



Greenhouse technology suppliers conquer the world

Survey results of AVAG Plus members

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Introduction

The global population is growing, and there is a trend towards people moving to the big cities. The need for sufficient and safe food is increasing. Income in emerging countries like Brazil, Russia, India, and China is rising, resulting in changes in demand and consumption patterns.

Horticulture in different countries around the world is responding to these developments. Vegetables and the demand for ornamental plants have an increasingly important role. Horticultural suppliers have insufficient up to date information on the international market. Primarily based on information from the companies themselves, this publication presents a picture of the economic significance of the sector, the current sustainability themes, and the collaborative projects. To this end, a survey was conducted in 2012 at the request of AVAG Plus among the members of branch associations AVAG, VPN, OVTO, and VTTB by LEI Wageningen UR. The study was co-financed by the Ministry of Economic Affairs and the branch associations within the Market Intelligence Horticulture programme.

Laan van Staalduinen
Managing Director LEI Wageningen UR

Harm Maters
Chairman AVAG Plus

1 Economic significance: massive growth

Horticulture is one of the sectors that can make a global contribution to the production of sufficient, safe and sustainable and good quality food and ornamental plants for the future global population.

Horticultural suppliers from the Netherlands can play a role in this due to their unique combination of the available knowledge (software), technology (hardware) and strategic and operational service provision (orgware) worldwide. The combination of these elements is partly achieved through the traditionally strong domestic market of growers and trade.

The Dutch horticultural complex is extremely important for the Dutch economy, as demonstrated by the fact that it has been designated by the Ministry of Economic Affairs as one of the nine top sectors in the Netherlands. Within the horticultural complex, a distinction can be made between the supply sector on the one hand and the primary production sector on the other. The processing industry is less important because many products find their way to the consumer as fresh produce.

Important suppliers and service providers

- Greenhouse construction
- Installations for energy, climate, and water
- Potting soil and substrate sector
- Suppliers of crop protection, fertilisers, and related products
- Advice and knowledge suppliers
- Banks and insurers
- Energy suppliers
- Plant material
- Trade, distribution and storage



AVAG Plus is the umbrella organisation for over 100 companies specialised in horticultural supply and service provision. It represents a wide range of activities in horticultural supply (greenhouse construction, installations and technical equipment, potting soil and substrate, related products, crop protection, fertilisers, knowledge and advice). Companies involved in energy supply, financial products, trade, logistics and plant material are not members of AVAG Plus and are therefore not included in this study.

Within AVAG Plus, there are four branch organisations: AVAG (greenhouse construction, installation, and technical equipment), VPN (potting soil and substrate), OVTO (advice and knowledge suppliers) and VTTB (suppliers of crop protection, fertilisers, packaging and consumables).

Some companies are members of more than one branch organisation. For this study, the companies are classified in the branch in which they achieve the greatest turnover. The total added value of the greenhouse horticulture complex rose in the period 1995-2009 from 5.6 to 7.2 billion euros. In this period, all the suppliers together contributed significantly to this rise by increasing their gross added value from a little over two to over three billion euros. The gross added value of primary greenhouse horticulture rose by 0.5 billion euros. The contribution of distribution declined. The contribution of the supply industry to the total added value rose from 36% to 45% in the period 1995-2009.

The recent growth does not stem the ambitions for the coming period. From top sector advisory horticulture and plant propagation material (2011), it appears that for the period 2011-2020 a further growth of 1.3 billion in added value is expected, extrapolated from the trends from the past. Calculations in the framework of this study point to a more modest growth of the added value of greenhouse horticulture from around 0.8 billion euros. Because the majority is generated in the supply part of the horticultural complex, the economic importance of the primary and supply part of the chain will be almost the same in 2020. After 2020, the supply sector in the Netherlands will actually become bigger than the primary horticulture in terms of added value.

Table 1 Gross added value (in billions of euros) of Dutch companies in the horticultural chain at home and abroad in the years 1995, 2004, and 2009, and a prognosis for 2020

added value	1995	2004	2009	2020 (prognosis)
primary horticulture	3,6	4,4	4,0	4,2
suppliers	2,0	2,7	3,2	3,8
total	5,6	7,1	7,2	8,0

Source: LEI calculations

Table 1 shows a picture of all the suppliers including energy, plant material, banks and insurers. An estimate based on the survey results of AVAG Plus members shows that in 2011, these companies generated a turnover of over 2.5 billion euros and an added value of around 0.75 billion euros. There are three qualifications:

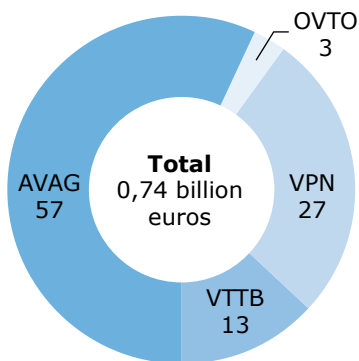
- Not all horticultural suppliers belong to AVAG Plus
- The AVAG Plus companies also supply other sectors (including agricultural sectors)
- An important part of the turnover and added value is generated through exports.

The survey also shows that between six and six and a half thousand people work in this part of the horticultural supply chain.

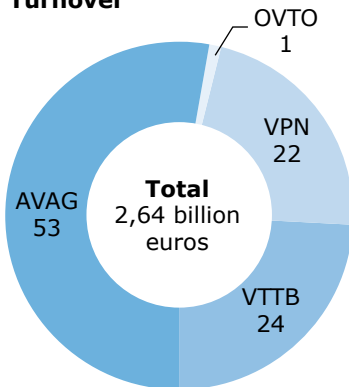
Figures 1 to 4 show the distribution of personnel, turnover and added value over the four branch organisations.

Figure 1-4 Share of companies, personnel, turnover and added value according to the branch associations (in %)

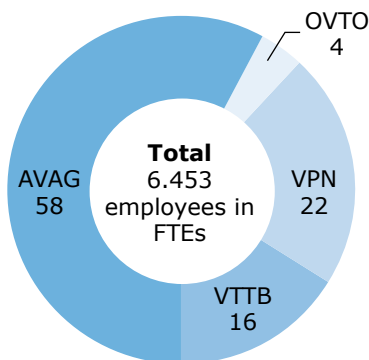
Added value



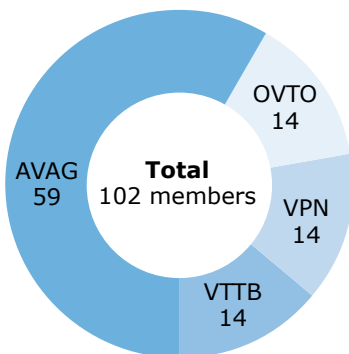
Turnover



Personnel



Companies



Source: Survey conducted among AVAG Plus members during this study

From the four figures, it appears that AVAG has the most members, generates the highest turnover, and offers the greatest added value: between 53 and 59% of the total. VPN and VTTB, each representing around 14% of the companies, have a relatively large number of employees, each of whom generates a lot of turnover. The added value per employee is relatively high at VPN and relatively low at VTTB. In terms of numbers of employees, the OVTO is small and generates a limited turnover. The added value per employee is average, because nearly all the turnover is also added value.

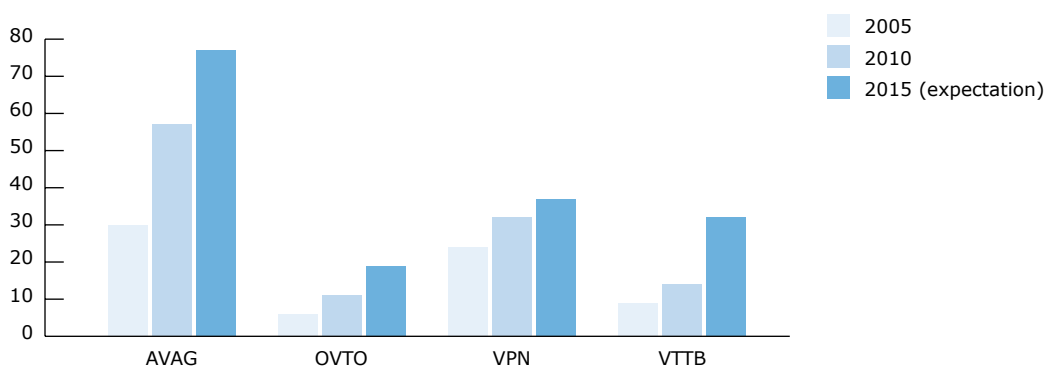
The fact that the companies in the horticultural supply sector play an important role within Dutch horticulture is also apparent from their representation in the Hillenraad 100 in 2012 (source: Hillenraad 100, 2012), an annual list of prominent companies in greenhouse horticulture. In fact, 21 of the companies that are members of AVAG Plus appear in the top 100.

From the surveys, it appears that many companies in the horticultural supply sector are optimistic about the turnover prognosis. They particularly expect to be able to strengthen their turnover abroad. This applies to nearly all the companies and does not vary according to the branch organisation. In 2013, most of the horticultural supply companies also operate internationally. The members of the OVTO generate around 11% of their turnover abroad, while the VTTB members generate around 14%, the VPN 32% and the members of AVAG as much as 57%. Without exception, the members of the different branch associations feel that their turnover abroad can increase and that turnover in the Netherlands is stable or declining slightly. In the short term, the members of the AVAG already expect to generate three quarters of their turnover abroad. The members of OVTO also expect that the international share in the turnover will nearly double between 2010 and 2015.

Figure 5 Turnover and net added value per employee (in 1,000 euros per FTE) per branch association

	Added value in k€/FTE	Turnover in k€/FTE
	2011	2011
AVAG	112	371
OVTO	109	112
VPN	139	406
VTTB	93	616

Figure 6 Share of turnover abroad (in %) per branch association



Source: Survey conducted among AVAG Plus members during this survey

Several themes play a role worldwide. Some of these themes are specific to certain continents, such as food security for Africa and Asia, while the chain organisation and water are a theme nearly everywhere except in Western Europe. In Western Europe, Russia, Ukraine, North America and Turkey, energy is an important theme due to the demand for heat and light for the production of horticultural products. Cooling plays a role in hot regions where technologically advanced systems are used. The urban-rural discussion about the migration to the city and the increased demand of daily fresh food is particularly important in Africa, South and Central America, and in Asia.

Figure 7 Important sustainability themes abroad

Theme	Western Europe	Eastern Europe Russia Ukraine Turkey	Africa	South and Central America	Asia
Food safety	■				■
Food security			■		■
Emergence retail		■			■
Chain organisation		■	■	■	■
Urban-rural			■	■	■
Water		■	■	■	■
Energy	■	■			

Source: Survey conducted among AVAG Plus members during this study

The turnover of the members of AVAG Plus abroad is mainly generated in Europe (70%). Outside Europe, big markets in Russia (particularly VTTB), China (particularly VPN), Central America (particularly AVAG) and North America (all branches) are important. Horticultural suppliers have spread their wings worldwide.

Figure 8 Share of foreign turnover according to continent per branch association (in %)

	Northern, Western and Southern Europe	Eastern Europe and Russia	Africa	Central and South America	Asia and Oceania	North America
AVAG	60	16	2	11	4	7
OVTO	77	7	3	1	2	10
VPN	66	5	3	5	16	5
VTTB	66	16	1	4	5	8
TOTAL	65	14	2	6	6	7

Source: The survey conducted among AVAG Plus members during this study

Figure 9 shows three levels of internationalisation: only domestic production and sales; exports (domestic production and sales at home and abroad); and international production (both production and sales at home and abroad).

In the publication *Internationalisatie: groeien over grenzen* (Internationalisation: cross border growth) (ABN AMRO, 2012), a dimension is added, namely where best to start with export ambitions. The advice is to start in countries which border the Netherlands, because some of the risks are then much smaller: exchange rates, cultural differences, language, and legislation, for example.

From the current distribution of worldwide activities of the companies which supply the horticultural sector, it appears that many companies do generate their international turnover in Western Europe and then go to the rest of the world. Within the survey, three groups of companies were distinguished: companies which do not export (level 0); companies which export to neighbouring countries but not to the rest of the world (level 1 within the EU) and companies which export to EU countries and to other continents (level 1 within the EU and to countries outside the EU). Only one company indicated that it did not export to other EU countries but it did export to countries outside the EU.

The survey shows that most companies currently operate at level 1 (export) (see figure 9). In half of the cases the company is a dealership, and in a quarter of the cases they have an office abroad. The eight companies in the survey which do not export are without exception of limited size in terms of turnover and employment.

The R&D expenses are relatively small, namely 3%. This is slightly lower than the total industry in the Netherlands (4%). Nevertheless, it is in stark contrast with the plant propagation sector in the Netherlands, which spends 15% of the turnover to R&D (Bakker et al., 2011). Around 10%, mainly smaller companies, do not perform any R&D. The differences between the branches are small. An explanation for the limited R&D is that a great deal of fundamental study takes place at universities and institutions like TNO. Another explanation is that companies are small and innovation and development takes place through projects for customers rather than through structured R&D. The companies apply new materials and new techniques or combine them for their products and services.

Level 0

Production and sales only in their own country

Level 1

Export

- 1.1 Sales abroad by others (exporters)
- 1.2 Manages sales abroad themselves
 - 1.2.1 From the Netherlands
 - 1.2.2 Agency
 - 1.2.3 Office abroad

Level 2

Foreign production

- 2.1 Issues licence to foreign contractor
- 2.2 Joint venture with foreign company
- 2.3 Acquisition of foreign company
- 2.4 Independent production site abroad

Figure 9 Level of internationalisation according to Van Meijl et al. (1999)



2 Sustainability: delivering and communicating

An important opportunity for companies involved in supplying the horticultural sector is the theme 'Sustainability'. Dutch horticulturalists can grow plenty of healthy food and ornamental plant products in a small area with minimum impact on the living environment through the combination of good management, extensive knowledge, and good greenhouses and equipment. In view of the growth of the world population and the migration to the city, as well as rising incomes outside Europe, there is a global need for more sustainable cultivation. This too will stimulate 'local4local' production. On the one hand, this trend is the result of sustainability themes, such as the carbon footprint (transport), residue requirements; on the other hand it is the result of chauvinism about the preference for food from the own region.

All the respondents felt that Dutch horticultural production was clean, efficient and of high quality. According to the horticultural suppliers, important sustainability themes are:

- In the Netherlands: energy & climate, crop protection, water quality;
- Abroad: energy & climate, water quantity and quality, working conditions and soil quality, Responsibly Produced Peat.

There are considerable differences among the branches with regard to the sustainability themes. The members of the OVTO feel that energy is the most important sustainability theme; the members of the VPN are strongly focused on soil and fine particles, while crop protection is a prominent issue for the members of VTTB. The 'Responsibly Produced Peat' initiative launched by the Netherlands (see box 3) aims at sustainable peat extraction with respect for biodiversity. The members of AVAG consider labour savings, energy (see box 4), and water (see box 1) to be important themes within the field of sustainability.

The suppliers highlight three issues as being important for promoting sustainable production:

- reduction of residues from crop protection agents and emissions to the environment (see box 2);
- renewal and cutbacks in horticultural areas in the Netherlands;
- promotion of the current sustainable production ('Be good and tell people about it').

Box 1: Water management

Water management is an important sustainability theme. In Africa, for example, a fully closed water storage system has been set up. This means the water cannot become contaminated and algae cannot form; this has a positive effect on the filter system.



Box 2: More food with fewer substances

Together with specialists, growers are taking great steps in applying organic and integrated crop protection systems. This means that chemical substances are only used to support the integrated crop protection system. The possibilities of an even wider assortment of integrated options help entrepreneurs grow a resistant plant while also safeguarding food quality, minimising emissions, and guaranteeing safe working processes.



Box 3: Sustainable and innovative enterprise

Peat is an important raw material for substrate, an important characteristic being that it is safe when used for food production. Because peat is a natural product, a sustainable working method is sought. Within the framework of sustainable enterprise, excavated peat areas are restored and brought back to their original state or are turned into a forestry area or made suitable for agriculture. In addition, with regard to sustainability, there is a continuous search for alternative raw materials, preferably locally sourced. These developments translate into sustainable replacements for peat, each with their own specific applications: coconut, wood fibre/improved wood fibre, bark, and rice chaff. These raw materials, in combination with peat and aligned to the needs of the grower, offer a sustainable alternative. All substrates used by the VPN members are certified by means of the RHP quality mark.



Promotion is also important for encouraging the export of the products and services of the horticultural suppliers. In this regard, entrepreneurs mainly recognise their own responsibility besides the efforts of the branch organisations and government.

It is interesting that Dutch horticultural suppliers are greatly inspired by typical Dutch sustainability themes like energy and the use of crop protection agents. In the light of strongly international expansion, it is important that customised solutions are developed (see the implementation agenda 2012-2016 of the top sector policy), whereby companies respond to demands from the international market. Figure 7 shows that different themes play a role in the different continents and that the relevant technology is also different.

In order to optimise the response to the diversity of developments, Greenport Holland International was set up in the Netherlands and the SMASH concept was developed.

The mission of Greenport Holland International is to boost the earning capacity of the Dutch horticultural cluster with international sustainable horticultural projects. Greenport Holland International is an initiative of the business sector which is in alignment with the Dutch top sector policy. This involves close cooperation between the business sector, government, and knowledge institutions.

The SMASH (SMart Adaptive Sustainable Hortichains) concept, in which integral sustainable production and sales systems for the international market are developed, is an example of cooperation between the business sector, government and knowledge institutions. Depending on climate and the economy, the horticultural suppliers provide entrepreneurs worldwide with certain technologies. In figure 10, four production segments (from low-technology to top-technology) are distinguished, each with their own technology, production characteristics and price level. The improved sustainability, modernisation and promotion can be released on the SMASH concept from three product types in the AVAG 'range'.

These product types are:

- technology (hardware)
- knowledge, concepts and equipment (software) and
- strategic and operational service provision (orgware)

The horticultural sector is intensifying worldwide as a result of increasing demand, higher market requirements, and social demands. As a result, producers are moving up this pyramid. The strong foundations of product delivery and service provision at the top level by AVAG members in the domestic market and in highly developed countries is a bonus in these change processes in technology, knowledge and application. Experiments with the SMASH concept are also being conducted in the programmes initiated by the AVAG and carried out in cooperation with the Ministry of Economic Affairs and companies from the AVAG Plus group.

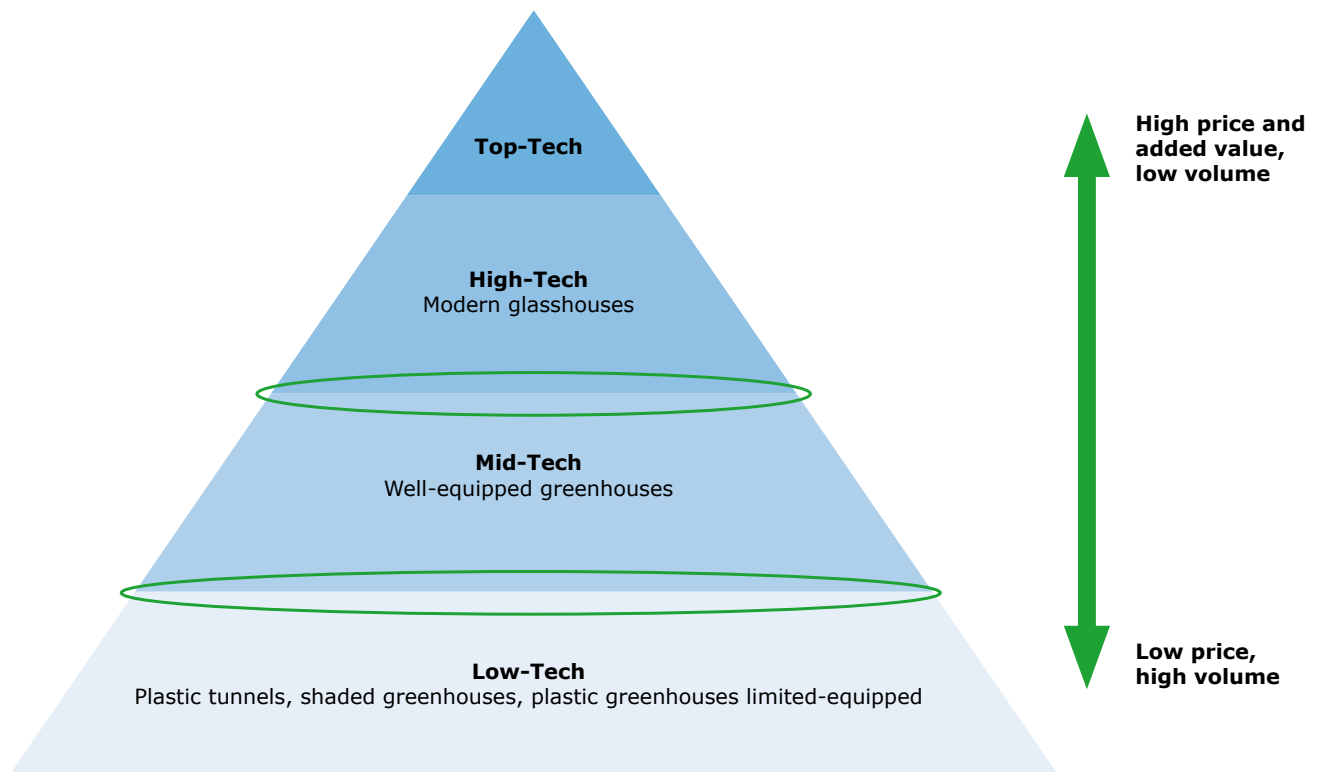
Box 4: More food with less energy

The sustainable energy of geothermal projects saves companies involved in greenhouse horticulture millions of cubic metres of gas. A contribution is made to this through successful project management and continuous knowledge development.





Figure 10 SMASH concept



3 Cooperation: a 'must' for the future

In order to serve the international market today and in the future, many entrepreneurs feel that more cooperation is needed. The current cooperation between these companies in the Netherlands is rated as average on the scale of 'lots and frequent cooperation' to 'little and no cooperation'. The cooperation with customers, end users, and suppliers has become more intensive. This can be explained by the fierce competition on the domestic market between suppliers and service providers and because many greenhouse horticulturists manage the organisation themselves in a larger investment and therefore choose or are themselves the advisor, supplier, installer, and greenhouse builder.

Although there is less cooperation abroad, the form in which it occurs is similar to that in the Netherlands. In other countries, so-called turnkey and larger scale projects are common, and competition between the various suppliers and service providers is stronger. The examples in boxes 5 and 6 provide good examples of cooperation between Dutch suppliers at home and abroad.

For each branch organisation, there are differences in the partners chosen. The members of the OVTO quite often work with 'colleagues and friendly competitors,' the members of VPN with 'suppliers,' the members of the VTTB with 'advisors and suppliers' and the AVAG with 'colleagues, friendly competitors, and suppliers'. There is little cooperation with knowledge institutions and government at home or abroad. Cooperation is stimulated by the Dutch top sector policy and by Greenport Holland International.

Where there is cooperation, this is nearly always in the form of projects. In a limited number of cases, there is participation in the other organisation. The activities to which the cooperation relate are, in order of importance: purchasing, sales, and knowledge development & design. Cooperation occurs rarely in assembly, production & construction, or with management & implementation. As reported earlier, cooperation abroad is substantially lower than in the Netherlands. In other countries, the focus of cooperation is on purchasing and sales. Figure 11 shows which areas the focus lies with regard to the cooperation per branch.

Box 5: International cooperation

SeraCulture is an example of more than thirty companies drawn from the entire horticultural cluster that are cooperating actively. The long-term 2g@there-programme focusing on Turkey reinforces the positioning of the Dutch horticultural supply. The programme addresses: Holland branding, knowledge transfer and business networking between Turkey and the Netherlands. Examples of this cooperation are a study into a training centre, a calculation tool for Turkish growers and/or investors and the SIC, the Sustainable Innovation Centre. Turkish and Dutch companies have jointly invested in a four-hectare horticultural project. This was related to a SeraCulture/Wageningen UR study into the optimal greenhouse and accessories in the Turkish climate, based on sustainable horticultural production.





Figure 11 Important activities in which horticultural suppliers work together with third parties¹⁾

	OVTO	VPN	VTTB	AVAG
Important activities for cooperation	Support, Knowledge development & design	Sales Production	Purchasing Knowledge development & design	Sales Knowledge development & design Project management

1) For these companies, knowledge development & design are often in the applied rather than the fundamental field. Consequently, people work together with knowledge institutions but also often with other companies with regard to knowledge development and design.

In the LEI report *Een wereld te winnen* (A world to win) (Van Meijl et al., 1999), the conclusion was drawn that with regard to internationalisation, the Dutch horticultural supply is still in its infancy. In 2013, this can no longer be said. The majority of the companies generate part of their turnover abroad and increasingly joint projects are started which are aligned to the local circumstances.

Cooperation must have a goal. When AVAG Plus members strive at more projects, more added value in projects and more projects abroad, this goal exists. From the SMASH concept, developing cooperation is a market opportunity which is underlined by the preference of foreign investors for turnkey projects. And the strength of core activities in hardware, software and orgware links up well to this. In consortiums or other collaborative forms, more and more complete answers can be given to the questions in global horticultural production and horticultural trade.

Box 6: Sustainable relationships

The cooperation within Green Farming consists of around 25 companies, Wageningen UR and other service providers and the Dutch government. The aim is horticultural development in Kenya and Ethiopia, based on flower and vegetable cultivation for local consumption and export. The Dutch horticultural sector is striving to achieve sustainable relationships and to develop sustainable solutions for water management, climate, and post-harvest, adapted to the local climate factors and the regional economy.



4 Conclusions

Economy

- The role of the AVAG Plus in the global horticultural complex is increasingly significant. This also applies to advisors and suppliers of greenhouses, installations, crop protection agents, fertilisers, potting soil, and substrates.
- The world wants fresh, sustainably produced horticultural products. The horticultural supply companies have the expertise, experience, and the innovation capacity to increasingly fulfil a leading role in this national and international horticultural chain.
- It is expected that after 2020, the horticultural suppliers will become more economically important in the Netherlands than the local Dutch primary greenhouse horticulture.
- There are plenty of opportunities to achieve more turnover and added value abroad through good and targeted cooperation. The cooperation between the companies has already improved significantly in the past ten years.

Sustainability and cooperation

- The increase in foreign turnover is possible through Dutch knowledge and skills with regard to various sustainability themes such as energy and climate, crop protection, water, soil, and biodiversity.
However, an integral approach is required to address specific foreign sustainability questions. The SMASH concept, possibly supplemented with provisions related to logistics, storage, and conservation, may form a good basis.

Internationalisation

- At the moment, over half of the turnover abroad is generated by greenhouse construction and installation companies. Businesses expect this to rise considerably in the coming years. This applies to both products and services.
- For the horticultural suppliers, internationalisation means opening a dealership or office. Production takes place abroad only in exceptional cases.

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Ministry of Economic Affairs

AVAG PLUS

AVAG Plus is the umbrella organisation of members from the individual branch organisations for horticultural supply and services



AVAG is the branch organisation of Dutch greenhouse and installation sector.



OVTO is the branch organisation of Horticultural Advisors and Researchers



VPN is the branch and interest group organisation for the Dutch substrate sector



VTTB is the branch organisation of the Horticultural Supply sector



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LEI Wageningen UR is part of the international expertise organisation Wageningen UR (University & Research centre). Our mission is 'To explore the potential of nature to improve the quality of life'. Within Wageningen UR, nine specialised research institutes of the DLO Foundation have joined forces with Wageningen University to help answer the most important questions in the domain of healthy food and living environment. With approximately 30 locations, 6,000 members of staff and 9,000 students, Wageningen UR is one of the leading organisations in its domain worldwide. The integral approach to problems and the cooperation between the various disciplines are at the heart of the unique Wageningen Approach.
