
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.

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A Circular agriculture

- Reduce fossil nutrients, water use, and nitrogen deposition
- Healthy, robust soil and cultivation systems
- Reuse of organic side and residual flows
- Protein supply from plant sources
- Biodiversity in circular agriculture

B Climate-neutral agriculture and food production

- Reduction of methane emissions from livestock farming
- Agricultural soils: nitrous oxide emission reduction, carbon sequestration increase
- Reduction of peat-meadow oxidation
- Increased carbon sequestration in forest and nature
- Energy production, -use, and -saving (incl. greenhouses as a source of energy)
- Production and use of biomass

C Climate-proof rural and urban areas

- Climate-proof rural areas: preventing inundation and water shortage
- Climate adaptive agriculture and horticulture systems
- Flood- and climate-proof urban areas
- Improved water quality

D Appreciated, healthy and safe food

- Appreciation of food
- Healthy food as an easy choice
- Safe and sustainable primary production
- Sustainable and safe processing

E Sustainable and safe North Sea, oceans and inland waters

- Sustainable North Sea
- Nature-inclusive agriculture, fisheries and water management in the Caribbean Netherlands
- Rivers, lakes and intertidal areas
- Other oceans and seas: Blue Growth
- Fishing

F The Netherlands is and must remain - past 2100 - the best protected and habitable delta in the world

- Making water management more sustainable at acceptable costs
- Adapting to accelerating sea level rise and increasing weather extremes
- The Netherlands' Digital Water Country
- Sustainable energy from water

Key enabling technologies

- Smart Technologies in Agri-Horti-Water-Food
- Biotechnology and breeding

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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

Kennis- en Innovatieagenda Landbouw, Water, Voedsel
De maatschappelijke uitdagingen waar Nederland voor staat vragen om samenwerking met andere Kennis- en Innovatieagenda's en Topsectoren. Daarom werken in de Innovatiehelix overheid, bedrijven en kennisinstellingen samen aan missies voor de toekomst.

KIA Sleuteltechnologieën

- Biomolecular and cell technologies
- (Bio) process technology
- Mechatronica en opto-mechatronica

KIA Klimaat en Energie

Energietransitie
- Decentrale elektriciteits-productie uit zon en wind
- Geothermie en Waterstof
- Wijken van de toekomst (infra, leefomgeving)

Bouw en Techniek
- Klimaatadaptatie gebouwde omgeving
- Natuurinclusief bouwen
- Reduceren van emissies

Logistiek
- Duurzaamheid van vervoer, opslag en conditionering
- Ketenregie en -samenwerking (aanvoer-, product- en retourstromen)
- Ondersteunende (digitale) concepten (o.a. track & trace, RFID)

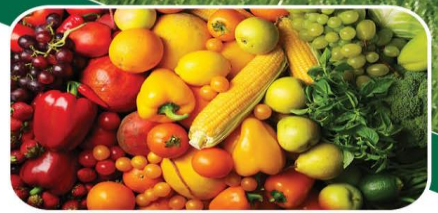
KIA Digitalisering

- Artificial Intelligence en Data science
- Cybersecurity
- Decentrale Technology (o.a. Blockchain)

KIA Landbouw, Water, Voedsel

KIA Circulaire Economie

- Ontwerpen voor circulariteit
- Ketensamenwerking
- Transitie naar een circulaire economie



KIA Gezondheid & Zorg

- Voeding & Gezondheid
- Kwaliteit Leefomgeving
- OneHealth (zoönoses, antimicrobiële resistentie)

KIA Maatschappelijk Verdienvermogen

- Versnelling maatschappelijke transitie
- Ecosystemen voor Missiegedreven innovatie
- Opschalen innovaties en verdienvermogen

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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!