
TOPSECTOR
HORTICULTURE & STARTING MATERIALS
The power of technological value chains

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Growth markets and promising technologies

- Global population growth → the demand for fresh products is increasing
- Climate change → demand for Controlled Environment Agriculture is increasing
- Personnel shortages → demand for mechanization and robotization is increasing
- Sustainable local ecosystems → demand for water and energy efficient circular production systems and use of sustainable energy is increasing

In numbers

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	Horticulture & Starting Materials complex – Statistics Netherlands/LEI 2022					
Key figures						
	Production value chain, Horticulture & Starting Materials	**Added value**	**Number of companies** (primary horticulture*)	**Workforce** (annual work units)	**Export value NL**	**R&D expenditure in NL**
Size (in € billion)	**31,2**	**23,6**	**23.7K**	**246K**	**27,5**	**0,98**
Share of the Netherlands (%)	**PM**	**2,8**	**1,6**	**3,1**	**4,7**	**5,1**

* Top Sector Monitor, Statistics Netherlands

In numbers

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- The Horticulture & Starting Materials sector is performing well despite challenges such as corona, geopolitical shifts and energy prices.
- Dutch horticulture is the fresh supplier of vegetables, fruit and ornamental plant products for Europe. The other horticultural products and technology are shipped all over the world:
  - Floriculture exports € 11.5 billion
  - Vegetable exports € 7.8 billion
  - Fruit exports € 7 billion
  - Technology export € 1 billion
  - Seeds/breeding export € 3.6 billion

- Sustainability is a precondition and not a discussion

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Dutch horticultural cluster
=
ecosystem

Nearly 24,000 independent (SME) companies operate collectively in the ecosystem as a multinational with a turnover of 30 billion euros.

1. Resilient nature

A. Strengthen biodiversity and nature

B. Strengthen and value ecosystem services

C. Effective and sustainable use of Nature-Based Solution

D. Transition to a nature-inclusive society

E. Technology and data-driven nature policy and management

2. Sustainable agriculture and horticulture

A. Agriculture and horticulture within the limits of the natural environment

B. Earning capacity, perspective & value creation

C, Resilient plant production on a vital soil or substrate

D. Resilient animal husbandry systems

E. Circularity, production & use of sustainable raw materials

F. Energy transition in agriculture and horticulture

3. Vital rural area in a climate-proof Netherlands

A. Future-proof spatial planning of rural areas

B. Future-proof design of built-up area

C. Future-proof freshwater system

4. Sustainable and valued food, healthy, accessible & safe

A. An ecologically and economically sustainable agricultural and food system

B. Sustainable processing and food safety, fresh and processed

C. Alternative proteins: chain, products, consumer

D. Sustainable and healthy food supply and consumer behavior

E. Food security now & in the future

F. Multiple value creation from the agrifood sector to food and non-food

5. Sustainable and safe use of the North Sea and other large waters

A. Sustainable North Sea & Oceans

B. Sustainable rivers, lakes and intertidal areas

C. Nature-inclusive agriculture, fisheries and water management in the Caribbean Netherlands

D. Sustainable Blue Economy

F. Aquatic food production

6. Safe and resilient Delta

A. Sustainable actions for safe, resilient, accessible deltas

B. Reducing the use of primary (construction) materials

C. Safe, circular and climate-neutral shipping

Key technologies: 1) Smart technologies 2) Biotechnology and breeding 3) Fermentations and bioconversions

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Key technologies & horticulture

- Artificial Intelligence & data science → genetic analyses, machine learning, autonomous cultivation in greenhouses, digital trading platforms, chain transparency and personalized nutrition.
- Biomolecular and cell technologies → develop genome-editing tools for breeding crops of the future, resistant to diseases and pests, adapted to changing climate conditions (Plant XR, Crop XR).
- (Opto)Mechatronics and optical systems → robotization and automation to combat scarcity on the labor market, simplify labor, replace repetitive tasks, control production using fewer resources (NXTGEN Hightech).
- Imaging & Sensoring → phenotyping gene bank material, determining plant properties during the breeding process, detecting fruit or flower quality.

Crossovers

Knowledge and Innovation Agenda Agriculture, Water, Food
The social challenges the Netherlands are facing requires collaboration with other Knowledge and Innovation Agendas and Top Sectors. That's why government, companies and knowledge institutions are working together in the Innovation Helix on Missions for the future.

KIA Key Enabling Technologies

- Biomolecular and cell technologies
- (Bio) process technology
- Mechatronics and opto-mechatronics

KIA Climate and Energy

Energy transition
- Decentralized electricity production from sun and wind
- Geothermal energy and Hydrogen
- Neighbourhoods of the future (infrastructure, living environment)

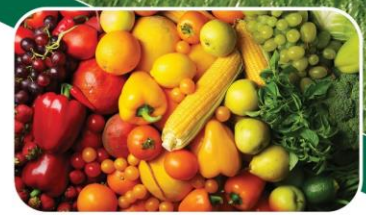
Built Environment and Technology
- Climate adaptation of the built environment
- Nature-inclusive constructions
- Reducing emissions

Logistics
- Durability of transport, storage and conditioning
- Chain management and cooperation (supply, product and return flows)
- Supporting (digital) concepts (e.g. track & trace, RFID)

KIA Digitization

- Artificial Intelligence and Data science
- Cybersecurity
- Decentralized Technology (including Blockchain)

KIA Agriculture, Water, Food



KIA Circular economy

- Designing for circularity
- Chain cooperation
- Transition to a circular economy

KIA Health & Care

- Food & Health
- Quality of the Living environment
- OneHealth (zoonoses, antimicrobial resistance)

KIA Societal Earning Capacity

- Acceleration of Societal transition
- Ecosystems for Mission-driven innovation
- Scaling up innovations and earning capacity

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Partners Top Sector have a prominent sustainability policy

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Dutch horticulture offers technologies for sustainable, high-tech production systems worldwide, developed with entrepreneurs and knowledge institutions from within and outside the cluster, applied and optimized for use in the cultivation of plants worldwide.

Dutch horticultural technology companies are already involved in almost 80% of international projects


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Thank you for your attention!