

Wageningen UR Greenhouse Horticulture

Research and innovation: networking with knowledge

sjaak.bakker@wur.nl
www.glastuinbouw.wur.nl




Wageningen University and Research Centre

Supervisory Board

Plant Sciences Group

17 university chairs

Plant Research International

PPO (Applied)




Plant Sciences Group

Wageningen University, Plant Sciences

Plant Research International

Applied Research International

Fundamental | *Applied*

- 411 fte
- Turnover 55.2M€

- 298 fte
- Turnover 41M€



- 284 fte
- Turnover 50.1M€




Greenhouse area: 10000 ha, ± 45% in Westland-Oostland

Investments/ replacement: 500-600 ha per year: 5%

	2009
Total area (ha)	10325
Floriculture	5435
Cut flowers	2690
Potplants	1460
Other (eg. gardenplants)	1285
Food	4890
Vegetables	4560
Fruit	330

Greenhouse Horticulture: Cut Flowers




Greenhouse Horticulture: Potplants






Wageningen UR Greenhouse Horticulture

- Mission: Initiate and stimulate innovations for a sustainable greenhouse sector
- Strategic and applied research
- Staff: > 100 researchers

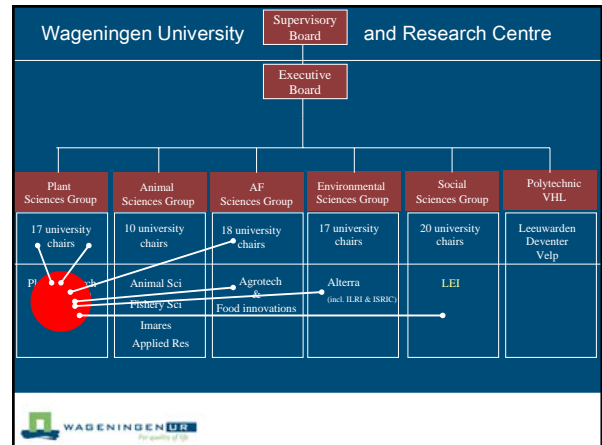
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Wageningen UR Greenhouse Horticulture

Research funding (project based):

- Ministry of Agriculture (35%)
- Horticultural Product board (30%)
- Other (35%):
 - European Community
 - Private companies
 - Ministry of Economic Affairs
 - Local governments
 -

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Location: Bleiswijk

- 85 greenhouse compartments
 - normal ventilation, cooling, complete airco
 - artificial light
 - soil, substrates, tables
 - Insect breeding
- Crop protection laboratories
- Test facility taste of products

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Location Wageningen

- Specific laboratories (e.g. robotics, light measurements)
- 2 Experimental greenhouses

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Research topics:


- Climate and energy
- Sustainable crop protection
- Water and emission
- Advanced cropping systems
- Quality of crop and product
- International (Adaptive greenhouse)



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Climate and energy


- Energy producing greenhouses
- Energy efficient cropping strategies
- High transparent covering materials (Anti Reflex, Micro V)
- (Crop)model based control
- Light (eg. LED)



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Energy: Electricity producing greenhouse

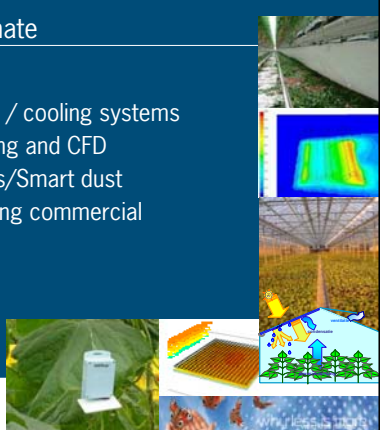
- NIR reflecting greenhouse cover/ photoselective
- Photovoltaic cells + cooling in focus point
 - First results: Electricity production: 16 kWh/m² per year and thermal 54 kWh/m²



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Greenhouse climate


- Dehumidification / cooling systems
- Physical modelling and CFD
- Wireless sensors/Smart dust
- Climate monitoring commercial greenhouses



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Sustainable crop protection

- Integrated pest management
- Disease suppressive soils (biological horticulture)
- Resistance against white spider using white fly
- Fungi against insects
- Reduced emission of pesticides



KOPPERT BIOLOGICAL SYSTEMS
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Water, nutrients & emission



- Emission free greenhouses
- Emission reduction soil grown crops
- EU Flow-Aid: Decision Support System for irrigation semi-arid area's
- Watersaving greenhouses (Gulf Region)
- Aqua Re-Use: water treatment for regions



AquaReuse FLOW AID

Advanced cropping systems


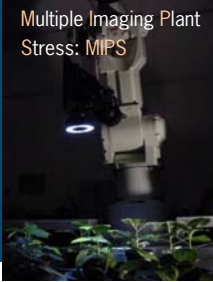
- Vision applications:
 - Camera based system to measure plant size
 - Multiple Imaging Plant Stress
- **Robotics**
- Mobile croppingsystems
- Combined greenhouse and livestock farming

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Advanced cropping systems/ robotics

- Harvesting (combined with movable benches/gutters)
- **Sorting/grading with vision**

Multiple Imaging Plant Stress: MIPS

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International project examples

- Sustainable greenhouse production (Mexico)
- Design of demonstration greenhouse (Turkey)
- Water efficient greenhouse (Saoudi Arabia, UAE)
- Capacity building (Uganda)
- Integrated pest management (Ethiopia)
- Greenhouse design tropical low lands (Indonesia)
- Greenhouse horticulture (Malasya)





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"Adaptive greenhouse": from current solutions to integral re-design



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Violierenweg 1 Bleiswijk
Borngesteeg Wageningen
www.agricultuur.wur.nl

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