron	Chinese Orch.	Phalaenopsis	Pot Chrysanth.
TOTAL	5,400	11,000	2,750	6,700	1,240	753	506	490
Beijing	21	44	17	5	0	0	0	22
Tianjin	3	70	31	3	0	0	0	21
Hebei	260	340	260	250	0	0	0	0
Shanxi	50	132	82	60	0	0	0	0
Inner Mong.	0.5	26	0	0.5	0	0	0	0
Liaoning	97	725	80	110	0	0	0	0
Jilin	2	7	3	12	3	0	3	6
Heilongjiang	0	0	1	1	0	0	2	3
Shanghai	52	28	35	60	0	0	0	0
Jiangsu	1,380	940	90	175	435	0	0	0
Zhejiang	66	265	50	70	0	0	0	0
Anhui	93	48	60	130	0	0	0	0
Fujian	0	0	41	0	520	600	80	0
Jiangxi	126	320	30	90	0	0	0	0
Shandong	20	0	0	0	0	0	76	0
Henan	105	260	71	200	0	0	0	0
Hubei	285	250	280	1,050	0	0	0	0
Hunan	460	600	115	805	62	51	1	62
Guangdong	1,040	2,610	550	2,400	0	0	0	0
Guangxi	330	500	60	110	0	0	0	0
Hainan	31	306	0	0	0	0	0	0
Chongqing	0	82	15	50	20	2	4	61
Sichuan	700	750	260	380	0	0	0	0
Guizhou	6	270	25	22	0	0	0	0
Yunnan	27	1,600	75	60	0	0	0	0
Shaanxi	200	600	500	600	200	100	300	300
Gansu	20	200	12	15	0	0	40	10
Qinghai	20	12	8	46	0	0	0	0
Ningxia	17	16	14	5	0	0	0	0
Xinjiang	1	1	1	1	1	1	2	4
Tibet	0	0	0	0	0	0	0	0

Source: Ministry of Agriculture, Beijing

Although the younger generations' preferences seem to move away from the 'classic' flowering pot plants like bromeliads, anthuriums and orchids, these still occupy the largest growing areas in the country. Especially small-size, low-tech growers are wary of 'innovation' by venturing into new and unknown species. The table also confirms the *widespread growing* of pot plants over northern, southern, coastal and interior regions. Provinces that stand out in this 'Major League' are *Hebei, Liaoning, Jiangsu, Hubei, Hunan, Guangdong, Sichuan and Shaanxi*. [**Note:** the table also hints to the fact that some Provincial authorities may have been more diligent than others in handing in their figures to the Central Ministry in Beijing: Shaanxi is showing remarkable figures for all species, whereas the figures of Shandong Province are looking lower than can be expected. Overall however, indications per province seem reasonable].

Table 11: Production areas (in ha) of main pot plants by province, 2014 (B)

Growing Area (ha) by Province	Cyclamen Pers.	Euphorbia P.	Clivia	Cycas Rev.	Bougainvillea	Camelia Jap.	Ficus Microcarpa	Others
TOTAL	570	520	1,235	164	145	855	1,842	13,420
Beijing	0	0	0	0	0	0	0	1,130
Tianjin	0	0	0	0	0	0	0	160
Hebei	270	0	0	0	0	0	0	0
Shanxi	0	0	0	0	0	0	0	40
Inner Mong.	2	0	0	0	0	0	0	0
Liaoning	0	0	950	0	0	0	0	0
Jilin	4	3	155	0	0.5	0.5	0	40
Heilongjiang	2	1	18	0	0	0	0	6
Shanghai	0	0	0	0	0	0	0	170
Jiangsu	0	0	0	0	0	0	0	0
Zhejiang	0	0	0	0	0	0	0	270
Anhui	0	0	0	0	0	0	0	0
Fujian	0	0	0	0	0	0	1,271	0
Jiangxi	0	0	0	0	0	0	0	895
Shandong	10	0	0	0	0	0	0	100
Henan	0	0	0	0	0	0	0	0
Hubei	0	0	0	0	0	0	0	0
Hunan	0	3	3	130	1	5.5	0	110
Guangdong	0	0	0	0	0	0	570	4,825
Guangxi	0	0	0	0	0	0	0	300
Hainan	0	0	0	0	0	0	0	3,120
Chongqing	0	0	9	34	9	3	0	70
Sichuan	0	0	0	0	0	0	0	0
Guizhou	0	0	0	0	130	0	0	0
Yunnan	0	0	0	0	0	845	0	2,110
Shaanxi	200	500	100	0	0	0	0	80
Gansu	7	0	0	0	0	0	0	0
Qinghai	46	0	0	0	0	0	0	0
Ningxia	16	0	0	0	0	0	0	0
Xinjiang	13	13	0.5	0.5	7.5	0.5	0.5	15
Tibet	0	0	0	0	0	0	0	0

Source: Ministry of Agriculture, Beijing

In this table ("Pot plants – B") we see the 'second tier' of pot plant species in the country, from cyclamen to camelia and ficus microcarpa. Figures are best seen as indications, and again we notice a focus on mostly the same provinces as growing area, although Fujian and Yunnan are a bit better represented here. Especially the case of *Yunnan* points to a trend: in recent years (2016-2018) we

have noted a growing acreage in this province for *smaller size pot plants, like pot roses, kalanchoe, zantedeschia (calla lily) and all kinds of succulents*. Because of certain improvements in logistics and the shift from government/institutional buying (large pot sizes) to the consumer market (small plants and pot sizes, better quality), in the smaller segment the rich southern markets of Guangzhou, Shenzhen and Hong Kong have come within reach of producers in Yunnan. Pot plant growers in Guangdong province feel this competition now, while Yunnan's sales to other wealthy areas in the north and east of the country are limited to cut flowers.

Table 12: Production areas (in ha) of main pot plants by province, 2014 (C)

Growing Area (ha) by Province	Major Bonsai	Flower Bulbs on Pot
TOTAL	5,645	1,070
Beijing	5	0
Tianjin	0	0
Hebei	0	0
Shanxi	0	0
Inner Mong.	0	0
Liaoning	0	0
Jilin	15	0.5
Heilongjiang	0	1
Shanghai	0	0
Jiangsu	0	0
Zhejiang	0	0
Anhui	0	0
Fujian	2,105	590
Jiangxi	0	0
Shandong	0	0
Henan	0	0
Hubei	0	0
Hunan	1,340	155
Guangdong	1,000	90
Guangxi	0	0
Hainan	0	0
Chongqing	0.5	33
Sichuan	0	0
Guizhou	0	0
Yunnan	0	0
Shaanxi	1,180	200
Gansu	0	0
Qinghai	0	0
Ningxia	0	0
Xinjiang	1	1
Tibet	0	0

Source: Ministry of Agriculture, Beijing

Finally, the above table ("Pot plants – C") shows two 'special' categories: the typical Asian phenomenon of *bonsai* (in China also seen as a 'national heritage', references to Japan as bonsai country are not appreciated) and *flower bulbs-on-pot*, in China mostly consisting of narcissus and (to a lesser extent) hyacinth. Flower bulbs of course have a very 'Dutch' image, and indications are there's a large potential to expand this market. Bulbs-on-pot are easier to grow than most pot plants, and definitely easier than *all* cut flowers; in fact, a good greenhouse is of minor importance. A properly given 'cold treatment' is crucial, and after

that the bulbs almost grow 'by themselves' until they are ready for sale. Lack of knowledge, reluctance to invest in better cooling rooms and lack of good consumer marketing are still bottlenecks.

As to the regional division for these two 'specialties', only a few provinces stand out: *Fujian, Hunan, Guangdong and Shaanxi*. For bulbs-on-pot, there are no real climate-related barriers; experiments in growing them have been done in Beijing, Shandong and Jiangsu as well.

5.2 Marketing and distribution of pot plants – the 'traditional' wholesale /retail system.

For a detailed description of the 'traditional', government-backed system of *wholesale/retail flower and plant markets*, as they are found in all major cities and some provincial towns, we refer to Chapter 4.3. All characteristics and challenges -described there in the context of cut flower sales and distribution- also apply to pot plants. The difference between the two sectors lies in the fact that pot plants, due to their weight and bulkiness, are even more dependent on the wholesale/retail markets, and on 'local' sales (say, within the Province where they are grown) than cut flowers. With the exception of some small-sized items like kalanchoe and small and mini-succulents, pot plants are grown at a relatively short distance from their final (consumer-) sales areas. In China's huge metropolitan areas, consumers often travel for more than an hour to reach one of the few flower and plant markets, up to now the only outlets where they can buy plants for their home, balcony or courtyard.

Apart from the big markets, most *florists* and the new trendy pop-up stores in shopping malls focus on cut flowers and high-value (but low-volume) gifts combining flowers or plants with jewellery, clothing or perfumes. *Garden centres*, of the type that we know from western countries, where pot plants form a major part of the turnover, are still virtually unknown in China. Some investors are now working on the garden centre concept, of course *with Chinese characteristics* (one difference with Western countries being that more than 90% of Chinese urban consumers do *not* own or rent a private garden).

Internet will of course play a role in improving distribution of pot plants, but the focus will be more regional and local than in the national (and even global) market of cut flowers.

5.3 Consumption and new, direct B-to-C distribution systems: E-commerce and home delivery of pot plants?

As made clear already, the enormous boom in e-commerce and home delivery in China has much less relevance for pot plants than for cut flowers. Most plants are still too heavy and low-value to make the whole e-commerce chain feasible, but of course some elements (ordering online, home delivery from regional and local 'plant hubs' or garden centres keeping stock of the most popular plants) can be expected.

An exception can be made for the 'really small stuff': especially **succulents** are presently enjoying a boom in sales and in e-commerce over large distances at the same time. Small, brightly coloured, easy to handle and hard to damage, succulent plants are a big hit on *Taobao*, and some larger growers have even set up their own web shop for this product, as we have encountered in Shandong

province, at *Qingzhou Flower Industry Group*. Even though prices per individual plant are not very high, consumers often buy a box with several succulents, making a longer-distance delivery feasible.



Figure 4: Succulents (picture taken at Lai Tai Flower & Plant Market, Sanyuanqiao, Beijing) enjoy a great popularity and are also distributed via E-commerce. According to preliminary figures by the China Flower Association, total production of succulents in China in 2016 was 300 million pots, average wholesale price 6 RMB/pot (€ 0,75). In 2017, production had risen to 400 million pots, and average price decreased to 5 RMB/pot (€ 0,63).

5.4 Quality issues and other challenges for the pot plant industry.

In this paragraph we can refer almost completely to § 4.6: in general, the same main issues and challenges affecting the cut flower value chain we saw there also apply to pot plants. Differences are mainly gradual, and in some cases the Chinese pot plant industry may be seen as 'more developed' than the cut flower sector given its longer history and traditional position in Chinese society and history.

In a brief summary, the following pot plant-specific remarks can be made:

Quality problems.

Looking from the perspective of developed Western markets and Japan, the general quality of most China-grown pot plants can be defined as 'reasonable / mediocre'. Some experienced growers produce good anthuriums, bromeliads,

orchids and other (sub-) tropical species, notably in southern provinces in the autumn/winter season and in certain heated and well-managed greenhouses in the North. Examples are *Heehua Floriculture in Guangzhou* (many species, a/o poinsettias for the Hong Kong market) and *Haojing Nurseries in Beijing* (kalanchoe, pot chrysanthemums).

Pot plants are mostly less delicate and much less sensitive to serious damage than cut flowers. Even when growing conditions are far from ideal, reasonable results can be achieved. This fact, combined with the nearly total lack of imported finished product, ensures that the local product is still widely accepted by consumers and institutional buyers. However, rising consumer incomes, big increases in foreign travel, growing activities of foreign suppliers and 'green theme parks' (see Chapter 7) are all fuelling demand for better quality and more variety. Traditionally dominant species like pot anthuriums and bromeliads are under pressure, and especially younger generations of consumers are looking for new shapes, sizes and colours.

Factors that negatively influence product quality, as mentioned in § 4.6, also apply to the pot plant sector:

- *Lack of knowledge at grower level (structural).*
- *Small land holdings of >95% of growers, making investments in quality improvement impossible or unfeasible.*
- *The inadequate organization of wholesale markets and distribution channels (structural).*
- *Poor and mostly absent cold storage and refrigerated transport.*
- *Rising prices of essential inputs (seeds/young plants/cutting, agrochemicals, fertilizers etc.).*

The same goes for the other, mostly economical issues growers are facing:

- *Pollution and stricter government regulations on environment protection.*
- *Rising labour cost.*
- *Succession problems / finding a new generation of growers.*

For more details on these two groups of factors we therefore refer to § 4.6 (pages 27-30).



Figure 5: Traditional pot plant transport, Beijing.

5.5 Breeding and propagation of pot plant starting materials.

As stated in § 4.7, Chinese breeding programs carried out at universities, research institutes and a small number of private companies haven't produced a real new generation of pot plant materials, just as in cut flowers. Ornamentals are still considered 'luxury' products: a sector in which good money can be made, but not 'strategic' for the nation as a whole.

Breeding programs and propagation carried out by government-owned institutes focus especially on supplying local growers with acceptable seedlings and young plants at low prices. Because of Plant Variety Protection issues, there is little to no cooperation with international companies in breeding programs. A big stimulus for more international cooperation could be given if China would sign the 1991 version of the UPOV treaty (see § 4.7 and Chapter 10) *and* if it would effectively enforce PVP laws.

In the pot plant sector, some foreign breeders and propagators have become 'household names' among Chinese growers already, as they have established themselves in the country and engage in variety testing, import of starting materials and propagation of tissue culture plants and seedlings. It concerns partly the same companies as mentioned in § 4.7, and in most cases the Chinese pot plant market is still of greater importance to them than the market for cut flowers.

Examples are (see also § 4.7):

- **Anthura.** Dutch-owned Anthura is the market leader in *pot anthuriums* in China, and also engages in propagation and sales of *orchid* young plants (especially *phalaenopsis*) from their facilities in Yunnan Province.
- **Dümmen Orange China.** This consortium of breeding companies owns many programs with potential for China. In pot plants, *anthurium*, *kalanchoe*, *pot chrysanthemum*, *pot carnation*, *poinsettia*, *pelargonium* and *begonia* are important, and via recent acquisitions Dümmen Orange has also become a main player in *calla lilies (zantedeschia)* and *pot orchids*.
- **Hilverda Kooij / Kunming HAS Farm.** Apart from their cut flower activities, Hilverda Kooij and its partner Kunming HAS Farm are producing and marketing *pot carnation* cuttings. With their rapid expansion in recent years, also products like *kalanchoe* cuttings (from Danish breeder **Jepsen/Queen**) are appearing on the Chinese market.
- **Armada Youngplants.** Besides cut chrysanthemums, the newly opened office in Shanghai of this Dutch breeder is also promoting their varieties of *pot chrysanthemums* and *pot roses*.

6. Trees and Shrubs.

As seen in Chapter 3, trees and shrubs for gardening and landscaping occupy nearly *half* the acreage used for ornamental crops in China (770,000 out of 1,340,000 hectares), and they represent a similar share of the total production value: 8,45 billion out of 18 billion Euro (* **Figures: Ministry of Agriculture, year 2016.**).

Trees and shrubs are grown for the local market, and *government institutions* like municipal landscaping departments and reforestation bureaus are the main end users. Other main client groups are real estate developers and owners/operators of large office and residential estates, entertainment parks and tourist attractions. *Private consumers* are less important.

6.1 Production regions.

As the huge acreage and 'local' use suggest, trees and shrubs are grown all over China in smaller and larger nurseries. According to an experienced Chinese producer/grower, "in China, 70% of tree and shrub nurseries are low-tech and produce low quality, and 30% are professional companies (government and private) that produce the good quality that is common at 95% of nurseries in the US, France or The Netherlands".

For climatic and logistic reasons, certain towns or districts have become 'concentration areas' for tree and shrub production. A small overview:

- **Beijing:** the huge markets of the ever-expanding capital and neighbouring cities, the availability of resources and know-how (universities, research nurseries) and the relatively favourable climate for many trees and 'woody plants and shrubs' have together created a good business environment for tree and plant nurseries. The Beijing Nursery Association (see Annex A) has 108 members (2018), with a combined cultivation area of more than 17,000 hectares.
- **Hebei Province:** known as "the countryside of Beijing", this province is very important for food crops as well as ornamentals, and nurseries are developing rapidly. Focus locations for tree and shrub growing are *Jizhou* (north-east Hebei) and *Dingzhou* (south of the city of Baoding).
- **Liaoning Province:** a well known nursery area here is the city of *Anshan*, south of the provincial capital Shenyang.
- **Heilongjiang and Jilin Provinces:** in these areas, with a climate resembling Siberia, smaller growers produce mostly shrubs.
- **Shandong Province:** although this area is more known for vegetables, some trees and shrubs are grown near the largest city *Qingdao*, and in *Tai'an*, to the south of the provincial capital Jinan (mostly small growers).
- **Jiangsu Province:** the town of *Shuyang*, in the north of the province near Suqian and Xuzhou, is known for growing trees and plants for landscaping.
- **Henan Province:** in this central region, the town of *Yanling* is a focus area for trees and shrubs.
- **Zhejiang Province:** the *Xiaoshan* district of the capital *Hangzhou* (known for IT and the Ali Baba 'empire') contains tree and shrub nurseries.

- **The North-West:** around *Xi'an in Shaanxi Province*, and in *Ningxia autonomous region* further west, small growers produce for the local market.
- **Hunan Province:** mostly small-scale production of magnolia and other (sub-)tropical species.
- **Guangdong, Fujian and Hainan Provinces:** mostly tropical species are grown here (like ficus types that develop into large trees), but the business seems less important than that of (tropical) pot plants and flowers.

6.2 Main species.

In China, trees and shrubs are categorized in two main groups, depending on their use: species used mainly for "Urban Landscaping", and those used for "Mountain and Forest Planting" (reforestation, greening of non-urban areas).

For urban landscaping, especially in **North and Central China**, species in demand are:

- Wild apple tree / Crab apple tree (*Malus*)
- Ornamental pear tree (*Pyrus*)
- Hawthorn (*Crataegus*)
- Elm (*Ulmus*)
- Maple (*Acer*) – a/o red maple, silver maple, Norway maple
- Birch (*Betula*) – a/o silver, red and black birch
- Ash (*Fraxinus*) – a/o American white and green ash
- Linden (*Tilia*) – a/o T. Americana, T. Manchurica and T. Mongolica
- Ginkgo (*Ginkgo Biloba*)
- Black Locust (*Robinia Pseudoacacia*)
- Poplar (*Populus*) – also omnipresent along country roads in North and Central China, as fast-growing wind breakers
- Willow (*Salix*)
- Flowering and colourful shrubs and plants: a/o Rose, Peony, Hydrangea, Rhododendron, Viburnum, Weigelia

For reforestation and mountain areas, the Forestry authorities in northern and temperate areas use many types of Birch (*Betula*) and Oak (*Quercus*), as well as Maple (*Acer*) and many species of mostly local shrubs.

In **South China**, more tropical and subtropical species are used. Species in demand (mostly using their botanical names) are:

- *Cinnamomum Camphora*
- *Ginkgo Biloba*
- *Koelreuteria Paniculata*
- *Sapindus Mukorossi Gaertn.*
- *Taxodium Distichum (L.) Rich*
- *Ligustrum Lucidum*
- *Liriodendron Chinense (Hemsl.) Sarg*
- *Liquidambar Formosana Hance*
- *Osmanthus sp.*
- *Prunus Serrulata*

- *Lagerstroemia Indica*
- *Platanus Acerifolia*
- *Acer Palmatum*
- *Camellia Japonica*
- *Zelkova Serrata (Thunb.) Makino*

6.3 Market developments and issues/challenges.

In spite of the large acreage used for trees and shrubs (50% of all ornamental crops in the country), Chinese major players talk of a “stagnating” market, which needs vitalization and more international trade. Large infrastructural projects, city expansion, touristic projects and mega-events like the 2019 Beijing International Horticultural Exhibition keep business running. A number of trends and developments are noted:

- The influence of the *State Forestry and Grassland Administration (SFGA)* in this sector is very large. Policies often change and sometimes are in contradiction with directives by the *Ministry of Agriculture and Rural Affairs (MARA)* in Beijing. Incidentally (in case of urgent need) quantities of ‘foreign’ young material or even fully grown trees are imported, but there is no steady cross-border flow of products as in other ornamental crops.
- Companies in the sector notice a trend toward *more propagation of local Chinese species and varieties*, and less imports. Again, the Forestry Administration seems to play a major part in this, as its recent policies call for more use of indigenous species in reforestation and roadside planting.

6.4 Major players in the market for trees and shrubs.

As indicated, government institutions dominate this market, and Public Greenery services in all major cities are involved in it. We state a few names of major players, most of whom have Dutch and other international contacts. For further details see Annex A.

- **Fat Dragon Co., Beijing** – This pioneering company in the Chinese ornamental sector started as a greenhouse constructor around 1990, but has developed into a specialist and market leader in gardening, landscaping and nurseries for trees and shrubs.
- **Beijing Florascape** – Under this name, the Beijing Municipal Public Greenery Service controls parks and street trees and plants in the capital. Its own nursery at Beijing Flower Port (not far from the Capital Airport in the north of the city) includes a high-tech modern glasshouse facility designed and engineered by leading Dutch companies.
- **Dadong Liu Experimental Park** – Also located in the Beijing area, this large park and nursery area is an important R&D and propagation area for trees and shrubs.

- **RPM (US)** – This venture set up by an American tree and shrub propagator is introducing new propagation methods to the Chinese market. The project consists of a relatively small nursery; expansion is planned for the coming years.
- **Beijing Nursery Association** – As mentioned above, its 108 members run more than 17,000 hectares of nurseries in the Beijing region alone.
- **Shanghai Garden Co.** – A leading producer in South China, supplying to both government greenery services and private sector project. This company was involved in supply and planting of park and garden materials for Disneyland Shanghai (completed in 2016), meeting its owners' very strict demands (including imports of non-native species).

7. Flower & Plant Theme Parks and 'Agri-Tourism'.

Within China's domestic tourism sector, Flower & Plant Parks have a special position. Hundreds of millions of city-dwellers go to 'green areas' whenever they can, to enjoy the cleaner air and the view of trees, plants and colourful flowers. Even regular production farms can become a tourist attraction: in the flowering season, busloads of Chinese tourists can be seen walking on pathways crossing *rapeseed fields* and photographing the yellow blossoms.

Local governments and tourism entrepreneurs have responded to the opportunity by setting up (very) large parks and 'flower ports', sometimes even with a 'Holland theme'. After a shaky start, (Holland) Flower Parks and Agri-tourism are now coming into their own in China.

7.1 History/Background: the 'first wave', 2005-2011.

In the first decade of this century, city governments in Beijing, Shanghai, Jinan and many other cities established so-called 'Flower Ports', huge complexes of parks, greenhouse facilities, offices and real estate with a mixed purpose. The idea was to combine business (concentration of breeding, propagation and other activities related to floriculture) with leisure (public parks, flower-related shows, restaurants and other tourist facilities). Furthermore, private investors set up the first 'Holland Flower Parks', a/o in Guangzhou and Chongqing, but many stopped operations already after one or two seasons.

Many of these ventures experienced difficulties: often they were set up at a too large scale. Greenhouse facilities weren't all used for R&D and propagation as planned (some were converted into restaurants) and parks were often so huge that a few peak periods (tulip- and other flower shows in spring, and another large visitor peak in early October during the "Golden Week" holidays) didn't bring enough revenue to cover maintenance and staff costs. Parks where enough commercial real estate could be developed continued as 'green oases' for the local population and domestic tourists, but levels of hospitality professionalism and profitability remained disappointing.

7.2 Recent developments: an upcoming sector.

From 2012 we have gradually seen a more professional approach by investors in Green Leisure Parks and Agri-tourism.

Real estate developers are eager to get a 'green stamp' for their urban expansion projects, and realize that leisure facilities are essential to attract investors and buyers of residential property. The entertainment park sector has further been boosted by the successful launch of Disneyland operations in Hong Kong and Shanghai (on the opening day of Disney Shanghai, all tickets for the first six months had been sold out).

Another influencing factor is the government's increased interest in developing new and large *residential estates for the elderly*, China's fastest growing population category. Green parks and entertainment are a welcome addition to these new urban areas.

Given the above developments, Chinese delegations have visited touristic parks world-wide, and new parks have been planned and constructed. Main new insights are: *Parks should be smaller than the ones established before 2012, and*

more entertainment and activities are required for off-season periods, to have sufficient attraction value. Flower shows alone won't bring year-round feasibility.

Assortment

A typical "Holland Flower Park" focuses firstly on *bulb flowers*, using the world-wide image of Holland as tulip country and home of other popular flowers like lilies and hyacinths. However, also other species like perennials (*Hemerocallis*, *iris*) are used and combined with many colourful shrubs and trees.

A theme park of the new generation, like the one in Dafeng district, Yancheng city, Jiangsu Province (see § 7.3 below), also includes a *garden centre/flower and plant store* where a broad assortment of pot plants, cut flowers and related products are sold. Other indoor attractions in some parks are *botanical gardens* (including plants from various regions in a controlled greenhouse environment), and "horticulture experience" facilities where visitors can see and learn about cultivation of ornamental and food crops in modern greenhouses.

7.3 Flowers & More – entertainment parks with Dutch characteristics.

During the last few years, flower theme parks and agri-tourism have drawn a lot of attention in China, and many local governments include them in their development plans. On the national level, one strategy is to develop so-called 'characteristic towns', in which agriculture, tourism, rural modernization and elderly care are combined.

A good example of this is the *Dafeng Holland Flower Park* in the north of Jiangsu Province. Dafeng, a district of Yancheng city which hosts a lot of modern industries, still remembers the activities of *Dutch water engineer Hendrik de Rijke*, who engaged in water works there about 100 years ago. The Holland Flower Park is supported by Dutch design and tulip cultivation professionals. Apart from two big flower shows per year (with over a million of paying visitors), other events are organized like pop concerts, sports tournaments, flower arrangement classes, conventions and training sessions, wedding parties and other social gatherings. As it looks now, leisure parks of this kind are becoming a new and stable market for Dutch floriculture-related products.

7.4 Bottlenecks.

Although their business model generally appears to be sound, also these modern theme parks face the challenge we see throughout this survey: *lack of knowledge and experienced staff and management*, especially in landscape care and operations management. Maintenance crew are often recruited from local farming communities with no or very little experience in flower growing or landscaping. Training programs can solve this issue, and here lies another opportunity for Dutch service providers (see Chapter 9).

In some cases also *logistics* can be a problem: flower parks are sometimes constructed in locations that are difficult to reach for their tourist target groups. However, ongoing massive investments in infrastructure by the Chinese government are quickly solving this issue. In the Dafeng example, a high speed train station is scheduled to open nearby the park in 2020, bringing the park within easy reach of visitors from the 23 million-metropolis of Shanghai.

8. Technology, equipment and supplies.

Modernization of (greenhouse) technology in Chinese horticulture (for ornamentals and food crops) has been a gradual and very slow process in the past 25 years. Lack of funding was and is a main issue here; initially the only 'high tech' greenhouse facilities were established by government research institutes, universities and 'demonstration parks' that often failed to show good results because of management problems, lack of maintenance and miscommunication with foreign (often Dutch) suppliers.

In the last five to seven years (roughly since 2011), there has been a surge in 'market-oriented' investments, often still assisted by government subsidies or favourable bank loans, but aiming for large-scale production of pot plants, cut flowers, vegetables and soft fruit. Because of reasons explained above (food security, food safety, high demand), in recent years the *vegetable* sector has been more booming than floriculture if it comes to investment in high-tech facilities. However, several leading growers of -especially- pot plants are now using modern glasshouses and equipment including automated handling systems.

These front runners form the very narrow top of a wide-based pyramid: more than 90% of Chinese flower and plant growers still operate very basic facilities. In North China, structures known as 'solar greenhouses' dominate the market; they consist of a brick or clay wall facing north and plastic foil running down to the ground on the south side. In winter, at night the plastic is covered with thick straw or cloth mattresses to keep out frost, while the wall gives off solar heat absorbed during the (usually cold but bright) daytime. In the South, plants and flowers are grown in simple plastic tunnels, or even in the open field in the dry season. Yields are low, effective climate control isn't possible and almost all activities are done by hand, leading to quality problems and great difficulty in achieving a homogeneous crop. In these basic greenhouses some improvement has been made in irrigation and screening (see below), but overall technical developments are slow among traditional growers. Real big steps are as of now only taken by the 'new' and well-funded investors who set up new, large-scale projects and acquire foreign expertise for start-up management and training of key staff.

Table 13: Protected Cultivation Floriculture – Greenhouse Types, 2016 (Ha)

Greenhouse *	Solar Greenhouse	Plastic Tunnel	Shading Shelter
24,600	10,970	47,400	44,220

Source: China Flower Association, Beijing

***)Note:** The figure for "greenhouses" includes all types considered 'modern': high-tech heated glasshouses, multispan foil-covered greenhouses, polycarbonate covered greenhouses and intermediate types in this category.

If we compare these data with the situation 10 years ago (2006), it is noted that the first category ('modern greenhouses') has *quadrupled* from approximately 6,200 to almost 25,000 hectare. The 'solar greenhouse' acreage for floriculture (which comes down to 'nearly nothing' compared to the acreage used for vegetables) has risen from 7,000 to nearly 11,000 ha, and the plastic tunnel acreage has more than doubled from nearly 22,000 to more than 47,000 ha. Finally, the acreage of 'shading shelters' or shading net halls has about tripled

from 14,300 to 44,200 ha, possibly partly due to the availability of better quality shade netting.

Overall the above data are encouraging: total acreage is growing, and the 'modern greenhouse' sector is growing faster than its traditional counterpart. The coming period will most likely see a 'development along two roads': on the one hand, investment in modern and high-tech greenhouse facilities will continue and pick up speed, as management and operators will be more professionally trained and gain experience. On the other hand, small family-owned growers will continue to use basic facilities and take small steps in improving flower and plant quality to meet market demands.

8.1 Greenhouse construction and cultivation systems.

For about 30 years (roughly from 1980 to 2010), the Chinese modern *greenhouse construction* sector focused on copying Dutch Venlo-type and other Western models, and putting these into operation in China. Main government-owned companies like Beijing Kingpeng Greenhouse Engineering Co. and Shanghai Dushi Green Greenhouse Co. manufactured steel frames, while other factories supplied glass and aluminium parts. For more complicated equipment (climate control systems, heating, screen and ventilation driving systems), Dutch suppliers were involved (see below and Annex A for names of key players). Interestingly, the present decade has seen a new development. Main Chinese players like Kingpeng and Dushi Green, but also Beijing Oriental Technologies (known as Oritech) and others, have entered into engineering agreements with Dutch leading greenhouse constructors and develop new projects together. Furthermore, 'new' large investors are turning to Dutch turn-key greenhouse suppliers to design and build their projects, stressing the importance of high quality and speedy delivery of a complete project. Many basic and bulky construction parts (steel, glass) as well as inside fittings (aluminium benches, pvc pipes etc.) are sourced in China, as the quality of supplying companies for horticulture is gradually improving.

As to **cultivation systems** (substrate gutters and containers, tables and benches, hydroponics/aquaponics etc.): these are partly produced and supplied by Chinese manufacturers. For certain specialized equipment, Dutch suppliers have set up local establishments. A good example is *Metazet China*, which operates its own equipment to manufacture and install substrate gutters on-site in any length required, and also supplies internal transport systems, hydroponic systems for growing on water and packaging lines.

New and more professional investors also realize the importance of *service and maintenance*, and therefore they turn to Dutch and other foreign suppliers with an own establishment or and/or service network in China (examples are Dutch technology suppliers *Priva*, *Ridder*, *Hoogendoorn* and *Metazet*, Swedish/Dutch *Svensson*, and Israeli *Netafim*; their example is now followed by others, like Dutch *Codema Systems Group* who are preparing their China office to open in 2019). See Annex A for more names and websites.

8.2 Heating and cooling.

In spite of the fact that heating is essential for year-round greenhouse production in Northern China, heated greenhouses are still rare. Many smaller growers can't afford the investment, and fuel prices are unpredictable. As burning of coal is being prohibited in many areas for environmental reasons, growers in the north are trying to get connected to natural gas pipelines. Many others only grow one or more seasonal crops from spring until late autumn. In the South, plastic tunnel greenhouses usually don't have heating, as it's not needed for crop survival and considered a too high investment. In Yunnan Province, only professional companies like Anthura and Van den Berg Roses apply heating systems to ensure constant plant and flower quality. Winters in Yunnan are considered mild, but some crops suffer from extended periods of low night temperatures (between 0 and 10°C) in unheated greenhouses. One heating method that is still considered a novelty in Dutch horticulture is already applied in China: *thermal heating*, i.e. pumping hot water from depths of around 2 kilometres and using heat exchangers to heat a hot water net within the greenhouse. This technology has already been widely used in Chinese industries for decades, and an example of a large scale modern glasshouse project using it is the *Tianjin Da Shun* mega pot plant project in Beihai District, Tianjin. This project in the port city at a two hour drive from Beijing is being built in phases of 30 hectares; the first one has been operational for over 5 years, and the second one is scheduled to go into production in the near future. Ultimately the project will consist of 100 hectares.

In most parts of China, summer temperatures can rise way above 30°C (40°C peaks are no exception) and air humidity is often high in this period. Many greenhouse projects use *pad & fan cooling systems*, also known as 'desert cooling' because they work best in areas with low air humidity. The effect of pad & fan in Chinese conditions is limited, and the system also raises greenhouse construction costs, as it requires a maximum width of compartments of about 40 metres. Another way to cool down greenhouses in hot periods is *screening*: modern facilities often have an *outside screen* (effective but sensitive to wind damage and mechanical problems) as well as movable *inside screens* for shading and energy saving in cold periods. Finally, new techniques like the *semi-closed greenhouse* are applied in the latest high-tech investments using Dutch technology: so far mostly for vegetable and fruit growing, but there are plans to apply these systems for ornamental crops as well.

8.3 Irrigation and fertilizing.

As stated already, China (especially the northern half of the country) faces severe problems in providing good quality water for its residential, industrial and agricultural needs. Traditional growers in solar greenhouses and plastic tunnels used to apply 'flooding' methods, whereby the whole greenhouse is flooded with water a few times per week, much water goes unused and soil clogging obstructs root development. In the last decade, not only in high-tech projects but also in traditional growing, *dripping irrigation systems* are on the rise. Whereas traditional growers still mix fertilizers and irrigation water by hand, modern projects use *fertigation units*, often manufactured by Dutch suppliers (and here

and there copied by Chinese competitors). This development towards more precise irrigation improves plant quality and saves precious water resources. Apart from dripping, in more advanced projects also *sprinkler systems, fogging and ebb & flow systems* are used, although the last two are still quite rare.

Fertilizers are mostly manufactured in China (the world's largest user and second largest manufacturer of chemical fertilizers). Growers of ornamentals still face quality issues with these products, and prices are high for small-scale operations. *Organic compost* is also widely used for soil improvement.

8.4 Soiless growing: substrates.

For commercial growers of ornamentals and vegetables, *substrate growing* in gutters, pots or containers is still relatively new. However, a 'revolution' is expected to take place in the coming 10-15 years, as many crops will go soiless to save water, reduce pesticide use and improve product quality and safety. Foreign young plant breeders and propagators like Anthura and Dümme Orange have been using imported potting soil and substrates for many years already, and the market is now growing fast. All international suppliers of substrates like Germany's *Klassmann*, Danish *Pindstrup* and Dutch *Jiffy, BVB, Grodan* and *Van der Knaap* are active on the Chinese market. Coconut fibre is imported from India and Sri Lanka and also manufactured in South China. Other local materials are peat moss, vermiculite, perlite and rice husks. In general, growers of ornamentals are way ahead of vegetable growers in soiless growing.

8.5 Pesticides and Integrated Pest Management.

Chinese farmers and growers are the most excessive users of pesticides in the world (see note in § 3.2). Farm soil is often heavily contaminated with chemical residues. Disease pressure caused by insects and other pests is high, so growers often don't have a choice but to spray heavy doses, especially in traditional greenhouse settings. Modern greenhouse projects with climate control and substrate growing can greatly reduce their pesticide use (if management and equipment function well, they can reach Dutch 'near zero' levels), but for now they remain a minority in the total market. Integrated Pest Management (IPM) is nearly non-existent, due to government barriers on imports of beneficial predators for greenhouse use. The Dutch specialist company *Koppert* has established itself in Beijing, but its success is so far limited to supply of bumblebees for pollination. The same goes for their Belgian competitors *Biobest*, who have established a sales office in Shouguang, the centre of Shandong Province's vegetable growing area. Chinese government institutes are testing other IPM methods and negotiations on admission of certain insects are going on; recently a more positive approach to this technology has been noted among officials.

8.6 Post-harvest handling.

Flower preservatives.

In the last decade, especially in Kunming/Yunnan and in large flower projects elsewhere, use of flower preservatives like *Chrysal* (present in China with a representative office in Kunming, Yunnan Province) has become more common. Growers and traders are aware of the importance of these substances and the market is growing steadily.

Cold storage and refrigerated transport.

As mentioned several times in the above, lack of cold storage and a professional 'cooled chain' is still a huge obstacle in Chinese horticulture as a whole, including floriculture. The great potential that was already seen for this technology ten years ago is still there today. Basic materials for cold stores and temperature control are available in China, but more refined climate control systems are lacking. Traders and wholesale markets still don't invest enough in this field, forcing serious investors to arrange their own cold storage, as part of their 'DIY' strategy. It is hoped that their example will be followed widely in the coming decade.

Packaging.

In Chinese and Asian culture, packaging of gifts and presents is very important and carries a high symbolic meaning. Therefore a very large packaging industry has developed, and international players in this industry source all kinds of materials in China. Packaging quality is good, but in more innovative sectors (like protected atmosphere packaging to increase product life) there is still a large market to be developed.

9. Training, education and consulting services.

Lack of knowledge and training at grower level has already been mentioned throughout this report as a major drawback in China's floriculture development.

Scientific institutes like *China Agricultural University (CAU)* and *China Academy of Agricultural Sciences (CAAS)* are active in research and high-tech project development, and are in close contact with Dutch *Wageningen University and Research (WUR)* and other leading agricultural universities in the world. WUR has a permanent representative office in Beijing, and is involved in projects all over China. Chinese students are the second largest foreign student group in WUR's Master and PhD programs in The Netherlands. These students often continue their career in research or as university professors in China.

At *operational* level, the situation is less positive. The governmental Agricultural Extension Service (formally present throughout the country) doesn't have a good reputation, and traditional growers get most of their information from local *suppliers* of seeds, pesticides and fertilizers. Vocational Colleges for Agriculture have tens of thousands of students, but their teaching is mostly theoretical and doesn't include much practical training.

Growing investment in modern greenhouse projects in recent years has led to a large demand for skilled project managers and equipment operators. The government now realizes the serious lack of training programs and facilities at this so-called 'middle level', and supports efforts to improve the situation. This development has opened possibilities for more practical agri-education institutions (in Dutch terms, at HBO and MBO level) and for consultants offering cultivation advice to growers and business development assistance to new investors. The traditional 'Confucian' doctrine that knowledge should be shared with everyone (which made Chinese authorities and companies unwilling to pay for advice and training) is now giving way to a more pragmatic approach: investors and advanced growers realize they need training and advice, and that it pays off to hire experts and engage in training programs at home and abroad.

This changing mindset has led to more government attention for the nation's *Vocational Colleges for Agriculture*, where students, often from a rural background, are prepared for a middle level-career in the agricultural sector. More funding is becoming available, and colleges engage in international exchanges and training programs abroad. This includes links with Dutch horticultural education. Cooperation programs have been set up by *Lentiz Education Group* (whose horticultural college has been integrated with the new *World Horti Center* in the Westland region, one of the two main centres of Dutch horticulture, the other one being the Aalsmeer region close to Amsterdam). Also Dutch Universities of Applied Science *InHolland*, *Van Hall-Larenstein*, *HAS Den Bosch* and *Aeres Group* are setting up practical horticultural training programs in China, and more institutions are expected to follow. Many consultancy companies engage in cultivation advice and experimental programs to improve conditions in traditional Chinese 'solar greenhouses'.

10. Legislation and phytosanitary issues.

The flower and plant business in China is bound by many rules and regulations. Laws change frequently, and new regulations affecting the sector appear almost on a monthly basis. When this report was prepared (2018), the Ministry of Agriculture (MoA) had just been renamed Ministry of Agriculture and Rural Affairs (MARA), and the important Plant Quarantine Service (formerly known as AQSIQ) is now part of the General Administration of China Customs (GACC). Some regions (notably Yunnan/Kunming) enjoy special privileges making it worthwhile to import cuttings, flower bulbs etc. through import agents based there (see § 10.3). As these special rulings also tend to fluctuate and change frequently, it is recommended to check the actual situation with authorities and experts regularly.

10.1 Plant Variety Protection (PVP) in practice.

China has still not signed the 1991 version of the UPOV treaty (Chinese PVP legislation is based on the 1978 version of UPOV), and Breeder's Rights seem to have a low priority. Farmers and growers multiply their own plants on a large scale (by saving seeds or taking cuttings), and certain government institutes use tissue culture laboratories to propagate plants without paying royalties to breeders. As stated in § 4.7, international plant breeders are therefore very reluctant to introduce their best and latest varieties to China, leading to stagnation of the assortment.

There is however one hopeful development in the *cut flower* sector, initiated and supported by the Kunming International Flower Auction (KIFA) in China's most important flower province, Yunnan.

Until recently, flower growers in Yunnan self-propagated their crop (especially flowers that are easy to propagate, like roses) and could freely sell them through the auction at Kunming's Dounan Flower Market. Now, only for *new* varieties in the market (!), auction authorities have set up a system of 'Three Party Agreements' between growers, breeders and the auction. As the auction registers variety names of all batches of flowers sold through its system, it automatically deducts a certain royalty for breeders from the selling price received by growers. Royalty levels are definitely lower than in 'full UPOV member countries', but it is a very hopeful beginning indicating the Chinese government's intentions to break the stalemate on Breeder's Rights issues. As KIFA claims that 90% of growers in the region are selling through its auction system, and it is estimated that this equals 70 to 75% of Yunnan's cut flower production, the new Three Party royalty system has been welcomed by breeders as an important step forward.

10.2 Chinese PVP – The National legal system of Variety Registration and Protection.

Under Current Chinese law, it is possible to register a New Plant Variety ('NPV') for protection under the National system of variety protection (* **Note:** for some crops there are also *Provincial Variety Lists and registration systems*; the procedure to register a variety in -for example- Yunnan Province is faster than the one for the National system, but it obviously poses risks to have a variety protected in only part of the country. Also, the trend is that all Provincial systems are being harmonized into one National System. Information in this report applies to this National system).

To apply for registration and protection of a New Plant Variety, it has to meet a number of requirements:

- It belongs to one of the species listed in the National Schedule of Protected Plant Varieties (NSPPV);
- It is new, i.e. not listed nor used on a commercial scale in China yet;
- It meets the criteria of Distinctness, Uniformity and Stability (DUS), as determined by compulsory tests;
- Its name is in line with the Regulations on the Naming of Agricultural Plant Varieties, published by the Chinese Ministry of Agriculture in 2012.

If the Ministry's Plant Variety Protection Office (PVP Office) concludes that a new variety meets these criteria, it can be registered in the applicable National Variety List and be protected under Chinese law.

The protection period for most agricultural crop varieties under the National PVP system is 15 years; however, *for forest trees, fruit trees and ornamental plants the protection period is 20 years*. This is still less than the periods in the international UPOV system, which are 20 and 25 years respectively.

Important (and for breeders partly negative) regulations within the National system are:

- Use of protected varieties for *breeding or other scientific research* is allowed, and for this use no royalties need to be paid and no prior consent by the breeder/registration holder is required;
- *Self-use of propagation material of a protected variety by farmers for breeding and propagation is allowed* (this is the main bottleneck and the main difference between the UPOV 1978 and 1991 versions);
- The competent authorities (MARA, the Ministry of Agriculture and Rural Affairs, and SFGA, the State Forestry and Grassland Administration) may, *for national or public interest, grant a compulsory license of a protected variety to certain parties*. This compulsory licensing should be registered and published, and doesn't imply exclusive rights for the license holder in relation to the variety (still, this opens the door for government-owned research institutes to propagate protected varieties without breeders' consent, "in the interest of the local farming population").

In practice, individual farmers who sell or share propagation materials (violating the rule that only self-use is allowed) are rarely or never sued or fined. However, in case of more professional infringements of the National PVP system's regulations, breeders and PVP holders can follow certain administrative and legal procedures to ensure the infringing party is penalized. These procedures are:

- (i) *Administrative Protection* – a lengthy procedure involving a lot of time and bureaucratic paperwork, evidence by plant DNA tests and by written proof of the infringement. When a conviction is declared, penalties consist of financial fines of up to ten times the value of ‘illegal goods’ discovered. Confiscated propagation material is either destroyed or -upon request- returned to the National PVP rights holder. In certain ‘serious’ cases this procedure can be simplified and speeded up in the interest of the PVP holder.
- (ii) *Civil Procedures* – it is possible for National PVP rights holders to take infringing parties to civil court – usually the Beijing Intellectual Property Court or an ‘appointed’ Intermediate People’s Court in certain regions (notably Shandong and Gansu Provinces, where a lot of seed production is taking place). Also here, proof of infringement and proof of economic loss by the PVP holder are needed, and compensation amounts calculated in the Court’s decisions can go to a maximum of 3 million RMB (€ 375,000.--).
- (iii) *Criminal Procedures* – not easy to obtain, these procedures can be used in case of serious counterfeit and “Illegal Business Operations”. Competent courts are County/District level courts or Intermediate Courts, there are no ‘specialized’ criminal courts for these matters. Punishment in case of conviction will involve high fines and possible imprisonment of convicted individuals, but in case of PVP infringement this route is rarely chosen.

For more information on Plant Variety Protection laws and procedures, we refer to a recent publication (November 2018). The publication (“A guide to Protecting New Plant Variety Rights in China”) can be downloaded using the following link: <https://www.burenlegal.com/en/news/guide-protecting-new-plant-variety-rights-china>.

10.3 Plant Quarantine and Import Regulations.

Any importer who intends to import plant products into China needs to apply for an *import permit* first. Responsibility for approval of import permits is divided between the Ministry of Agriculture and Rural Affairs (MARA), the State Forestry and Grassland Administration (SFGA) and the General Administration of China Customs (GACC). The division of duties is as follows:

- GACC: In 1997, the Ministry of Agriculture (MOA, now MARA) has published a notice named “*List of Substances whose entry to the People’s Republic of China has been prohibited for phytosanitary reasons*”. Import of all substances on this list has been prohibited because of phytosanitary concerns. If import of these substances is considered necessary -for example, for scientific research- the importer must apply for an import permit at GACC in advance.
- MARA: the Ministry is in charge of approval of import permits for *field crops and vegetable seeds*.
- SFGA: this Administration is responsible for approval of import permits for *seedlings, nursery stock, flowers, flower bulbs* and other items.

As seen in the above, *Chinese plant quarantine regulations* are very strict, especially when they consider the *ban on soil* for all planting materials and finished products. Cuttings can only be imported in bare-root form, and the same goes for young tree materials, other young plants and finished pot plants. This poses challenges for breeders/suppliers, who often import cuttings from halfway across the globe and fear deterioration or rotting of the sensitive bare-root material.

An alternative for import is choosing for *own production* in controlled facilities within China (as is done successfully by Anthura); this policy demands serious investment and a long term strategy.

Another option is to engage in *license production* by large Chinese plant growers like *Brighten Group* (originally from Hong Kong and known in China as '*Ban Fan*'); several breeders are following this path, with mixed results concerning plant quality and financial/royalty arrangements with licensees.

Interpretation and enforcement of the very strict plant quarantine regulations varies per product, region and authority in charge. A very reliable and professional importer or counterpart is extremely important for successful import business in China. Careful checking with authorities and import agents is the main recommendation here.

Import duties and other taxes.

Also in the field of import duties and taxes, rulings vary widely and change frequently.

The following rule of thumb applies to *import duty levels*:

- For *flowers, plants and starting materials* (seeds, cuttings, bulbs): *between 0 and 15%* of import value.
- For *equipment* (greenhouse materials, irrigation units, climate computers etc.): *between 10 and 25%* of import value.

For equipment, also an *Import VAT tax* is due of 15 to 20%; this tax can later be deducted from the domestic sales VAT the importing company has to charge to its customers.

A changing system.

China's systems of plant quarantine and import duties are constantly evolving. A few practices and developments we witness today are:

- *Regional differences in legislation and/or practical application of rules*: the strongest example of this is Yunnan Province, where the importance of agriculture (and especially floriculture) has led to certain advantages and benefits for the sector. Most importantly, for many years there has been *much less waiting time* involved in customs clearance and paperwork for shipments of agricultural products in and out of Kunming Airport and other locations in Yunnan than elsewhere. This has led to the situation that imports of flower and plant cuttings for use in East China were (and are) taking place via Kunming Airport. After customs clearance, the materials are sent to Beijing, Shanghai and other locations by domestic flight or truck. This 'detour' in importing sensitive plant materials obviously brings risks of quality deterioration, especially in summer months.

- *Shortening of procedures and waiting times:* in contrast to the above, recently import procedures and waiting times at customs have been shortened also in other locations, notably in the case of shipments of fresh cut flowers by air directly to main market hubs like Shanghai, Beijing and Guangzhou. This reduction (“from two days to just a few hours”) is of course of enormous importance to cut flower exporters, importers, resellers and consumers.
- *Export subsidies:* a practice especially important to the *equipment* sector. Chinese manufacturers and greenhouse constructors (especially those that are government-owned) still enjoy government subsidies if they sell Chinese-made products outside China. This sometimes makes their products cheaper in overseas countries than in China itself, a situation to which most of their Western competitors are not accustomed. Export subsidies by the Chinese government are often discussed in WTO- and other international fora promoting free trade and little government interference.

11. SWOT Analysis – The Chinese market and opportunities for input from The Netherlands

In the following diagram, a short SWOT Analysis is given of the Chinese ornamental market, focusing on its Strengths and Weaknesses as of today, and on Opportunities and Threats for Dutch companies and institutions operating in China or willing to do so.

STRENGTHS (Chinese Market)	WEAKNESSES (Chinese Market)
<i>Growing Economy:</i> more wealthy middle class.	<i>Economy:</i> large national debt, priorities of Government and banks will most likely not include floriculture.
<i>Market:</i> growth at consumer level.	<i>Market:</i> shrinking at institutional (government consumption) level.
More demand for <i>quality and luxury goods</i> by upper and middle class consumers.	<i>Sensitivity to conjuncture change:</i> ornamentals are most affected in case of economic downturn.
<i>Production:</i> 'new' investors look for innovation and automation, investment in high-tech greenhouses and systems.	<i>Production:</i> lack of knowledge at all levels, not enough investment in cold storage, logistic cold chain etc.
<i>Distribution/sales:</i> E-commerce boosts cut flower/bouquet sales.	<i>Distribution/sales:</i> Flower wholesale/retail markets are lagging behind, inadequate facilities, product deteriorates quickly.
Consumers and traders look for <i>new/non-traditional</i> species and varieties	Breeders and young plant suppliers are reluctant to introduce new/better varieties because of <i>royalty issues/uncontrolled propagation</i> .
Government projects aim to create <i>new, large agri-industrial zones</i> .	<i>Small size</i> of traditional farm holdings, transformation will take time.

OPPORTUNITIES (NL input)	THREATS (NL input)
<i>Import</i> of finished product is growing fast, especially in <i>cut flowers</i> .	<i>Changes in government policies and legislation</i> .
<i>Excellent reputation of The Netherlands</i> in all fields: cut flowers, seeds & young plants, greenhouse engineering, technology.	<i>Seeds & young plants:</i> lack of PVP law enforcement, uncontrolled propagation. <i>Technology:</i> copycat production by local competitors.
<i>High-tech investment boom</i> in recent years, very good prospects for Dutch suppliers.	<i>Vegetables and other food crops</i> dominate the current 'boom'.
Need for <i>cold storage, distribution centres and other post-harvest facilities and equipment</i> .	<i>Competition</i> by suppliers from China, South Korea and other countries; some investors still <i>don't realize the importance</i> of the post-harvest chain.
Need for <i>training programs and consultancy</i> in all fields.	<i>Training:</i> more cooperation is needed, joining of forces by institutions will increase efficiency.

12. Conclusions and Opportunities.

In this final chapter, some general conclusions are given based on the SWOT Analysis and the preceding chapters. As we have seen, the Chinese market for ornamental products is developing fast, and in some cases it is really *transforming*: several trends and expected developments can be identified, although many 'unpredictable' factors will remain in force.

In its own, unique way, the Chinese government has realized enormous economic growth over the past forty years, creating an ever larger middle class of hundreds of millions of people and an affluent elite in major cities and in 'rich' provinces in the Eastern and Southern coastal regions. This has stimulated growth of the market for cut flowers, pot plants, trees and shrubs and other ornamental products: figures indicate increases of 50 to 100% in cultivation acreage over the past ten years, and a *tripling* of the production's wholesale value in the same period. Imports of cut flowers, flower bulbs, other planting materials and equipment are rising steadily, and the blow dealt to -especially- the pot plant sector by governmental austerity and 'anti-waste' campaigns since late 2012 has by now been compensated by the rise in consumer spending. Gardening and landscaping are important elements of urbanisation projects throughout the country, and flower theme parks and 'agri-tourism' create new and growing business opportunities.

As a result of these positive developments, both Chinese and international suppliers (many of whom are Dutch) are intensifying their efforts on the Chinese market. Technology suppliers and breeding companies have taken the lead in setting up their own sales & service facilities in China, followed in recent years by cut flower exporters. Training and education organizations and consultancy companies are also increasing their activities in the country, benefiting from a growing awareness by the Chinese government and investors of the importance of training and start-up management in horticulture.

The trend of further 'internationalization' of the Chinese floriculture market is likely to continue; apart from the huge and growing national market, some front-running growers and traders study *export* possibilities to nearby and rich markets like Japan and South Korea, which further stimulates quality awareness in production and post-harvest handling and the need for good equipment, planting materials and training. Dutch suppliers are in a good position to further increase their involvement in this development.

The positive trend indicated in the above of course also has its drawbacks and (potential) problems. For new parties on the market, *caution and patience* are highly recommended, and a thorough *preparation* of activities will help to avoid disappointment. Behind the image of a fast-paced *booming* market (Chinese are always in a hurry to get quotations, sign contracts and have goods delivered quickly), real business development takes time, a good network and a sense of the cultural and historical issues affecting business practices.

In all markets, flowers and plants are 'luxury' products, and sales are highly influenced by the general state of the economy and consumer purchasing power. In China's state-dominated economy, policy changes are difficult to predict and *good government contacts* are important in almost any business sector.

Legal issues remain important obstacles for business growth, especially in the markets for seeds, cuttings and other planting materials. Very strict *plant quarantine regulations* make it difficult (and sometimes practically impossible) to

supply materials, in spite of market demand. An even larger issue is *the low priority given to the enforcement of Plant Variety Protection (Breeder's Rights) and China's widespread uncontrolled propagation*. Foreign breeders won't introduce their newest and best varieties in China, leading to serious stagnation in development of the country's cut flower and pot plant assortment. The new 'Three Party Agreement' system developed by the Kunming Flower Auction is a step in the right direction. Technically, investments in *post-harvest handling, cold storage and refrigerated transport* are urgently needed to increase product quality and final profitability of investments in flower and plant growing. A growing awareness of this fact among investors offers business opportunities for Dutch suppliers. At the same time, *greenhouse engineering & construction and cultivation technology* remain important sectors for Dutch input. The 'labour drain' from agriculture towards industry and services even opens a market for highly sophisticated internal transport- and other automation systems, although in the coming years this market is expected to remain limited to high-level, high-capital investment projects.

Finally, *training and education* are essential for further market development, and thereby form a growing market themselves. Government-funded universities, colleges and schools engage in more programs with Dutch and other international knowledge centres. Large-scale investors have their key staff trained by foreign experts, both in China and abroad. The Dutch "World Horti Center" in Westland Municipality, where research, product promotion and practical education are combined, is seen as an ideal model by many Chinese authorities and entrepreneurs.

To sum up: the Chinese floriculture market is growing, fast in some sectors and steadily in others. There are big opportunities for Dutch suppliers of products and services, when they keep in mind that entering *and staying in* the Chinese market takes a lot of time, investment in a large network and careful operation in legal and financial matters.

The following sectors are likely to be especially interesting for Dutch suppliers and investors in China in the coming years:

- Cut flower imports to China from The Netherlands, Africa, Latin America and other areas, especially in 'new' species and varieties.
- Greenhouse engineering and construction (with Chinese partners/sourcing of certain materials in China).
- Cultivation technology for greenhouse production.
- Heating, cooling and climate control equipment for greenhouses.
- Flower bulbs and other planting materials, especially for landscaping, gardening and theme parks (commercial cut flower and plant growing is also on the rise, but PVP issues are still a major issue here).
- Training, education, cultivation management and consulting services.

Annex A: Names and e-mail addresses/websites of main organizations and companies active in the Chinese floriculture sector (indicating sector/type of business). **Note: some websites are only in Chinese.**

Chapter 1: Introduction.

- **Royal Netherlands Embassy, Beijing** – Agricultural Bureau: pek-lnv@minbuza.nl
- **Royal Netherlands Consulate General, Shanghai** – Agricultural Bureau: sha-lnv@minbuza.nl
- **Royal Netherlands Consulate General, Guangzhou** – Agricultural Bureau: pek-lnv@minbuza.nl and hon-lnv@minbuza.nl
- **Royal Netherlands Consulate General, Chongqing** – Agricultural Bureau: cho-lnv@minbuza.nl
- **Royal Netherlands Consulate General, Hong Kong** – Agricultural Bureau: hon-lnv@minbuza.nl
- **Netherlands Business Support Office, Dalian**, Liaoning Province: nbsodalian@nbsodalian.com
- **Netherlands Business Support Office, Jinan**, Shandong Province: nbsojinan@nbsojinan.com
- **Netherlands Business Support Office, Qingdao**, Shandong Province: nbsqingdao@nbsqingdao.com
- **Netherlands Business Support Office, Nanjing**, Jiangsu Province: nbsonanjing@nbsonanjing.com
- **Netherlands Business Support Office, Wuhan**, Hubei Province: nbsowuhan@nbsowuhan.com
- **Netherlands Business Support Office, Chengdu**, Sichuan Province: nbsochengdu@nbsodalian.com

Chapter 2: China – Introduction to the country and its market for ornamentals.

- **World Bank** (data): <https://data.worldbank.org>
- **The Netherlands Bureau of Statistics (CBS)**: www.cbs.nl
- **National Bank of The Netherlands**: www.dnb.nl
- **Netherlands Foreign Investment Agency**: <https://investinholland.com>
- **World Economic Forum**: www.weforum.org

Chapter 3: The Chinese market for ornamentals: facts, figures and trends.

- **Ministry of Agriculture and Rural Affairs, Beijing**, Department of Crop Production: <http://202.127.42.157/moazzys/zzydata.html>
- **National Forestry and Grassland Administration**: <http://www.forestry.gov.cn/main/index.html>
- **China Flower Association (CFA)**: <http://hhxh.forestry.gov.cn>
- **Hortiflor IPM** (yearly professional floriculture and horti-tech exhibition in May, organized by CFA, in Beijing in even years and in Shanghai in uneven years): www.hortiflorexpo.com.
- **Horti China** (yearly professional horticulture exhibition [technology, breeding and trade] for the vegetable, fruit and ornamental sectors, organized in September by VNU Asia Shanghai, scheduled to be held in 2019 in Qingdao, Shandong Province): www.hortichina.cn.
- **International Horticultural Exhibition 2019, Beijing** (Huge outdoor and indoor flower and plant exhibition, in the style of the Dutch 'Floriade' but 10 times larger, to open on April 29th, 2019): www.horti-expo2019.org.

Chapter 4: Cut flowers, cut branches and cut foliage.

(i) Dutch companies and institutions:

- **Van den Berg Roses, Kunming/Yunnan** (active in China for many years, still the *only* Dutch-owned *grower* in China of cut flowers and pot plants (final product, for the consumer market): www.bergroses.com.
- **Royal Flora Holland (Dutch Flower Auction) – office in Shanghai:** www.royalfloraholland.com – Mr. Martijn van Os, General Manager China.
- **Holex BV** (Dutch exporter/trader of cut flowers, now opening a sales office in Shanghai in cooperation with the Rooyal Flora Holland office): www.holex.com.
- **Batian Flowers/Upendo Flowers** (Dutch grower and exporter/trader of cut flowers, very active in East Africa and now represented in Beijing, China): www.upendoflowers.com.
- **Anthura China** (Dutch breeder of anthuriums and orchids for cut flower and pot plant use, with its own facilities in Songming, Yunnan Province): www.anthura-china.com.
- **Dümmen Orange China** (Dutch conglomerate of breeding companies of cut flowers and pot plants, established in Shanghai): www.dummenorange.com.
- **Hilverda Kooij** (Dutch breeder of cut flowers, active in Yunnan Province with its joint venture partner Kunming HAS Farm): www.hilverdakooij.com.
- **Deliflor** (Dutch breeder and market leader in cut chrysanthemums, active in cutting sales in China via their Chinese agent): www.deliflor.nl.
- **De Ruiter Roses** (Dutch rose breeder, active in production and sales of young plants in Yunnan Province): www.deruiter.com.
- **Schreurs BV** (Dutch breeder of roses and gerberas, active in propagation and sales in Yunnan Province): www.schreursroses.com.
- **Interplant BV** (Dutch breeder of spray roses, represented in China): www.interplantroses.com.
- **Armada Young Plants** (Dutch breeder of chrysanthemums and pot roses, represented in Shanghai): www.armadayoungplants.com.
- **Syngenta Flowers** (ornamental division of Dutch/Swiss seed giant Syngenta Seeds, active in China from its base in Liaoning Province): www.syngentaflowers.eu.
- **iBulb** (Dutch Flower Bulb and Bulb Flower Information Centre): www.ibulb.org.
- **Jan de Wit & Zonen BV** (Dutch exporter of tulip- and other flower bulbs, active in China since many years): www.jandewitenzonen.com.
- **Van den Bos Bloembollen BV** (Dutch exporter of lily- and other flower bulbs, active in China since many years): www.vandenbos.com.
- **Onings Holland BV** (Dutch exporter of flower bulbs, active in China): www.onings.com.
- **Jansen Overseas BV** (Dutch exporter of tulip- and other flower bulbs, active in China): www.jansenoverseas.com.
- **Holland Bulb Market BV** (Dutch exporter of flower bulbs, active in China): www.hollandbulbmarket.nl.
- **Kapiteyn Group** (Dutch breeder and supplier of calla (*zantedeschia*) bulbs, active in China): www.kapiteyn.nl.
- **Barenbrug China** (Dutch breeder and producer of turf grass seeds, has its sales & services office in Tianjin): www.barenbrug.com.cn.

(ii) **Chinese companies and institutions:**

- **The Beast** (chain of “flower, plant & lifestyle shops” in China, originated in Shanghai): www.thebeastshop.com.
- **METRO China** (chain of supermarkets/cash & carry stores, of German origin and present all over China): www.metro.cn.
- **Tao Bao** (Chinese E-commerce platform for consumers, owned by Alibaba group and market leader) www.taobao.com.
- **JD (Jin Dong)**, Chinese E-commerce platform, similar to Tao Bao): www.jd.com.
- **Flower Plus** (Chinese E-commerce retail company specializing in cut flowers): www.flowerplus.cn.
- **Huadian Shijian** (Chinese E-commerce retail company specializing in cut flowers): www.reflower.com.cn.
- **24Hua** (“24 Flower”, Chinese E-commerce retail company specializing in cut flowers): www.24hua.cn.
- **Yunnan Shining Flora Co. Ltd.** (producer/grower of lysianthus, rose, lily, chrysanthemum and other cut flowers, agent of Dutch lysianthus plug producer Van Egmond BV): www.shiningflora.com.
- **Brighten Floriculture** (Of Hong Kong origin, producer of cut flowers, pot plants, young plants and cuttings in Yunnan Province and other locations, also engaging in license productions for Dutch and other international breeders): www.brighten.cn.
- **Beijing Beautiful Agriculture Co. Ltd.** (Large importer of Dutch flower bulbs, cuttings and other floriculture materials, supplier throughout China): www.bba99.com.
- **Beijing Clover Floraculture Co. Ltd.** (Large importer and distributor of flower bulbs and seeds): www.cloverflora.com.
- **Sino Floriculture Co. Ltd.** (Large importer of flower bulbs, cuttings and other planting materials, based in Beijing, also producer of cut flowers on several locations: www.sinoflor.com.
- **Shanghai Hezhong International Co. Ltd.** (Large importer and distributor of Dutch flower bulbs, cuttings and machinery for floriculture): www.hezhong-international.com.

(iii) **Companies/institutions from other countries:**

- **Kunming HAS Farm** (Chinese daughter company of Da Lat HAS Farm, the leading company in ornamentals in Vietnam run by Dutch management, active in production and sales of cuttings in China): www.kunminghasfarm.com / www.dalathasfarm.com.
- **Lynch Group** (Australian flower and plant trader & producer, running a project and handling facilities in Jincheng, Yunnan Province): www.lynchgroup.com.au.
- **Ball Seeds** (US breeder of (a/o) cut flowers and pot plants propagated from seed, active in China from its base in Liaoning Province): www.ballseed.com.
- **Sakata Seeds** (Japanese seed breeder for ornamentals and vegetables, active in sales in China via its sales office in Suzhou, Jiangsu Province): www.sakataseed.cn.
- **Oboya Horticulture Industries AB** (Swedish manufacturer and supplier of potting soil, pot trays, packing materials and other supplies for floriculture, in China based in Qingdao, Shandong Province): www.oboya.cc.

Chapter 5: Pot Plants.

(i) Dutch companies and institutions:

- Dutch Pot Plant breeding companies, active in China: **Anthura, Dümren Orange, Hilverda Kooij, Armada Youngplants** – see Chapter 4.

(ii) Chinese companies and institutions:

- **Tianjin Da Shun** (Huge government-backed pot plant project nearby Tianjin Airport, now 30 ha of modern glasshouses, planned to grow to 100 ha): www.flower-china.cn.
- **Brighten Floriculture** (Hong Kong/Chinese propagator of young plants and cuttings) – see Chapter 4.
- **Shanghai Seed Co.** (Government-owned breeder/propagator of young plants, seeds and cuttings, based in Shanghai but owning facilities in Yunnan and other locations): www.shseed.com.
- **Yuanyi Horticulture** (Propagator of young plants and cuttings, based in Shanghai): www.yyseedling.com.
- **Yee Hua Horticulture** (propagator of young plants and cuttings, based in Guangzhou): www.hortchina.com and www.hee-huahort.com.
- **Da Han Horticultural Development Co.** (propagator and grower of many kinds of pot plants, also supplying cultivation materials, based in Shanghai): www.dahant.com.cn.
- **Hong Yue Group** (Large grower of many kinds of pot plants, based in Hangzhou, Zhejiang Province, operating its own 'Chinese-style garden centres' selling all kinds of plants and garden supplies, very active in marketing): www.hongyue.com.
- **Guangdong Speedling Co. Ltd.** (Large producer of all kinds of (sub-)tropical pot plants based in Foshan, Guangdong Province): www.gdspeedling.com.cn.
- **Evergreen Nursery** (Large grower and exporter of ficus and other green pot plants, based in Zhangzhou, Fujian Province): www.chineseficus.com.
- **Shanghai Worth Garden Products Co. Ltd.** (Privately owned manufacturer of garden tools, consumer use lawn mowers etc., supplier to large garden centre chains in Europe, plans for own garden centres in China): www.worthgarden.com.
- **Beijing Sunny Agriculture Co. Ltd.** (Large importer and distributor of pot plant cuttings and other planting materials from The Netherlands, Denmark and other countries): www.sunnyagri.com.

(iii) Companies/institutions from other countries:

- **Deroose Plants/Exotic Plant China** (Belgian breeders and propagators of young plants and cuttings of bromeliads, orchids, succulents, kalanchoe and many other varieties, having a production facility and office in Shanghai): www.derooseplants.com.

Chapter 6: Trees and Shrubs.

(i) Chinese companies and institutions:

- **Fat Dragon Co.** (Leading producer and supplier of young trees and shrubs in Northern and Central China, based in Beijing): www.fatdragon.com.cn.
- **Beijing Nursery Association** (108 members, in total more than 17,000 hectares production area of trees and shrubs): can be contacted via Fat Dragon Co.
- **Beijing Florascape** (Beijing Municipal Parks & Gardens company): www.bjfc.cc.

- **China National Tree Seed Corporation/NTSC** (State-owned producer and propagator of trees and plants, mostly for landscaping of infrastructure projects): www.chinaseeds.com.
- **Dadong Liu Experimental Park, Beijing area:** www.forestry.gov.cn/zm/ddl.html. Tel. +86 10 61711422.
- **Shanghai Garden Co.** (Important producer and supplier of young trees and shrubs in South China): www.sggc.com.cn.
- **Hong Mei Horticulture** (propagator of rhododendrons and other ornamentals, based in Shandong Province and active all over China, also owning a nursery in Germany): www.hongmeihort.com.
- **Shandong Salong Agriculture Co. Ltd.** (Tree nurseries and tissue culture lab in Shandong Province for propagation of trees and shrubs, in total 200 ha production area): www.salong-agriculture.com.

(ii) **Companies/institutions from The Netherlands and other countries:**

- **Huverba BV** (Tree nursery from The Netherlands, active in China): www.huverba.nl.
- **RPM China** (New nursery in the Beijing area, owned by American entrepreneur David Hoven and introducing new propagating technologies): no website known.

Chapter 7: Flower & Plant Theme Parks and 'Agri-Tourism'.

(i) **Dutch companies and institutions:**

- **IGMPR** (Designer and developer of "Holland flower parks 2.0" in China, including entertainment programs, restaurants, retail etc.): www.igmpr.nl.

(ii) **Chinese companies and institutions:**

- **Shanghai Garden Co.** (a/o involved in supply to the gardening and landscaping of Disneyland Shanghai): see Chapter 6.
- **Dafeng Holland Flower Park**, Dafeng District, Yancheng City, Jiangsu Province (Example of a new-generation flower & leisure park): see a/o https://www.telegraaf.nl/nieuws/414307/klein-china-in-de-hollandse-polder?utm_source=google&utm_medium=organic en <https://www.inteylingen.nl/nieuws/kleintje-pils-warm-ontvangen-in-dafeng.html>.
- **Shanghai Flower Port** (traditional Chinese flower park on the edge of the 23 million metropolis of Shanghai, including greenhouse restaurants and wedding/party facilities): see http://english.pudong.gov.cn/2017-07/19/c_84789.htm.
- **Beijing Flower Port** (similar to Shanghai Flower Port and also encompassing a greenhouse-industrial area where Beijing Florascape and other propagators and plant growers are located): see a/o <https://www.slightlyastray.com/tulips-at-beijing-international-flower-port/>.
- **Jinan International Flower Port** (Chinese flower park combined with research and propagation facilities in Jinan, capital of Shandong Province): <http://www.jinanxianhuagang.com/>
- **[Note: many Chinese cities have "Flower Ports" of this kind].**

Chapter 8: Technology, equipment and supplies.

(i) **Dutch companies and institutions:**

- **Metazet/FormFlex China** (Cultivation systems, own manufacturing of growing gutters, supply of packing lines and other equipment, established in Beijing and Xi'an): www.metazet.com and <http://metazet.com/index.php?id=2&L=13>.
- **Priva Asia, Beijing/Shanghai** (manufacturer of greenhouse computer systems for climate control and coordinated operation of equipment, irrigation/fertilizer/water recirculation systems and labour registration systems): <https://www.priva.com/contact/offices>.
- **Hoogendoorn Asia, Beijing** (manufacturer of greenhouse computer systems for climate control and coordinated operation of equipment and labour registration systems): www.hoogendoorn.nl and www.hoogendoorn.asia.
- **Ridder Group (China), Shanghai** (manufacturer of drive systems for greenhouse ventilation systems, greenhouse computer systems for climate control and coordinated operation of equipment, irrigation/ fertilizer/water recirculation systems, labour registration systems and screen cloth): www.ridder.com.
- **Codema Systems Group** (manufacturer of high-tech cultivation systems for greenhouses, internal transport systems, irrigation/fertilizer/water recirculation systems and lighting systems for greenhouses, decided to open an office in China in 2019): www.codemasystemsgroup.com.
- **Kubo Group** (turn-key greenhouse project designer and builder, active in China): www.kubogroup.nl.
- **Dalsem** (turn-key greenhouse project designer and builder, active in China): www.dalsem.com.
- **Van der Hoeven Group** (turn-key greenhouse project designer and builder, active in China): www.vanderhoeven.nl.
- **Bom Group** (turn-key greenhouse project designer and builder, active in China): www.bomgroup.nl.
- **Ammerlaan Group** (turn-key greenhouse project designer and builder, active in China): www.glassconstructions.eu.
- **Prins Group** (turn-key greenhouse project designer and builder, active in China): www.prinsgroup.nl.
- **Debets Schalke** (turn-key greenhouse project designer and builder, active in China): www.debetsschalke.com.
- **Certhon** (turn-key greenhouse project designer and builder, active in China): www.certhon.com.
- **Horti XS:** (turn-key greenhouse project designer and builder, active in China): www.hortixs.com.
- **Signify NV/Philips Horticulture** (Horticulture division of Philips Lighting, specializing in LED lighting systems for greenhouse cultivation, having its main office in China in Shanghai): www.philips.com/horti.
- **Svensson China** (manufacturer and market leader in greenhouse shading cloth, originally a Swedish company but its horticulture division is based in The Netherlands): www.ludvigsvensson.com and www.ludvigsvensson.com.cn.
- **Berg Hortimotive** (Dutch manufacturer of internal transport systems for greenhouse cultivation): www.berghortimotive.com.
- **Grodan** (manufacturer and market leader in rock wool substrates for horticulture, originally a Danish company but its horticulture division is based in The Netherlands – they operate on the Chinese market through their distributor **AgriPlus Ltd.**, Shanghai/Changzhou): www.grodan.com and www.agriplus.cn.
- **Jiffy Group** (manufacturer and supplier of substrates, young plant plugs and potting soil, represented in China): www.jiffygroup.com.

- **Van der Knaap BV** (manufacturer and supplier of substrates, young plant plugs and potting soil, owner of several factories in Asia and active in China): www.vanderknaap.info.
- **BVB Substrates** (manufacturer and supplier of substrates, young plant plugs and potting soil, active in China): www.bvb-substrates.nl.
- **Koppert Biological Systems** (manufacturer and world market leader in biological control systems, specializing in breeding and production of insects for pollination and pest control in greenhouses, represented with a sales and distribution office in Beijing): www.koppert.com and www.koppert.cn.
- **Chrysal International** (manufacturer and world market leader in post-harvest treatment products and preservatives for cut flowers, having its representative office in Kunming, Yunnan Province): www.chrysal.com.
- **Geerlofs Refrigeration** (manufacturer of cold storage systems and technology for cold storage of fresh flowers, plants and food products, active in China and operating a sales & service office in Singapore): www.geerlofs.com.
- **Vostermans Ventilation / Multifan** (manufacturer of ventilators for many purposes including horticulture, active world-wide and having its own sales & service office in Shanghai): www.vostermans.com and www.vostermanschina.com.
- **Visser Horti Systems** (manufacturer of greenhouse cultivation systems, seeding lines, packing lines and other horticultural equipment, established in Suzhou, Jiangsu Province): www.visser.eu.

(ii) **Chinese companies and institutions:**

- **Beijing King Peng International** (State-owned and largest Chinese greenhouse manufacturer and builder, active all over China and abroad): www.chinakingpeng.com.
- **Beijing Sangreen International Agriculture Technology Co. Ltd.** ("Spin off" of Beijing King Peng Co., focusing on export of complete greenhouse projects from China to the rest of the world): www.sangreen.cn.
- **Dushi Green Shanghai** (Government-owned major Chinese greenhouse manufacturer and builder, active all over China, sometimes abroad): www.dushigreen.com.
- **Beijing Oritech Ltd.** (privately owned and very experienced greenhouse manufacturer and builder, active all over China and sometimes abroad): www.oritech.cn.
- **Zhongnong Futong Ltd.** (greenhouse project developer and builder owned by China Agricultural University, Beijing): www.caufutong.com.
- **AgriGarden/IEDA Ltd.** (greenhouse project developer and builder, closely associated with the China Academy of Agricultural Sciences in Beijing): www.agri-garden.com.
- **Rui Xue Global Ltd.** (privately owned supplier to the horticulture industry based in Beijing, in recent years also active as a greenhouse manufacturer and builder in several regions of China): www.ruixueglobal.com.
- **Xin Tian Bi Agricultural Facilities Engineering Technology Co. Ltd. / XTB** (Chinese manufacturer of greenhouse systems and parts based in Beijing, also active as greenhouse project developer and builder): www.xtb.com.cn.
- **Trinog XS Ltd., Xiamen** (Chinese greenhouse manufacturer and builder based in Xiamen, Fujian Province, specializing in plastic foil-covered greenhouses, active all over China and abroad): www.trinog.cn.
- **Chengdu Jia Pei Science & Technology Co. Ltd.** (Chinese greenhouse manufacturer and builder based in Chengdu, Sichuan Province, specializing in plastic foil-covered greenhouses, active in South China incl. Yunnan Province): see www.cdjptech.en.china.cn and https://cdjptech.en.alibaba.com/company_profile.html.

- **Shanghai Sunqiao Agriculture Technology Co. Ltd.** (Government-owned greenhouse project developer and builder, based in Shanghai but with related projects in several provinces): www.chinasoiless.com.
- **Yunnan AiBiDa Horticulture Technology Co. Ltd.** (Chinese greenhouse project developer and supplier of greenhouse cultivation systems and control technology, owning a 5 hectare 'demonstration' flower glasshouse in Yunnan): www.aibida.cn.
- **Qingzhou Jinxin Greenhouse Engineering Co.** (Chinese manufacturer of steel frame materials, supplier to many greenhouse constructors, based in Qingzhou, Shandong Province): www.jinxinwenshi.com.
- **Xiamen Nongfengyuan Greenhouse Co. Ltd.** (Chinese manufacturer of plastic foil-covered multitunnel greenhouse systems, active locally): www.nongfengyuan.cn.
- **Henan Yuhua New Materials Co. Ltd.** (Chinese modern manufacturer of all types of glass and PV-solar panels, glass supplier to most Chinese and many foreign leading greenhouse constructors): www.hnyuhua.com.cn.
- **Beijing Auto-control Technology Co. Ltd.** (Chinese manufacturer of electronic control systems for greenhouses): www.auto-control.com.cn.
- **Shanghai Yongor Industrial Co. Ltd.** (Chinese manufacturer of shade screens, insect netting and other agricultural textiles): www.yongor.com.
- **WL Green Garden Nets Co. Ltd.** (Chinese manufacturer of shade screens and other types of netting for horticulture): www.lyscreen.cn.

(iii) **Companies/institutions from other countries:**

- **Netafim China** (Israeli supplier of irrigation materials, specializing in dripping irrigation tubes and related systems, established offices in Beijing and Guangzhou): www.netafim.cn.
- **Klasmann-Deilmann GmbH** (German manufacturer and supplier of substrates, young plant plugs and potting soil, represented by a sales office in Shanghai): www.klasmann-deilmann.com.
- **Pindstrup A/S** (Danish manufacturer and supplier of substrates, young plant plugs and potting soil, active in China): www.pindstrup.com and www.pindstrup.com.cn.
- **Compo China** (German manufacturer of potting soil focusing on the consumer market, present in China since 2016 with a sales office in Shanghai): www.compo.com.
- **Floragard GmbH** (German manufacturer and supplier of substrates and potting soil, active in China): www.floragard.de and www.floragard.cn.
- **Biobest Group** (Belgian manufacturer of biological control systems, specializing in breeding and production of insects for pollination and pest control in greenhouses, represented with a sales and distribution office in Shouguang, Shandong Province): www.biobestgroup.com and www.biobestchina.com.
- **Lock Antreibstechnik GmbH** (German manufacturer of drive systems for greenhouses, active in China and represented by XTB Co. Ltd., see above): www.lockdrives.com and www.xtb.com.cn.
- **Urbinati s.r.l.** (Italian manufacture of seeding and transplanting machines, irrigation systems and other equipment, active in China): www.urbinati.com.
- **Rough Brothers China** (Daughter company of large American greenhouse constructor, based in Shanghai, mainly producing greenhouse materials for export): www.roughbroschina.com.
- **Richel Group** (French manufacturer of greenhouse structures and materials, very large in plastic foil-covered multispan projects but also supplier of glasshouses, having a representative office in Beijing): www.richel.fr.
- **Scotts/MiracleGro** (Daughter company of large American fertilizer manufacturer specializing in slow-release fertilizers, strong in consumer market products): www.miraclegro.com.cn.

Chapter 9: Training, education and consulting services.

(i) Dutch companies and institutions:

- **Wageningen University & Research** (Leading agricultural university in the world, very active in China and represented by its own office in Beijing): www.wur.nl/cn
- **Lentiz Education Group** (Vocational training for operational staff and management of modern greenhouse projects and mid-level courses for students of Chinese agricultural vocational colleges, based in the Westland region and represented in China): www.lentiz.nl.
- **InHolland** (University of Applied Sciences, active in China): www.inholland.nl.
- **HAS Den Bosch** (University of Applied Sciences, active in China): www.hasuniversity.nl.
- **Van Hall Larenstein** (University of Applied Sciences, active in China): www.vhluniversity.com.
- **Aeres Group** (University of Applied Sciences, active in China): www.aeres.nl.
- **Delphy BV** (Cultivation consultancy company for horticulture, active in China): www.delphy.nl.
- **CoHort Consulting** (Business development consultancy & representation company, active in China): www.cohortconsulting.eu.

(ii) Chinese companies and institutions:

- **China Academy of Agricultural Sciences (CAAS):** www.caas.cn.
- **China Agricultural University (CAU):** www.cau.edu.cn.

Chapter 10: Legislation and phytosanitary issues.

- **Ministry of Agriculture and Rural Affairs (MARA), Beijing:** <http://english.agri.gov.cn>.
- **General Administration of China Customs (GACC):** <http://english.customs.gov.cn>.
- **Royal Netherlands Embassy, Beijing – Agricultural Bureau:** pek-lnv@minbuza.nl.
- **Buren Legal** (Dutch law firm with offices in Beijing and Shanghai, specializing in Chinese company law and regulations for foreign companies on the Chinese market): www.burenlegal.com.

Annex B: Reference data China.

• **Calendar of Chinese Holidays:**

Holidays/Festivals	Dates	Remarks
New Year (official)	1 st January	Often 2 or 3 holidays.
Spring Festival (Chinese New Year)	Period end of January – end of February (lunar calendar calculation)	Most important family event. Officially 1 week holiday, in practice everything stands still for 2 to 3 weeks.
Valentine’s Day	14 th February	Growing importance.
Qing Ming Festival (“tomb cleaning festival”)	Early April (lunar calendar calculation)	Usually 3 days holiday. Flowers offered to the deceased, visits to graves.
Labour Day	1 st May	One day off.
Mother’s Day	Second weekend in May	Growing importance.
Dragon Boat Festival	Early June	3 days holiday, festivities esp. in Southern China.
Chinese Valentine’s Day	August (2019: 7 th / 2020: 25 th / 2021: 14 th) – lunar calendar calculation.	No official day off. Gifts for loved ones.
Mid-Autumn Festival	Period August-September (lunar calendar calculation)	3 days holiday.
Teacher’s Day	10 th September	No official day off. Flowers for the teacher...
National Day and “Golden Week”	Week of 1 st October	One week off, many Chinese go on holiday.
Singles Day	11 th November	No official day off. Huge buying bonanza on Internet (discounts).
Christmas Day	25 th December	No official day off.

Annex C: Names and phone numbers of major flower wholesale & retail markets in Beijing, Shanghai and Guangzhou.

- **BEIJING:**

Name & location	Phone number	Remarks
Lai Tai Flower Market 9 Maizidian Xilu, Sanyuanqiao, Chaoyang District	+86 10 6463 5588	Largest flower and plant market in Beijing, good quality, domestic & import.
Dongfeng International Flower Market	+86 10 6431 5396	
Huaxiang Flower Creative Park	+86 10 8367 9939	
Hua Hua Shi Jie	unknown	

- **SHANGHAI:**

Name & location	Phone number	Remarks
Hongqiao Flower Market	+86 21 5117 3882	Largest flower market in Shanghai, good quality, much import product.
Hongqiao Antique City	+86 21 6402 5388	
Hengsheng International Floral Art Exhibition Center	+86 21 3255 2500	
Longda Flower Seedling Market	+86 215063 0766	

- **GUANGZHOU:**

Name & location	Phone number	Remarks
Lingnan Flower and Plant Market Fang Xing Lu 57, Liwang District	+86 20 8158 8443	Products from Guangdong, Kunming and all over the world: focus on pot plants, but also cut flowers are offered.

Source: China Flower Association

Annex D: Leading websites offering cut flowers and other ornamental products.

For estimated turnovers and growth indications, see § 4.4.

- **Flower Plus:** www.flowerplus.cn.
- **The Beast:** www.thebeastshop.com
- **Huaji (a.k.a. Fomdas):** www.huaji.com.
- **Huadian Shijian:** www.reflower.com.cn.
- **24flower:** www.24hua.cn.
- **Royal Flora Holland, Shanghai office:** the RFA e-commerce platform is under development and scheduled to go online in 2019. The web address is: www.youhehuapin.com.
- **Van den Berg Roses, Kunming** (see § 4.3): their e-commerce platform for fresh flowers “directly from the farm”, linking flower shops and consumers to producers, is already online. Address: www.m.vandenbergchina.com.

Annex E: Dutch Government (RVO) programs relevant to the ornamental sector.

The Dutch government has many support and subsidy programs to stimulate international business activities by Dutch companies, especially SME's. Some of these programs are financed by the European Union (EU), others directly by the Dutch government. Coordination and administration of all programs is done by the National Service for Entrepreneurship (RVO), a department of the Ministry of Economic Affairs. Details of all programs can be found at the RVO website: www.rvo.nl.

Due to its speedy development in past decades, China is no longer eligible for all subsidy programs; some of them specifically target the "least developed countries", and China no longer belongs to that category. Below we highlight some (possibly not all) programs that are applicable to China per December 2018:

Name of Program	Remarks
<i>Dutch Trade & Investment Fund (DTIF)</i>	Loans, guarantees and export financing. Maximum € 15 mln per project.
<i>GlobalStars</i>	Stimulating market-oriented R&D and product development by EU companies/ institutions with partners outside Europe. Projects are <i>called for</i> by the EU/RVO; Dutch and other EU companies can apply after publication of a project.
<i>Knowledge Vouchers Starters in International Business (SIB)</i>	Facilitating SME's entering of of foreign markets by subsidizing 50% of costs of expertise (lawyers, consultants etc.), to a maximum of € 2,500.— per voucher.
<i>Individual Coaching Vouchers Starters in International Business (SIB)</i>	Facilitating SME's entering foreign markets by subsidizing costs of individual coaching by approved training organizations, to a maximum of € 2,400.— per voucher.
<i>Mission Vouchers Starters in International Business (SIB)</i>	Facilitating SME's entering of foreign markets by subsidizing 50% of costs of participation in trade missions or exhibitions, to a maximum of € 1,500.— per voucher.
<i>Partners for International Business (PIB)</i>	Project financing, usually a combination of R&D/practical testing of technology and commercial implementation. PIB projects must be carried out by a Consortium of minimum 5 Dutch companies and/or knowledge institutions. Budget for 2019 is € 9 mln; maximum subsidy per project is € 350,000,--, whereby the same amount (in money and in kind / working hours) is expected from consortium partners.
<i>DHI – Subsidy program for Demonstration Projects, Feasibility Studies and Investment Preparation</i>	Budget for 2019 is € 4 mln for the "least developed countries", and € 5 mln for other countries, including China.