



Wageningen UR Greenhouse Horticulture

Research and innovation: networking with knowledge

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The Wageningen UR domain

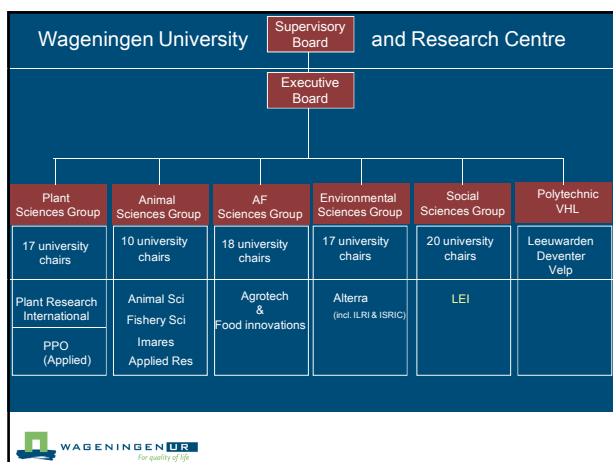



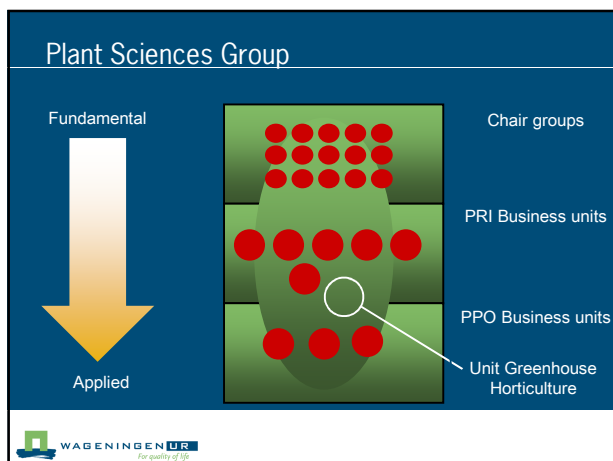
Wageningen University and Research Centre



Social Sciences Group
Animal Sciences Group
Environmental Sciences Group
Plant Sciences Group
Agrotechnology and Food Sciences Group







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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Agriculture in The Netherlands: production value

	2000	2008
Total (Billion Euro)	17.1	19.7
Horticulture (70% greenhouse)	6.7	7.7
Arable farming	2.0	2.5
Livestock (milk)	4.3	5.2
Animal production	4.2	5.2
% horticulture	39%	39%



Greenhouse area: 10000 ha, $\pm 45\%$ in Westland-Oostland

	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






Current high priority issues in Dutch Horticulture








- Sustainability
- Production efficiency
- Costs of energy
- Labour costs and availability
- Food safety
- Economic viability


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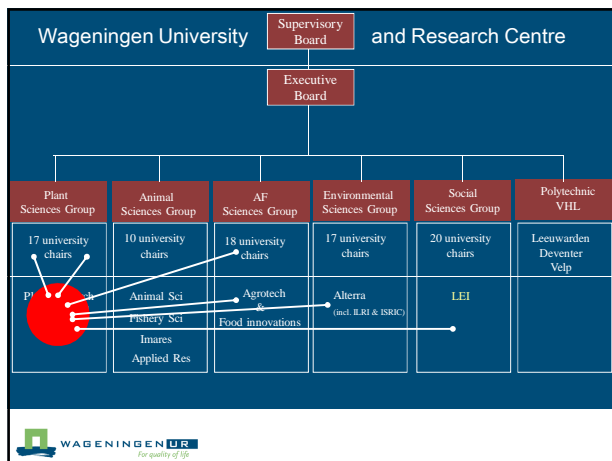
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Research funding (project based):

- Ministry of Economic Affairs, Agriculture and Innovation (50%)
- Horticultural Product board (30%)
- Other (20%):
 - European Community
 - Private companies
 - Local governments
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Location: Bleiswijk

- 90 greenhouse compartments
 - normal ventilation, cooling, complete airco
 - artificial light
 - soil, substrates, tables
 - Insect breeding
- Crop protection laboratories
- Test facility taste of products
- Innovation and Demonstration Centre
- Greenhouse as Energy Source






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Location Wageningen

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






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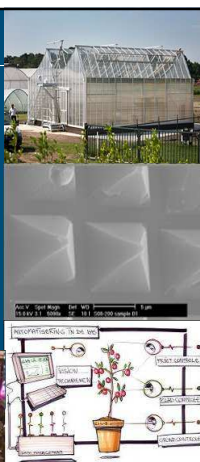
Research topics:

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



Climate and energy

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



Sustainable crop protection

- Integrated pest management
- Disease suppressive soils (biological horticulture)
- Induced resistance against pests
- Fungi against insects
- Reduced emission of pesticides



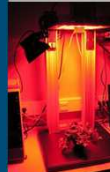
Water, nutrients & emission

- Emission free greenhouses: closed watercycle on farm level
- Emission reduction soil grown crops
- Decision Support System for irrigation semi-arid area's
- Watersaving greenhouses (Gulf Region)
- Possibilities of algae production
- Alternative substrates



Advanced cropping systems

- Vision applications:
 - Camera based system to measure plant size, phenotyping
 - Multiple Imaging: photosynthesis
- Robotics
- Mobile cropping systems
- Combined greenhouse and livestock farming



Quality of crop and product

- Crop research: vegetables, cut flowers, fruits.
- Effects of environment, plant treatments, cropping systems
- Post harvest: flower life in relation cropping conditions and:
- Taste vegetables (model based and pannels)
- Virtual (3-D) plant modeling

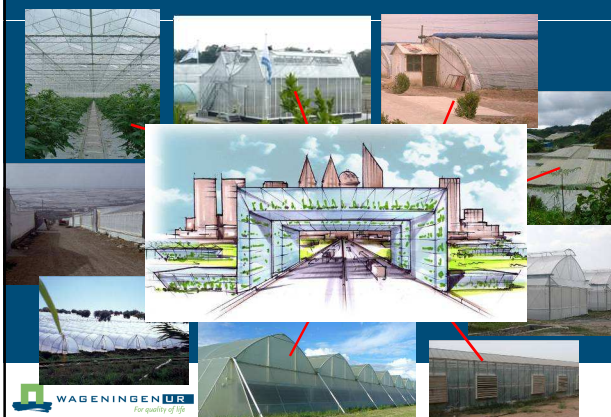


International project examples

- Sustainable greenhouse production (Mexico)
- Design of demonstration greenhouse (Turkey)
- Water efficient greenhouse (Saudi Arabia, UAE)
- Capacity building (Uganda)
- Integrated pest management (Ethiopia)
- Greenhouse design tropical low lands (Indonesia)
- Greenhouse horticulture (Malaysia)
- EU projects: Euphorus, Spicy, Flow-Aid, Crops)



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



Networking: co-creation/ innovation

- Scientific
- Growers
- Supply industry
- Advisory
- Education





Knowledge transfer and information

- Web site: www.glastuinbouw.wur.nl
- Publications:
 - In 2010 > 600
- Thematic days (5)
- Excursions
- Ca 3000 visitors (2010)

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