

A photograph of three children running through a golden wheat field under a blue sky. In the foreground, a girl with long brown hair, wearing a white floral dress, is running towards the right with her mouth open in a joyful expression. Behind her, a boy in a red t-shirt and blue jeans is also running. In the far background, another child in a pink shirt is visible. Two large, thin white circles are overlaid on the image, one centered on the girl's head and another partially visible behind the boy. The text 'For quality of life' is positioned in the upper left, with 'life' in blue.

# For quality of life



WAGENINGEN **UR**

*For quality of life*



For quality of life




**WAGENINGEN UR**

*For quality of life*

## Contents

1	Wageningen UR: expanding horizons in a changing world	6
2	Our strength: education, research and valorisation	16
3	Our contribution to healthy food and living environment	26
4	Facts about Wageningen UR	66

The image features a solid blue background. Two circles are overlaid on the right side of the frame. The larger circle is defined by a thin white outline. The smaller circle, positioned to the right and slightly below the center of the larger one, is defined by a thin dark blue outline. The text is centered within the larger white circle.

To explore  
the potential  
of nature to  
improve the  
quality of **life**



# 1 | Wageningen UR: expanding horizons in a changing world

Our world is changing. The population is growing fast and prosperity is increasing in many regions. Around the world, land use for food production is reaching its limits. The climate is visibly changing while fossil fuels are becoming ever scarcer. Meanwhile, people are attaching more importance to healthy, safe and sufficient food.

It is this changing world that is the real specialisation of Wageningen UR – the domain of good and safe food & food production, food security and a healthy living environment. In essence, Wageningen UR is a research institute that not only develops knowledge but also helps to apply it.

Our mission is: *'To explore the potential of nature to improve the quality of life'*. This is achieved together with industry, governments and research institutions around the world. In addition to our renowned fundamental research, Wageningen UR also has a strong global position as a supplier of application-oriented and field-based research. At the same time, we train many thousands of students from over a hundred countries to be professionals in the domain of 'healthy food and living environment' every year.



This combination of research, education and value creation has made us internationally successful. It is with good reason that we have the highest success rate in attracting EU funds for research and score so highly in international rankings and citation indexes. This is due to the Wageningen approach - the joint strengths of Wageningen University and specialised research institutes, and the connections between our scientific, technological and social disciplines. Furthermore, we are well aware that our partners – governments, companies and research institutes at home and abroad – need to achieve genuine social breakthroughs. This is also why we cooperate on a large scale in public-private partnerships, as well as in the form of confidential contract research.

Together we aim to continue to lead the way, bundling financial flows and using our knowledge to design applicable solutions for the major challenges faced by the world. This is the ultimate ambition of Wageningen UR.

Wageningen UR is a research institute that not only develops knowledge but also helps to apply it





## The campus

Wageningen Campus is an inspiring place where most research and educational activities take place. Scientists and students alike have access to excellent facilities, including high-tech laboratories, modern lecture halls and stimulating meeting places. These facilities are divided over several buildings, with the Forum being one of the landmarks. This building, which some say resembles a contemporary castle, hosts a large number of facilities, including Wageningen UR's extensive library. Orion also catches the eye: thanks to its exceptionally efficient energy use, this sleek, pentagonal education building is the most sustainable on campus.

The campus is increasingly taking on the function of a flywheel for innovation as more and more businesses in related industries open branches here. These include FrieslandCampina, one of the five largest dairy manufacturers in the world, as well as the Netherlands Institute of Ecology. Since these types of organisations carry out a lot of innovative research, it is attractive for them to be part of the campus, where they have direct access to Wageningen UR's knowledge.





## The campus is increasingly taking on the function of a flywheel for innovation

Companies looking to perform high-tech research and requiring specialised equipment for this purpose can turn to CAT Agrofood, the centre for advanced research in the agro food sector. The Microspectroscopy Centre Wageningen can help with optical, spectroscopic and microscopic research.

While our name suggests that we are located solely in Wageningen, we also have research and experimental facilities in 28 different places throughout the Netherlands. Lelystad is a site for our research into animal diseases and plants, for example, while ecological marine research is concentrated in the coastal towns of Den Helder, IJmuiden, Yerseke and on the island of Texel.

### Abroad

Wageningen UR is active in many regions of the world. From China to Chile and from Ethiopia to the Arctic, we work together with partners in research programmes. The goal is to improve food safety and food security, develop biobased products, materials and logistics chains, and determine the impact of



economic activity on the environment and people. Our ambition is to further strengthen our global position by providing comprehensive support to our clients as they seek the right partners inside and outside of Wageningen UR. Because we are increasingly active abroad, Wageningen UR now has five permanent offices outside the Netherlands, in Brazil, Chile, China, Ethiopia and Zambia. This makes it easier to coordinate projects and develop new initiatives.

### Sustainability

Sustainability is an important pillar in all the research and teaching activities of Wageningen UR. This is reflected in our mission: *'To explore the potential of nature to improve the quality of life'*.

Sustainability also plays an important role in our business operations as we aim to be at the forefront of developments in the Netherlands in this respect. For instance, our energy consumption is fully sustainable. Not only do our wind farms in Lelystad produce more energy than we consume, we also purchase one hundred per cent pure wind energy. In addition, we undertake other measures to reduce our CO<sub>2</sub> footprint, such as separating waste, using geothermal heat pumps and reducing energy consumption in our buildings. And, finally, Wageningen UR is well above the Dutch average in terms of sustainable procurement.

## Our domain: healthy food & living environment

Our 5,000 employees and 9,000 students are active within the domain of healthy food & living environment. This comprises three core fields which are strongly inter-linked:

### Health, lifestyle and living conditions

- How do we stay healthy for as long as possible?
- What is the relationship between food risks and consumer behaviour?
- What do consumers know about food quality and safety?

### Nutrition and food production

- How can we produce and distribute food more efficiently with as little use of fossil raw materials as possible?
- How do we guarantee clean and safe products on the shelves?
- How do we improve the shelf life of products without reducing food quality?
- What are the social consequences of food production worldwide?

### Living environment

- What is the influence of climate change on nature and landscapes?
- What are the consequences of social changes on land use?
- How can water supplies in the world be managed in a more sustainable way?
- Which sustainable solutions allow the management of conflicting claims on space?

# Our domain: healthy food and living environment

health, lifestyle and livelihood

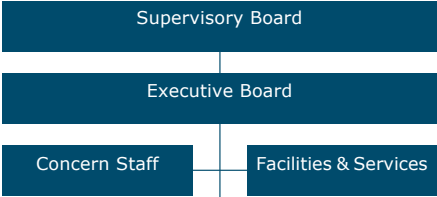


food and food production



living environment

# Organisation chart Wageningen UR



## Research and education combined

Wageningen UR is the cooperative framework of Wageningen University and the DLO Foundation, which comprises ten independent research institutes. The parties work together in five Science Groups. One department of Wageningen University is organisationally integrated within each Science Group together with one or more application-oriented research institutes. This combination of forces allows education and research to partner in focused, high-quality projects (see the organogram on the left page).

The combination of research, education and value creation has made us internationally successful







# 2 | Our strength: education, research and value creation

The work of Wageningen UR comprises three components: teaching, independent research and value creation. Translating knowledge into practical value makes us strong.

## Education

With 20 bachelor programmes, 31 master's programmes and six graduate schools, Wageningen UR is the world's leading supplier of scientific education in the healthy food and living environment domain. Our teaching has a strong international focus, which is underlined by the composition of our student population. Of the total number of students, 21% are non-Dutch. Most are from China, Germany, Ethiopia and Indonesia. In total, our students originate from over one hundred countries, making us the most international university in the Netherlands.

Wageningen UR's global reputation is also demonstrated by our top position in international rankings when it comes to the research areas of health, lifestyle & living conditions, food & food production, and living environment.

In addition to our BSc and MSc programmes, we offer short courses, on-the-job training and management training to professionals in the food, agricultural and pharmaceutical industries via the Wageningen Academy and the Centre for Development & Innovation.

## Research

Wageningen UR conducts scientific research across the board in the healthy food and living environment domain. This ranges from fundamental to applied research.

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### The five departments of Wageningen University

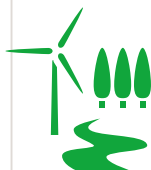
#### Agrotechnology & Food Sciences



#### Animal Sciences



#### Environmental sciences



#### Plant Sciences



#### Social Sciences



### Fundamental research

Fundamental research is primarily carried out by our university scientists and, due to the nature of our work, is often highly practical. Wageningen UR has 86 chair groups divided across five departments. Funding usually comes from the government or organisations for scientific research.

### Field-based research

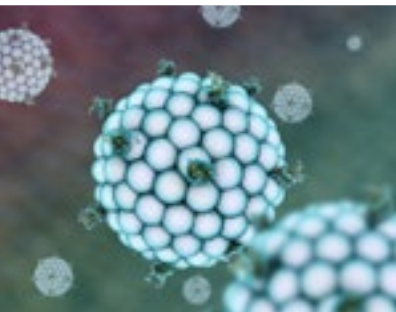
Field-based research is primarily the domain of ten independent research institutes at Wageningen UR. It is deployed to answer specific practical questions, allowing our scientists to find solutions in areas such as crop

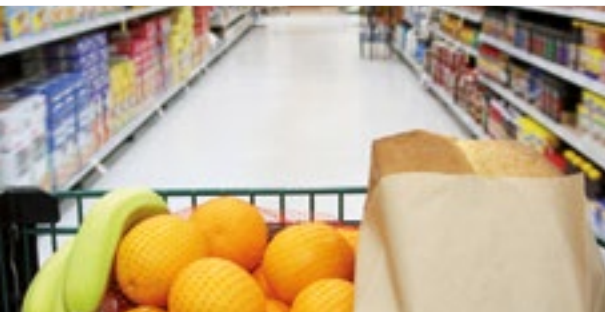
production, livestock farming, animal welfare and the environment based on practical knowledge and insights. Other research has led to the introduction of new farming systems in a sector. Furthermore, our scientists frequently test new varieties and breeds, often in cooperation with future users. Trade associations and companies usually provide a large portion of the funding for field-based research.

### **Application-oriented research**

A second type of research on which the research institutes work is application-oriented. This focuses in part on the development of expertise for practical applications. It includes, for instance, the development of biobased products as an alternative to petroleum-based products; new, sustainable production systems and processes; innovations that improve the functioning of agricultural chains; and applications that respond to climate change.

Another component is policy support. Examples include studies into the impact of new laws and regulations or the influence of social developments on the income of farmers.





Application-oriented research is commissioned by the government, industry and non-profit organisations. It is often conducted in partnerships with governments, other research institutes (potentially with Wageningen University) and Dutch and international companies. But we also perform a lot of contract research on behalf of specific clients. The results of public-private research are always available to the public, whereas research carried out on behalf of a given company means that publication of the results is subject to authorisation – possibly only once the parties involved have been made anonymous.

### **Independence**

Clients have no influence on research conclusions, which are solely based on facts we have determined and analysed in the studies. Wageningen UR also always notes in its research reports which parties funded the research.

We encourage the development of spin-offs, which valorise the acquired knowledge on the market

## Value creation

At Wageningen University and Research centre (Wageningen UR), we believe that a broad dissemination of results from our research contributes to creating added value through novel applications. Wageningen UR pays special attention to the transfer of knowledge and technologies by giving meaning and value to our scientific knowledge. Transfer of knowledge will, in many cases, be achieved in collaboration with industrial partners that also take care of the commercialisation of products. In other cases, new enterprises have been founded on the basis of Wageningen UR's knowledge or expertise. Value creation at Wageningen UR is provided in various ways;

- By educating and training students, and thereby supplying industry and society-at-large with new experts;
- By offering industry and non-profit organisations access to our knowledge infrastructure (facilities, tools, expertise, publications);
- By transferring our knowledge/technologies to both (long-standing or new) companies and non-profit organisations, where new applications can be realised for the benefit of society;
- By stimulating co-creation together with our stakeholders
- By helping start-up companies succeed and transfer Wageningen UR's technologies from the lab to marketplace for public use and benefit.

We invest the return of our commercialization efforts and use the added value from our investments to promote and aid further scientific investigation and research at Wageningen UR. However, our valorisation efforts often lead to the creation of added social value or contribution to society, such as in the case of research on animal welfare, or the assistance in national and international legislation or support for educational organisations.

Spin-offs in which  
Wageningen UR  
is shareholder:

- Bio-Product
- Ceradis
- Fresh Forward
- Green Dino
- Covaccine
- Isolife
- CAN-IT
- NSure
- Pepscan
- Surfix

Spin-offs established  
on the basis of  
Wageningen UR's IP:

- Biqualy
- Bfactory
- Byosis
- PhenoVation
- Prionics Lelystad
- Plant-e
- Waste2Chemical

## Our expertise

Within the healthy food and living environment domain we focus on seven specific areas of expertise. They are:

### **Biobased economy**

The biobased economy makes efficient use of crops and biomass for food, feed, materials, chemicals, energy and fuel. Wageningen UR carries out fundamental research, application-oriented research, field-based research and education in all these areas.

### **Coast and oceans**

People are already using coastal areas and seas for transport, fishing, sand extraction and recreation. They also provide opportunities for the production of sustainable and healthy food, wind energy and bioactive substances from seaweed and algae. Wageningen UR develops knowledge to exploit these opportunities further, as well as the expertise necessary for the optimal and sustainable use of space in densely populated deltas.

## Optimal and sustainable use of space





### **Market and chains**

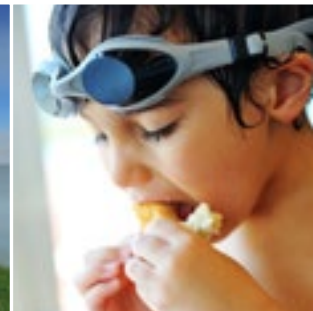
The Netherlands is a major world player when it comes to food. As much as 7.5% of global agricultural exports go through the Netherlands, which makes it the second largest agricultural exporter in the world. The Dutch knowledge of trade and logistics plays a crucial role in this achievement, and Wageningen UR makes a key contribution to strengthening that knowledge.

### **Nature & landscape**

Nature and landscape are important for many economic activities, such as recreation and agriculture. Yet while they provide a variety of benefits, their preservation and development are anything but clear-cut. Wageningen UR helps create a solid balance between economic, ecological, social and cultural-historical values.

### **Food and health**

Nutrition is crucial to our health. We need food to be safe and tailored to our needs. This area of expertise covers all aspects of human nutrition: the choice of food, the way we eat and drink, the way our body processes food and the effect of food on our health.



## **Food production**

Providing everyone with healthy food without causing environmental damage is the main challenge we face in the world today. This planet will be home to nine billion people by 2040 and food demands will have radically changed. At the same time, raw materials such as water and phosphate will become increasingly scarce and must be managed in a sustainable way. Wageningen UR contributes to designing solutions which allow twice as much to be produced with only half the resources.

## **Water and climate**

The climate is changing and global warming will cause a significant rise in sea levels over the coming centuries. Wageningen UR studies climate change while also working on solutions to address its causes and anticipate the consequences.

**Our main challenge: providing everyone with healthy food without causing environmental damage**



## Wageningen UR's research institutes

**Alterra** – Research aimed at the realisation of a high quality and sustainable green living environment.

**Central Veterinary Institute** – For the protection of animal and public health and for advice on animal diseases.

**Centre for Development Innovation** – For sustainable and fair development through knowledge, knowledge exchange and cooperation.

**Food & Biobased Research** – For applied research on sustainable innovation in healthy food, fresh food chains and biobased products.

**IMARES** – For research into marine ecosystems and the sustainable use and management of coastal areas and seas.

**LEI** – For socio-economic research and consultancy with regard to sustainable and economic developments in the healthy food and living environment domain.

**Livestock Research** – For fundamental, innovative and practical solutions aimed at sustainable and profitable farming.

**Applied Plant Research** – For applied research and co-innovation with partners from various agricultural sectors, science, industry and government.

**Plant Research International** – For research into the potential of plants to resolve issues regarding food, raw materials and energy.

**RIKILT** – For specialist research and advice on food safety.



# 3 | Our contribution to healthy food and living environment

## **A few examples of the impact of our research**

Monitoring systems for financial security 28 | Deltafacts unlock knowledge for district water boardsh 30 | Clarifying the relationship between water quality and fish welfare 32 | Improving resistance to Panama disease 34 | Increasing knowledge of nutrition & cancer 36 | Successfully building with nature 38 | Tools for the proper care of cows 40 | Increasing yields for small farmers in Ethiopia 42 | Monitoring purchasing behaviour in virtual supermarket 44 | FOODSECURE shines a new light on food security 46 | Concrete advice to reduce acrylamide levels 48 | Research into sustainable development in the Arctic 50 | Cooperation on innovative breeding programmes 52 | Consumers find organic food healthier 54 | Bacterium as nitrogen fixing agent 56 | Pioneers in sustainable dairy farming 58 | App leads the way in nature reserves 60 | Improving shelf-life and health 62 | Joint vision on food safety 64





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# Monitoring systems for financial security

North America is an important market for Dutch sweet pepper growers, but the demands imposed on exporting companies are stringent: if harmful insects are found, there is a risk of trade embargos. Reliable monitoring systems can save companies millions of euros in income losses while ensuring the continuance of their export activities.

## **Trade activities**

In 2009 the African codling moth was found on a sweet pepper being transported to North America via the Netherlands. Although the pepper was not a Dutch product the borders were closed to all Dutch pepper growers, leading to millions of euros of losses in the sector. Thanks to a close collaboration between the sweet pepper sector, the Dutch Food and Consumer Product Safety Authority and Wageningen UR, immediate measures were taken.

Two years earlier, scientists of Plant Research International, part of Wageningen UR, had used pheromone traps to develop

a reliable monitoring system for the African codling moth. These short lines of communication facilitated a swift response in 2009. The monitoring system developed by Wageningen UR was immediately deployed by the sector, and within a few weeks it was able to use an adequate sample survey to prove that the Dutch companies were 'clean', allowing the companies to continue their export activities.

## **More monitoring programmes**

The collaboration also resulted in effective programmes for monitoring the Mediterranean fruit fly and the tomato leaf miner, for example. Due to the high level of expertise and the well-functioning network of companies, authorities and Wageningen UR, the Netherlands is able to respond faster than any other country. The result: no long-lasting trade embargos and no major losses for sweet pepper growers.

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# Deltafacts unlock knowledge for district water boards

District water boards in the Netherlands are responsible for water safety and the provision of clean water. Performing these duties well, both now and in the future, requires a wealth of knowledge. Alterra, Wageningen UR's research institute for green habitats, is working with fellow knowledge institute Deltares to make this expertise accessible via information sheets called Deltafacts.

## **Water management in changing climate**

Alterra and Deltares are developing the factsheets on behalf of the Dutch Foundation for Applied Water Research (STOWA), the centre of expertise for the district water boards. The tasks of these boards are increasingly complex, and climate change is altering the conditions too. STOWA's Deltaproof knowledge programme collates expertise on water safety and fresh water, with contributions by Alterra and others. This know-how is then shared in the Deltafacts, with

each factsheet focusing on one topic; for instance how district water boards can use the soil as a buffer in a more efficient way; or what they could do to keep the infrastructure intact in case of flooding.

## **Best possible information Fact-based measures**

To ensure that the Deltafacts are based on the most accurate information, STOWA entered into a partnership with Alterra and Deltares. The focus of Alterra is mainly on ecological and agricultural aspects. The starting point for the development of the Deltafacts are questions by the district water boards, based on which Alterra and Deltares unlock existing knowledge and develop new insights wherever necessary.

The Deltafacts are available on the internet via [www.deltafacts.nl](http://www.deltafacts.nl).

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# Clarifying the relationship between water quality and fish welfare

Fish farmers usually provide a degree of water quality that stimulates the growth of fish. But how does the water quality affect fish welfare? The Dutch Ministry of Economic Affairs commissioned IMARES to research the matter.

## **Ammonia**

One of the experiments was focused on African catfish in water containing increasing levels of ammonia. The scientists analysed the effects of these rising levels on food intake, as well as on the growth, physiology of the gills and blood composition. In the experiment, a proper growth and unaffected gills reflected adequate fish welfare. As soon as the ammonia levels rose above 0.34 milligrams per litre, there was a clear reduction in growth and

food intake as well as clear changes in the gills and blood. In practice the ammonia level in the water of fish farms is lower, and does not result in negative effects.

## **African catfish**

What applies to catfish does not necessarily apply to other fish species, however. The African catfish, for instance, tolerates high levels of ammonia, nitrite and nitrate, which is why scientists are also carrying out experiments with pike perch which live in various conditions in the wild.

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# Improving resistance to Panama disease

The Panama disease is a major threat to food security in the world. This devastating fungal disease is threatening banana cultivation in Southeast Asia, and has recently also reached the Middle East and Africa. Wageningen UR is involved in various research programmes that aim to ensure a healthy future for the banana, which is the main source of income for hundreds of millions of people.

## Arms race

The Panama disease is caused by the soil fungus *Fusarium* and has a devastating effect: it wipes out complete plantations and leaves the soil contaminated for decades. Wageningen UR conducts research into this disease, for which there is unfortunately currently no cure. Examples of initiatives include the *Interdisciplinary Research and Education Fund* (INREF), of which Wageningen UR is a cornerstone, and which focuses on the development of tools and methods to provide banana farmers with the most efficient means to guard against the spread of the fungus. The institute is also working on a genetic method to make crops resistant to the Panama disease. *Tropical*

*Race 4*, a highly destructive variant of the fungus, is the subject of special attention.

## Fundamental knowledge

Wageningen UR also coordinates a research programme by the Royal Dutch Academy of Sciences. In the framework of the *Scientific Programme Indonesia Netherlands* (SPIN), scientists are accumulating fundamental knowledge about the interactions that take place between the banana genome, the *Fusarium* bacterium and the soil. The programme also focuses on the human factor: examples include helping banana farmers detect the disease themselves and prevent spread as early as possible, and defining which cross-border measures are needed to make the Panama disease more manageable.

These are some of the ways in which Wageningen plays an important role in the global research effort aimed at effectively expanding and deploying expert knowledge on bananas.

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# Increasing knowledge of nutrition & cancer

Poor nutrition, insufficient exercise and being overweight are the cause of cancer in 30 to 40 percent of all cases. There is an enormous need to disseminate knowledge about nutrition and cancer, both before and after it has been diagnosed.

## **Relationship nutrition and cancer**

There has been a great deal of research into the relationship between nutrition and cancer worldwide, including by Wageningen UR. As a result we have a reasonable insight into the products we should or should not eat. Only one to five percent of all cancer cases is hereditary. Additionally we have shown that people with a hereditary form of colon cancer (Lynch syndrome) can reduce the risk of cancer if they eat healthy food, maintain a Body Mass Index below 25 and refrain from smoking.

## **Nutrition to survive cancer**

An example of research into the role of nutrition in cancer survival includes a study among 1000 patients with colon

cancer. The research is financed by the World Cancer Research Fund. In the coming years we will be studying whether a high vitamin D-status is beneficial to these patients. Another example is a study among women with breast cancer as part of a research programme for the Alpe d'HuZes foundation and the Dutch Cancer Foundation (*KWF Kankerbestrijding*). Here we research changes in body composition during chemotherapy and the role of nutrition and exercise.

## **Food supplements**

We also study the preventive use of food supplements among 'healthy' people, as well as by people with colon cancer. Recent studies show that a critical attitude is beneficial: products such as beta-carotene, selenium and vitamin E-supplements did not show any cancer-preventive effects.

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# Successfully building with nature

The growth of the global population and rising sea levels are increasing the pressure on ecosystems. Low-lying delta regions are most impacted by these developments. *Building with Nature* is a sustainable and cost-efficient method for solving ecological problems by using natural processes as building blocks.

## **Sand engine**

IMARES, Wageningen UR's knowledge institute for applied maritime ecological research, is a recognised authority in the application of Building with Nature concepts. These concepts are typically supported by a consortium of companies, government and research institutes. An example is the 'sand engine' off the Dutch coast; a hook-shaped man-made peninsula of 21.5 cubic metres of sand. Due to the influence of wind, currents and waves, the sand spreads, causing the coast to replenish itself naturally. This ensures better protec-

tion of the land, while providing more space for nature and increasing biodiversity.

## **Oyster banks**

Another example can be found in the Dutch province of Zeeland, where the storm surge barrier in the Oosterschelde waterway is causing a rapid widening of the tidal area. Forming new, natural oyster banks on a substratum of dead oyster shells prevents erosion of the sand bars.

## **Process-oriented**

Typical for the approach is its process-orientation. This means that the question of which stakeholders will be involved in a project and how communication will be realised is answered at the initial stage to avoid solutions that cannot be realised in practice.

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# Tools for the proper care of cows

The Dutch cattle industry continues to grow. But how can the sector ensure that it does not affect the animals' health? In the Smart Dairy Farming project we work with partners in the chain to develop new tools, methods and sensors which improve the life expectancy and welfare of cows, and increase production.

## **Monitor and manage**

The innovations we are working on are tools for dairy farmers to monitor and manage individual animals. They include pedometers, devices on milking machines and ways to measure animal feed. These intelligent tools provide insight into the developments of individual cows. For example, how is their bodyweight developing? How much feed are they ingesting? How are they behaving? What is the best time for insemination? The tools

help dairy farmers make the right choices in caring for the animals. A well-tended cow benefits health and life expectancy.

## **Increasing sustainability**

Smart Dairy Farming is a pilot project that will run until 2015. The tools, methods and sensors developed are tested in practice at six dairy farms and at the Dairy Campus of Wageningen UR in Friesland, after which they are distributed to as many companies as possible in the sector. These firms then contribute to making Dutch cattle farming more sustainable thanks to this project, which was commissioned by dairy producer Friesland-Campina.

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# Increasing yields for small farmers in Ethiopia

Using best practices to improve the yields of small farmers in Ethiopia is the goal of the CASCAPE project. Alterra, Wageningen UR's knowledge institute for green habitats, is in charge of the project.

## **Upscaling successful innovations**

With the CASCAPE project we support the Ethiopian government in its goal to strengthen the position of the country's small farmers. Examples include mapping the problems which farmers encounter in practice, as well as the opportunities for increasing their yield. We also scientifically determine the results of best practices and other innovations, and study ways in which farmers are willing to innovate. Finally, we determine how successful innovations can be applied on a large scale.

## **Stimulating cooperation**

Agricultural innovations are only viable when all partners in the chain (farmers, NGOs, businesses, universities, research institutes and policy makers) work together. We stimulate this cooperation by connecting these partners at various levels.

## **Ambitious**

CASCAPE is an ambitious project: if the goals are realised, it will have a considerable impact on policy makers, agricultural officials and farmers. And by taking into account short and long-term effects, we expect the project to contribute to the sustainable growth of Ethiopian agriculture.

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# Monitoring purchasing behaviour in virtual supermarket

What moves consumers to purchase one product and not the other? In the Albert Heijn supermarket located in one of the buildings of Wageningen UR, scientists follow the behaviour of test persons to the smallest detail. A unique feature is that the supermarket is actually a powerful computer.

## **Albyte Heijn**

Via three large monitors, test persons 'step' into the supermarket. Using scroll arrows and a shopping list, they work their way past the refrigerated sections and shelves while scientists monitor their every move: What route do they take? Where do they stop? What products do they put in their baskets?

## **Real life research**

The virtual supermarket is an addition to existing types of real life research into consumer behaviour which are

available to companies in the food industry. This type of research is also performed in the Restaurant of the Future on the campus of Wageningen UR. The location is used to test consumer behaviour of lunch guests using, among other things, 21 cameras. Real life research is also performed at specific locations, such as nursing homes.

## **Testing new products**

The virtual supermarket offers a wealth of research opportunities. For example, it can be used by companies to test new products on the virtual shelves to help them make well-informed decisions. It also facilitates tests on the effects of nudging, whereby consumers are stimulated in small steps to purchase more sustainable and healthier products.

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# FOODSECURE shines a new light on food security

Why do some regions in the world face food insecurity and others not? Within the EU research programme FOODSECURE, scientists from LEI are looking for explanations and effective solution strategies.

## **Politics and hunger**

FOODSECURE is a partnership between LEI and seventeen other knowledge and research institutes from Europe, Ethiopia, China and Brazil. The project was developed based on the need for scientific strategies to tackle global hunger and malnutrition. Recently it has become increasingly clear that political policy decisions have a major influence on food insecurity. This shines a new light on the causes that traditionally explained the issue.

## **Better plans**

FOODSECURE is focused on the development of a toolbox containing advanced models and databases. The project part-

ners use it to help national governments and organisations such as Unicef, the WHO and FAO to find effective solutions for reducing food insecurity. Although many of the current solutions have short-term benefits, they are often counterproductive on the long term. Shutting down food export, for example, is one of the measures that seem useful because it causes the national food supply to grow, which in turn reduces prices. However, such an approach does not stimulate farmers to invest in new technology. Using models from the toolbox should provide a better insight into the effects of policy decisions and help governments and NGOs to develop better strategies.

FOODSECURE is part of the seventh framework programme for research and development of the EU, and was started in 2012.

## **Contact**

*thom.achterbosch@wur.nl*





# Concrete advice to reduce acrylamide levels

Baking and frying food products releases the potentially carcinogenic compound acrylamide. Wageningen UR took part in the European HEATOX study, which analysed the health risks of acrylamide and offered advice based on the results. One of the recommendations was to fry pre-fried chips at 175°C rather than 180°C.

## **Pre-fried chips**

Scientists from Wageningen UR Food & Biobased Research and Wageningen University focused on reducing the levels of acrylamide in industrially pre-fried chips. They developed a model to calculate the acrylamide level. This model, the FrySimulator, led to the recommendation to fry chips at a lower temperature. Manufacturers have taken the advice and included the recommendation on their chips packaging.

## **Maillard reaction**

Acrylamide is caused by a reaction

between sugars and amino-acids at a high temperature; and it is one of the compounds developed in the Maillard reaction. This reaction occurs when baking and frying products such as bread, biscuits and chips. Eliminating acrylamide completely is impossible: heating food is an important way of killing harmful bacteria and gives products their colour, aroma and flavour.

## **Toolbox**

The HEATOX study was part of the basis for the Acrylamide toolbox from the Confederation of the Food and Drink Industries in Europe (FoodDrinkEurope). This toolbox provides food producers with instructions that allow them to reduce acrylamide levels in processed foods, sometimes in collaboration with their suppliers.

## **Contact**

[charon.zondervan@wur.nl](mailto:charon.zondervan@wur.nl)





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# Research into sustainable development in the Arctic

The retreat of the sea ice means that the Arctic is becoming more accessible to humans. The area offers many economic opportunities, but they are at odds with the vulnerability of the ecosystem and the people who live here. Wageningen UR examines how ecology, economy and people can go hand in hand.

## **Economic activities**

Our research institutes IMARES, Alterra and LEI are developing tools to determine the impact of industrial activities on ecosystems and people. For instance, we develop biological indicators to measure the effects of various activities. We do this in Spitsbergen, for instance, by analysing water beds and the organisms living there (shellfish, worms) for traces and effects of chemicals.

## **Exotic organisms**

The intensification of shipping through the Northwest Passage increases the risk that non-native plants and animals

end up in the Arctic ecosystem. These organisms reach the area by becoming attached to hulls or travelling in the ballast water of vessels. Using DNA techniques we develop monitoring tools to better understand this transportation of exotic organisms. We also investigate whether current ballast water treatment is effective at lower temperatures.

## **Human impact**

We also work on indicators to chart changes affecting local populations in the Arctic. This allows us to analyse links between new activities and long-term social, economic and cultural consequences. This includes the importance of the Arctic region as a habitat, food source and cultural identity.

## **Contact**

[www.wageningenUR.nl/arctic](http://www.wageningenUR.nl/arctic)  
[www.wageningenUR.nl/triplepatsea](http://www.wageningenUR.nl/triplepatsea)  
[martine.vandenheuvel-greve@wur.nl](mailto:martine.vandenheuvel-greve@wur.nl)



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# Cooperation on innovative breeding programmes

Strengthening the position of the Netherlands as a place for innovative breeding is the ambition behind Breed4Food, a cooperative framework between Wageningen UR and four companies from the animal breeding sector.

## **DNA information**

In Breed4Food, Wageningen UR's Animal Breeding and Genomics Centre (ABGC) has joined forces with CRV (dairy and beef), Hendrix Genetics (laying hens, turkeys, pigs, salmon), TOPIGS (pigs) and Cobb Europe (broilers). The aim is to effectively use DNA information in breeding programmes. This also allows the improvement of characteristics that are harder to measure, such as the efficient use of 'resources' and the robustness of animals.

## **Animal and human welfare**

The partners realise that innovation in

breeding programmes is required to improve their competitiveness and to meet the growing global demand for quality animal protein. Breed4Food aims to contribute to increasing the added value in the food chain, realising a smaller ecological footprint and providing a better response to the changing needs of consumers. A condition for every innovation is that it should contribute to the health and welfare of humans and animals.

## **Top institute**

The partners in Breed4Food aim to become the Dutch top institute for the cattle breeding sector in the Netherlands. The Dutch government sees Breed4Food as a promising example of a partnership between industry and science, and provides the programme with financial support.

## **Contact**

[sipkejoost.hiemstra@wur.nl](mailto:sipkejoost.hiemstra@wur.nl)





# Consumers find organic food healthier

Why do consumers buy organic food? LEI, Wageningen UR's research institute for socio-economic issues, investigated this question and concluded that people see organic as healthier. The packaging plays an important role too.

## **'Organic is poison-free'**

Many consumers who buy organic products do so because they assume that they are healthier than conventional ones. But why exactly they think this was not known until recently. Research by LEI shows that consumers are convinced that organic products are healthier due to the absence of toxins, chemical pesticides and fertilisers. The belief that organic products contain positive nutrients plays a less important role.

## **Product packaging**

LEI also researched the effect of product packaging. It compared a number of packaging features and determined the extent to which they contribute to a product appearing sustainable and attractive. The study shows that the style of the picture on the packaging has the most influence. Of the techniques investigated, the 'photo style' was found to contribute most to attractiveness and the perception of sustainability. Logos were a close second. Text contributes much less to the desired appearance, although the term 'organic' works well here too.

## **Contact**

[elvi.vanwijk@wur.nl](mailto:elvi.vanwijk@wur.nl)

# Bacterium as nitrogen fixing agent

---

The world is expected to have to feed nine billion people in 2050. Ensuring that there is enough food for everyone will be a major challenge. Wageningen UR works actively to improve food security on many fronts around the world. One example is Africa, where a nitrogen fixing bacterium allows leguminous plants to provide for their own needs in nitrogen.

## **Fertile soils**

Food production in Africa lags way behind other parts of the world. Many farmers work on unproductive soils and there is often insufficient artificial fertiliser.

A good example is the small-scale farmers who grow peanuts, beans and soy south of the Sahara. In the international research project N2Africa, scientists from Wageningen UR work with partners to increase yields for these farmers. The Rhizobium bacterium plays a key role.

## **Symbiosis**

The idea is simple: in order to grow fruits need nitrogen. Leguminous crops can get it from the air as well as from the soil. The Rhizobium bacterium helps them do this, receiving sugars and carbon from them in return. This symbiosis makes plants less dependent on artificial fertiliser provided by farmers.

## **Doubling yields**

Farmers are being taught to add the Rhizobium bacterium to the soil simultaneously with the seeds of leguminous crops. Moreover, new crop varieties have been introduced and crop management has been improved. This project has already reached 250,000 farmers and initial results indicate that it should be feasible for them to double their yields in the future.

## **Contact**

[ken.giller@wur.nl](mailto:ken.giller@wur.nl)







# Pioneers in sustainable dairy farming

The fact that sustainability and a profitable operational management go hand in hand is shown by the 'Cows & Opportunities' (*Koeien & Kansen*) project; a classic example of a successful public-private partnership.

## **Income and environment**

Cows & Opportunities, which ran from 1998 to 2013, saw sixteen dairy farmers test and economically evaluate sustainable innovations for the Dutch Ministry of Economic Affairs and the Dutch Dairy Board under the supervision of Wageningen UR. The underlying idea was that innovation is necessary to achieve the environmental goals which apply to dairy farming.

## **Leading group**

The strength of the 'triangle' of government, industry and science is that all partners are determined to come to solutions and realise them in practice. The sixteen companies served as the

lead group, and will be followed by other dairy farmers taking over the successful innovations. A good example is the Excretion Indicator (*Excretiewijzer*) which allows dairy farmers to easily analyse the mineral cycles within their companies.

## **De Marke**

One of the crucial links in the Cows & Opportunities project has been testing company De Marke, part of Wageningen UR, where innovations are tested that are too risky for ordinary companies. This includes opportunities to deposit phosphate from cow manure in a profitable way using biorefinery.

Cows & Opportunities shows that many measures have two distinctive effects: a positive environmental impact and increasing income for dairy farmers.

## **Contact**

[www.koeienenkansen.nl](http://www.koeienenkansen.nl)  
[michel.dehaan@wur.nl](mailto:michel.dehaan@wur.nl)

# App leads the way in nature reserves

Over 160 Dutch nature reserves are included in the Natura 2000 network. The goal of this European network is to recover and preserve biodiversity in the EU. Alterra, Wageningen UR's knowledge institute for a green living environment, developed an app to guide visitors through these reserves.

## **Information technology**

The Natura 2000 app, developed for iPhones and Androids, provides answers to questions such as: 'Where is the nearest Natura 2000 area?', 'Which specific plants and animals live here?' and 'What are the borders of the reserve?'. A unique feature of the app is that it uses LAYAR technology for augmented reality: the camera gives visitors extra information based on their current location. This information can be

augmented with location-specific videos about the cultural-historic value of an area, as tested in the Sint Jansberg region. Visitors are also able to take photos and share them with the world via social media.

## **Practical applications**

The Dutch Ministry of Economic Affairs, which commissioned the app, sees it as an example of how modern technology can improve communication with the general public and other parties. A large part of the information is from the Ministry's Natura 2000 database, which is managed by Alterra. The Ministry regularly commissions Alterra for research.

## **Contact**

[anne.schmidt@wur.nl](mailto:anne.schmidt@wur.nl)





Orange

250 ml fresh juice  
picked and pressed

Apple  
Pear  
Raspberry

250 ml fresh juice  
picked and pressed

# Improving shelf-life and health

Fresh fruit products that are three weeks old and yet remain as tasty and healthy as fresh products - this has been achieved via high-pressure processing, one of the mild preservation techniques developed by Wageningen UR together with various companies.

## **Mild preservation**

Mild techniques such as high-pressure processing, pulsed electric field processing and cold plasma eliminate harmful micro-organisms, while preserving flavours and aromas. With the increasing shelf-life of fresh products, companies can now deliver the same quality anywhere in the world. Moreover, less food is wasted as the products do not perish so quickly.

## **High-pressure pasteurisation and sterilisation**

High-pressure processing extends the shelf-life of cooled products by processing them under pressure of up to 600 MPa. The technique is now widely applied in the market. We are now working on a similar tech-

nique on a laboratory and pilot scale, called high-pressure sterilisation (HPS). Combining high pressure with heating above 90 degrees for a brief period inactivates bacterial traces, ensuring that products have a longer shelf life even when not refrigerated.

## **High voltage**

Together with the industry, we proved the effectiveness of pulsed electric field processing on an industrial scale. This technique makes it possible to produce safe fruit juices that retain a fresh quality for a period of three weeks. In the process, products are subjected to a pulsed electric field at a high voltage. We are also making progress in the field of cold plasma in which we use cold gases to disinfect the surfaces of food product packaging. In collaboration with the industry we are working on gaining further insight into the functioning of cold plasma and taking the first steps toward upscaling.

## **Contact**

[ariette.matser@wur.nl](mailto:ariette.matser@wur.nl)



# VLEES

MALS EN (H)EERLIJK VLEES



ELKE DAG VERS  
GESNEDEN

PRECIES ZOALS  
U DAT WILT

EEN ONSJE  
MEER OF MINDER



# Joint vision on food safety

---

Our food supply is globalising and becoming increasingly complex. These changes impact food safety. In the European project Collab4Safety, Wageningen UR is working with global partners to find solutions for current and future food safety issues.

## **EU and trade partners**

The project includes universities and knowledge institutes from eight countries. In addition to the Netherlands these are the UK, France, Portugal, Russia, Poland, China and Brazil. RIKILT, the research institute of Wageningen UR focused on food safety, is in charge of the project. It is essential that the project includes partners from various continents as food safety issues exist everywhere, and can spread quickly due to our global trading system. The goal of Collab4Safety is to develop a joint vision on food safety among EU countries and their trade partners.

## **Recommendations**

The first step in the project is for the participating parties to map information on research, methods, knowledge & information, training activities and legislation in the field of food safety. This is necessary to evaluate the similarities and differences between the various countries. Eventually this will lead to recommendations on issues such as possible collaboration between chain partners, as well as measures to prevent and manage food risks in the food chain.

Collab4Food started in 2012 and will last four years.

## **Contact**

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# 4 | Facts about Wageningen UR

Wageningen University 68

Students 70

Alumni 72

Employees 74

Partnerships 76

Historical timeline 78

Turnover and Funding Sources 80

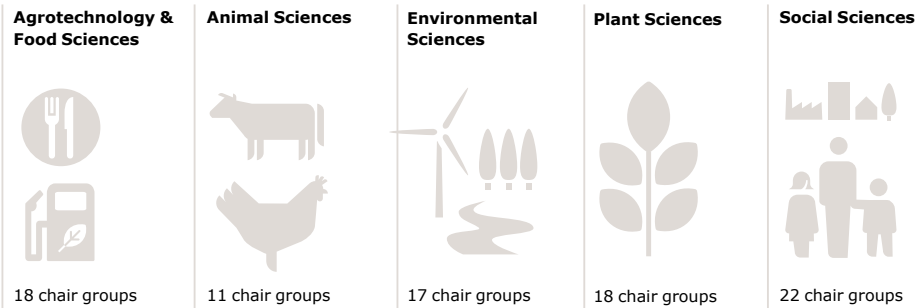
Locations 82

Output 84

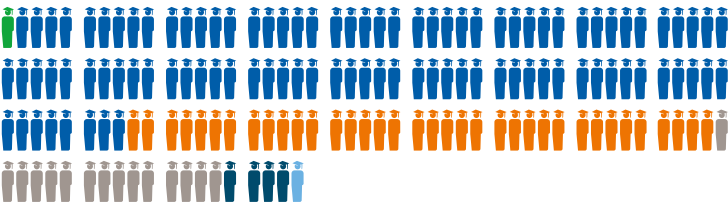
1  
faculty

5  
departments

86  
chair groups



professors



- Rector magnificus 1
- Chairplan 97
- Personal chairs 36
- Professors and endowed chairs (fte) 15
- International education 4
- Honorary professor 1



---

## 20 Bachelor's programmes

Agrotechnology  
Management, Economics and Consumer Studies  
Biology  
Biotechnology  
Surface, Water, Atmosphere  
Forest and Nature Conservation  
Animal Sciences  
Health and Society  
International Land and Water Management  
International Development Studies

Landscape Architecture and Planning  
Food Technology  
Environmental Sciences  
Molecular Life Sciences  
Orientation on Life Sciences  
Plant Sciences  
Applied Communications Science  
Tourism (taught in English)  
Nutrition and Health  
Economy and Policy

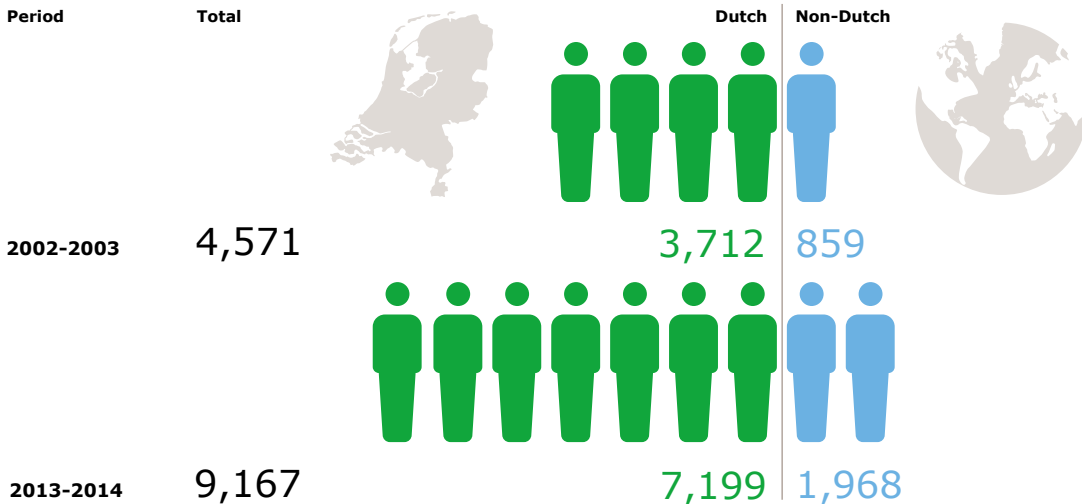
## 31 Master's programmes

Animal Sciences  
Applied Communication Science  
Aquaculture and Marine Resource Management  
Bioinformatics  
Biology  
Biosystems Engineering  
Biotechnology  
Climate Studies  
Development and Rural Innovation  
Earth and Environment  
Environmental Sciences  
Food Quality Management  
Food Safety  
Food Technology  
Forest and Nature Conservation  
Geographical Information Management and Applications  
Geo-information Science

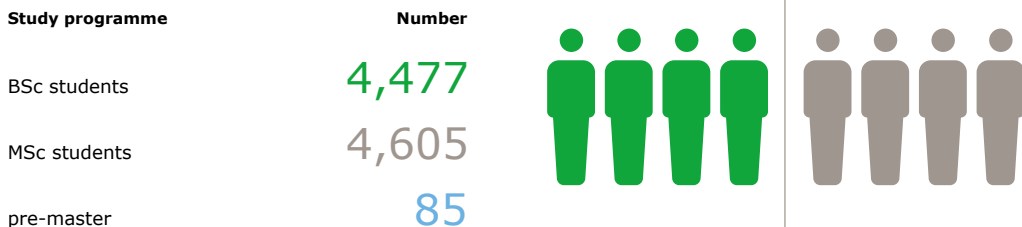
Health and Society (specialisation)  
International Development Studies  
International Land and Water Management  
Landscape Architecture and Planning  
Leisure, Tourism and Environment  
Management, Economics and Consumer Studies  
Molecular Life Sciences  
Nutrition and Health  
Organic Agriculture  
Plant Biotechnology  
Plant Sciences  
Urban Environmental Management  
Water Technology

# Students October 2013

## Number of students excluding PhD students

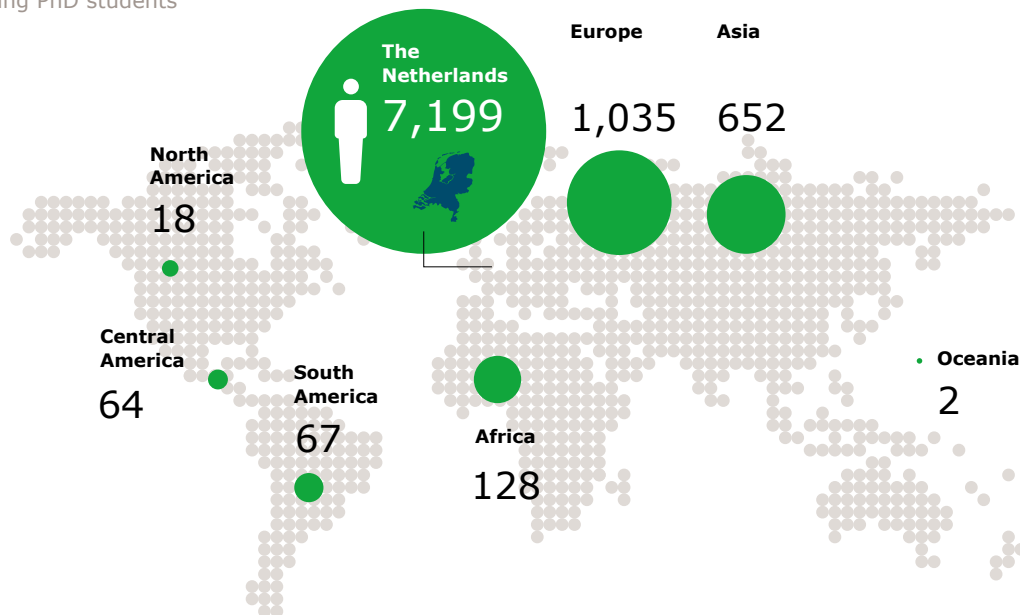


## Number of students per study phase October 2013



## Origin of students

excluding PhD students



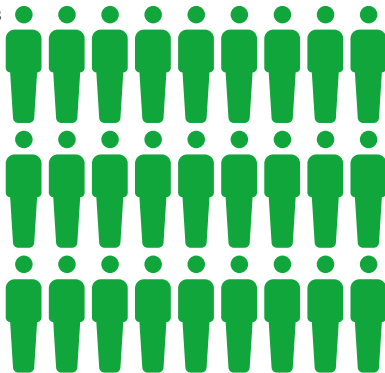
**113**  
nationalities

Afghanistan, United States of America, Argentina, Australia, Bangladesh, Belarus, Belgium, Benin, Bolivia, Bosnia, Botswana, Brazil, United Kingdom, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cyprus, Denmark, Germany, Ecuador, Egypt, Eritrea, Estonia, Ethiopia, Philippines, Finland, France, Gabon, Gambia, Georgia, Ghana, Greece, Guatemala, Honduras, Hungary, Ireland, India, Indonesia, Iraq, Iran, Israel, Italy, Ivory Coast, Japan, Yemen, Cameroon, Kazakhstan, Kenya, Kuwait, DR Congo, Croatia, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Morocco, Mexico, Moldova, Mongolia, Burma (Myanmar), Namibia, Netherlands, Nepal, Nicaragua, New Zealand, Nigeria, Norway, Ukraine, Uzbekistan, Austria, Pakistan, Peru, Poland, Portugal, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Serbia, Singapore, Slovenia, Slovakia, Sudan, Spain, Sri Lanka, Suriname, Syria, Tajikistan, Taiwan, Tanzania, Thailand, Czech Republic, Togo, Tunisia, Turkey, Uganda, Uruguay, Venezuela, Vietnam, Zambia, Zimbabwe, South Africa, South Korea, Sweden, Switzerland

## Number of alumni

41,111

### The Netherlands



33,100

### Europe



2,346

### Outside Europe



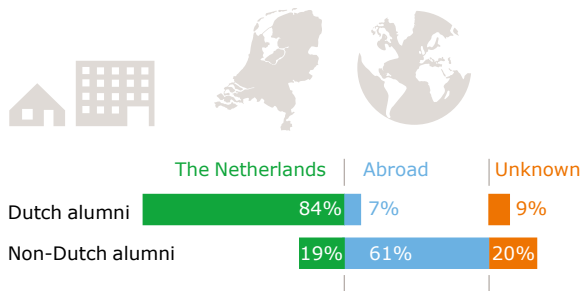
5,129

unknown 536

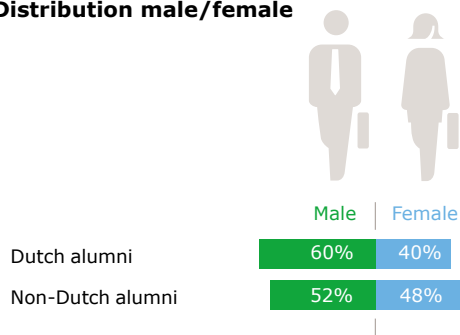
## Average graduates per year



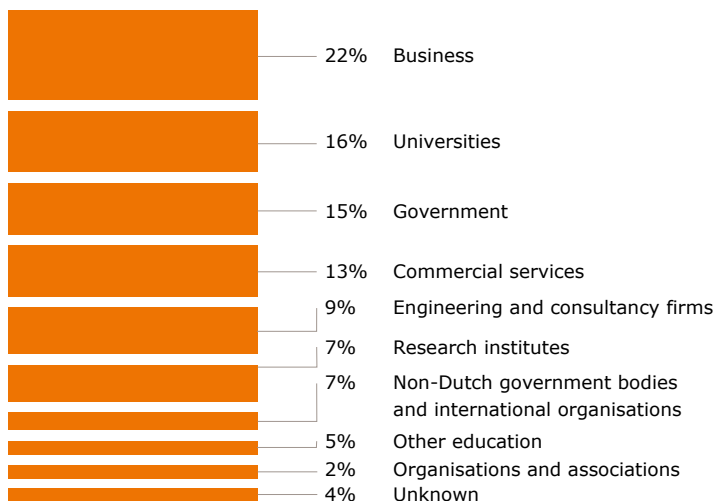
## Living and/or work location



## Distribution male/female



## Market sectors in which Wageningen alumni work



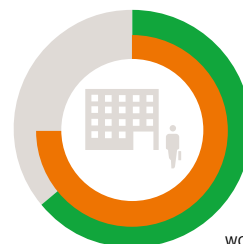
## Labour market opportunities

64%

find interesting work within their specialist field within three months after graduation.

75%

of the alumni with job, obtained a function in their own specialism one year after graduation.

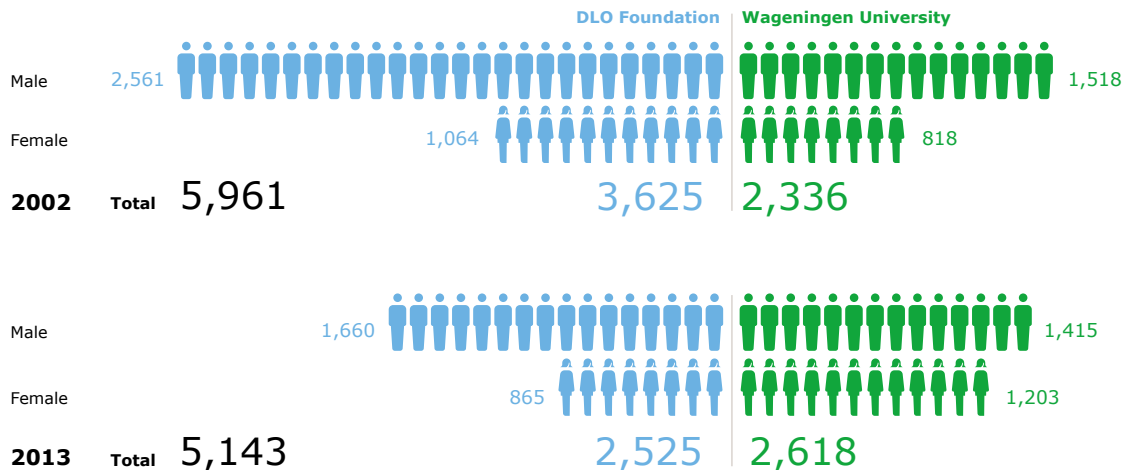


WO monitor 2013



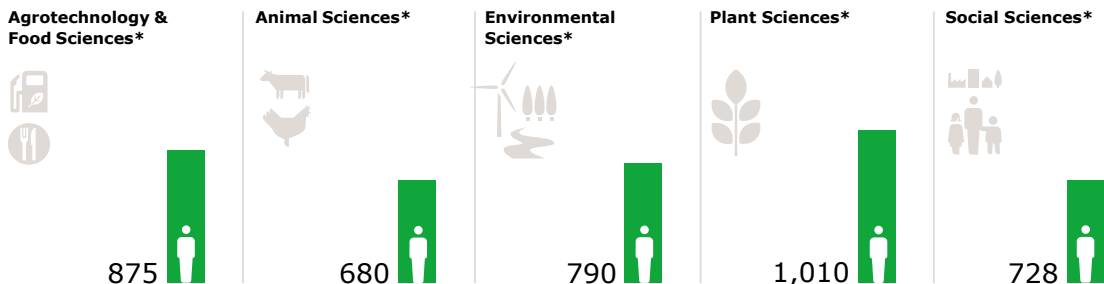
# Employee October 2013

## Number of employees in fte



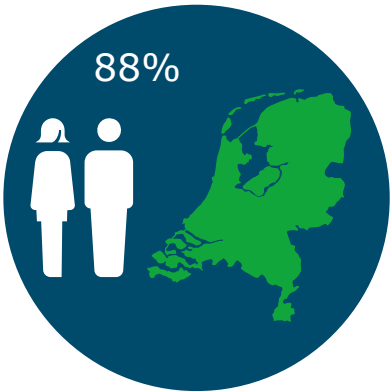
## Number of employees per organisational unit (2013, in fte)

\* Sciences groups

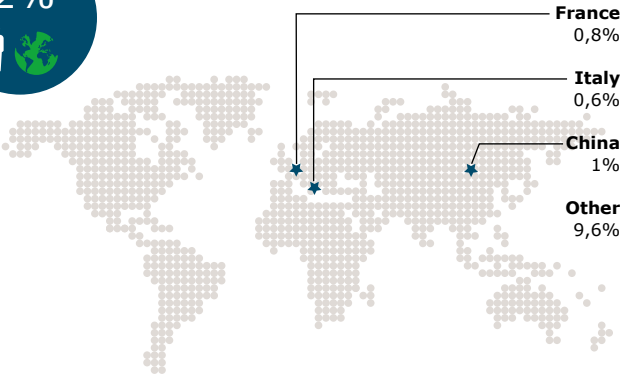


Nationalities of employees, in fte

Dutch



Non-Dutch



IMARES



RIKILT



Wageningen International



Wageningen Academy



Corporate Staff & Facility Services



# Examples of collaborative partnerships

- **AlgaeParc**

This facility for micro-algae research on the edge of Wageningen Campus is financed with money received from the Dutch Ministry of Economic Affairs, the Province of Gelderland and Wageningen UR. The research itself is funded by users.  
[www.wageningenUR.nl/algaeparc](http://www.wageningenUR.nl/algaeparc)

- **CAT AgroFood**

The Centre for Advanced Technology AgroFood (CAT-AgroFood) utilises facility-sharing to give access to Wageningen UR's state-of-the-art research facilities to researchers from all organisations. Top sectors Horticulture & propagating materials and AgroFood  
Top sectors are areas in which the Dutch business community and research centres excel on a global scale. The business community, universities, research centres and the Dutch government work together on knowledge and innovation in order to continue to strengthen this position of excellence.  
[www.wageningenUR.nl/catagrofood](http://www.wageningenUR.nl/catagrofood)

- **Dairy Campus**

Educational institutions, research institutes and governmental bodies work together within Dairy Campus to create a meeting space for study programmes, work placements and graduation procedures and for research and innovative projects in the dairy sector.  
[www.dairycampus.nl](http://www.dairycampus.nl)

- **FoodValley Foundation**

Food Valley NL works in proximity to and in cooperation with many national and international food companies and highly-respected knowledge institutes to bring knowledge and entrepreneurship together in a targeted way, thereby creating a breeding ground for further innovation from within Wageningen UR.  
[www.foodvalley.nl](http://www.foodvalley.nl)

- **FoodValley region**

Regio FoodValley is a partnership between eight municipalities totalling 330,000 residents. This partnership has the goal of developing the FoodValley region into Europe's leading agro-food centre and into a leading international region for knowledge and innovation in the area of healthy, sustainable food.  
[www.regiofoodvalley.nl](http://www.regiofoodvalley.nl)

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- **Wetsus**

Wetsus, the centre for sustainable water technology, is a research institute which unites the forces of the business community and leading universities and research institutes. As a top technological institute, Wetsus develops innovative, sustainable water technologies. Together with three universities, more than 40 companies – multinationals and small and medium-sized businesses – participate in Wetsus.

*[www.wetsus.nl](http://www.wetsus.nl)*

- **Science Shop**

The Science Shop of Wageningen UR mediates research questions from civic and community organisations, action groups and associations in the areas of sustainable agriculture, rural development, nature & the environment and consumers & food.

*[www.wetenschapswinkel.wur.nl](http://www.wetenschapswinkel.wur.nl)*

**We are well aware that our partners need to  
achieve genuine social breakthroughs**

# Historical timeline

## Wageningen University

**1876**

The state takes over the local council's Agricultural College in Wageningen: the start of National Agricultural Education in The Netherlands.

**1904**

Wageningen education has been developed to a higher level and the institution is now called the National Higher College of Agriculture, Horticulture and Forestry.

**1918**

Wageningen's status as an institute of higher education is legally ratified, and it becomes the National Agricultural College on 9 March 1918.

**1986**

In accordance with amendments to the Academic Education Act, the Agricultural College is now called the Agricultural University.

**1956**

Post-war developments in education and research necessitate new legislation: the Agricultural College Statute.

**1968**

From now on the Agricultural College is subject to the same law that governs other universities: the Academic Education Act.

## DLO

**1877**

Foundation of the first agricultural research station in Wageningen (predecessor to the current research institutes).

**1888**

The National Institute for Fisheries Studies is set up in IJmuiden (now part of Wageningen IMARES).

**1898**

Establishment of the National Agriculture Testing Station in Maastricht.

**1919**

A forestry research station is established (now part of Alterra).

**1903**

Establishment of the National Dairy Station in Leiden.

**1899**

Botanical gardens are established at Westland and Boskoop (now part of PPO). The government agricultural research station for seed inspection (part of the current PRI) becomes a separate organisation.

**1936**

Establishment of the Institute for Research and Processing of Fruit and Vegetables in Wageningen (now part of Agrotechnology & Food Sciences Group).

**1938**

Establishment of the DLO Research Institutes.

**1940**

Establishment of the International Economics Institute (LEI).

**1976**

Establishment of RIKILT. The result of a merger of the National Agriculture Testing Station in Maastricht and the National Dairy Station in Leiden.

**1971**

Establishment of PHLO (now part of Wageningen Academy).

**1951**

Establishment of the International Agricultural Centre (IAC).



## Wageningen UR

### 1997

The formation of Wageningen University and Research Centre (Wageningen UR) begins; the Agricultural University merges with the DLO Research Institutes and the Institutes for Applied Research.

### 1998

Official launch of Wageningen UR, following a staff merger. The Agricultural University officially becomes Wageningen University.

### 2000

Alterra and PRI are established within Wageningen UR.

### 2001

PPO, IAC, PV, ILRI and ISRIC become a part of Wageningen UR.

### 2002

CIDC Lelystad is established.

### 2002

Decision to form campus.

### 2008

CIDC Lelystad and the Infectious Animal Diseases section of the Animal Sciences Group join together to form the Central Veterinary Institute.

### 2007

Opening of Wageningen Campus and Forum.

### 2006

RIVO, in cooperation with parts of Alterra and the Department of Ecological Risks of TNO, establishes Wageningen IMARES.

### 2005

IAC, the North-South Centre and the 'Europadesk' merge to become Wageningen International.

### 2004

Cooperation VHL Van Hall Larenstein University of Applied Sciences becomes part of Wageningen UR.

### 2003

PHLO merges with Wageningen Business School.

### 2010

NIOO establishes itself at the Wageningen Campus.

### 2010

New construction of RIKILT, arrival of nVWA (Netherlands Food and Consumer Product Safety Authority) labs.

### 2011

Opening of AlgaeParc.

### 2012

Wageningen University has the highest number of students in its history, and growth continues.

### 2012

Zodiac comes to the Campus.

### 2012

Opening of Impulse.

### 2012

Start of disengagement of Van Hall Larenstein

### 2013

FrieslandCampina Innovation Centre establishes itself at the Wageningen Campus.

### 2013

Stoas establishes itself at the Wageningen Campus.

### 2013

Opening of Orion.

# Financial figures

Agrotechnology & Food Sciences Group  
Turnover: € 99 mln

Animal Sciences Group  
Turnover: € 104 mln

Environmental Sciences Group  
Turnover: € 90 mln

Plant Sciences Group  
Turnover: € 132 mln

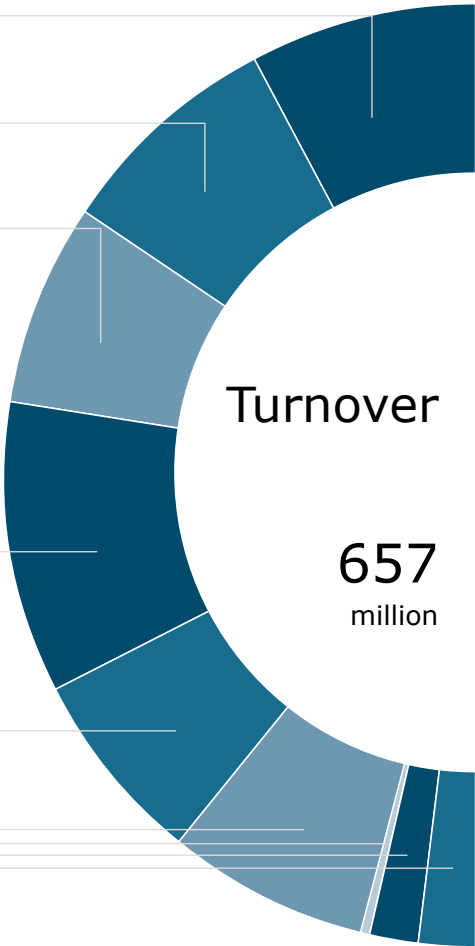
Social Sciences Group  
Turnover: € 87 mln

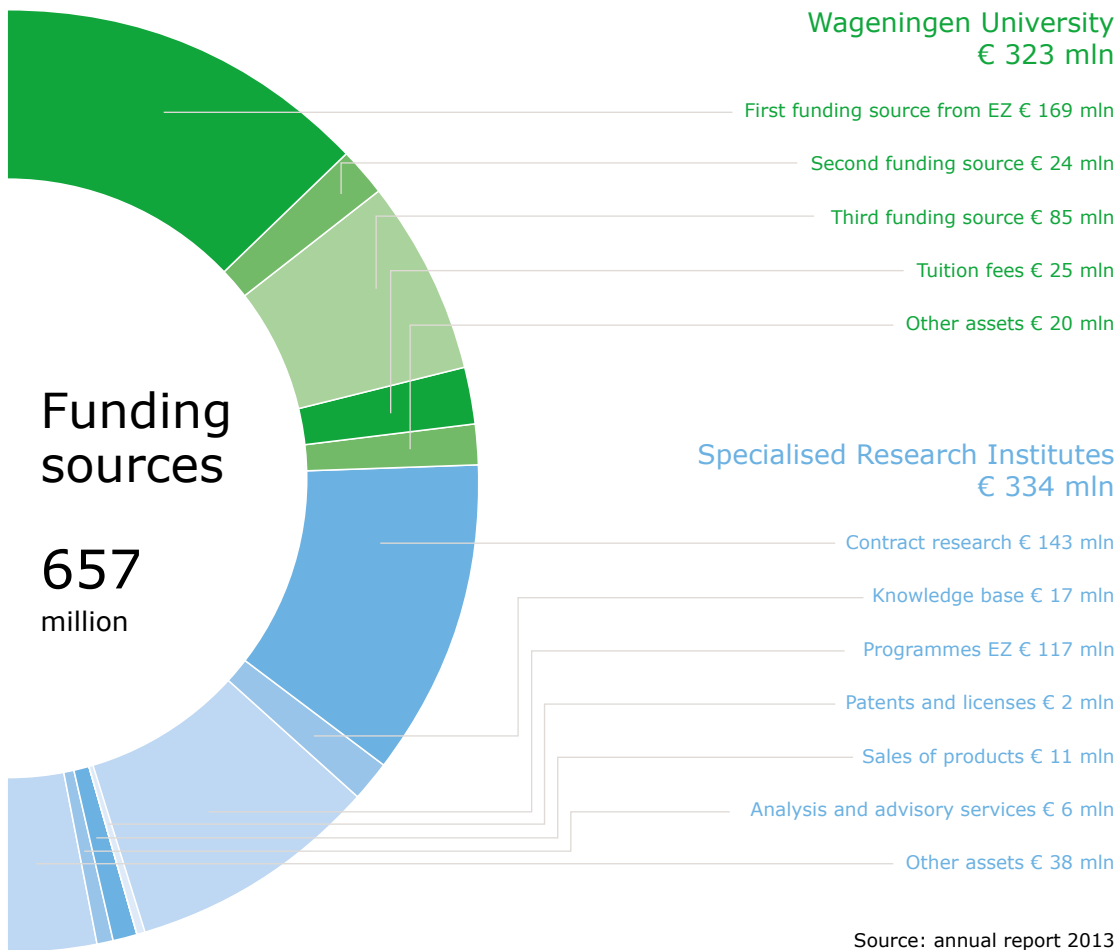
Central divisions  
Turnover: € 95 mln

Wageningen Academy  
Turnover: € 1 mln

RIKILT – Institute of Food Safety  
Turnover: € 22 mln

IMARES  
Turnover: € 27 mln





Source: annual report 2013

# Locations

## Locations in the Netherlands

**Wageningen University**

Wageningen, 1

**Wageningen Academy**

Wageningen, 1

**Agrotechnology & Food**

**Sciences Group**

Wageningen, 1

**Animal Sciences Group**

Hengelo (Gld.), 2

Lelystad, 3

Sterksel, 4

Wageningen, 1

Zegveld, 5

**Dairy Campus**

Leeuwarden, 6

**Environmental Sciences**

**Group**

Renkum, 28

Wageningen, 1

**IMARES**

IJmuiden, 7

Yerseke, 8

Den Helder, 9

Texel, 10

**Plant Sciences Group**

Bleiswijk, 12

Lelystad, 3

Lisse, 13

Marwijksoord, 14

Nagele, 15

Randwijk, 16

Valthermond, 17

Vredepeel, 18

Wageningen, 1

Westmaas, 19

**RIKILT**

Wageningen, 1

**Social Sciences Group**

Alkmaar, 20

Assen, 21

Dalfsen, 22

Den Haag, 11

Goes, 23

Haaksbergen, 24

Huissen, 25

Leeuwarden, 6

Lelystad, 3

Meijel, 26

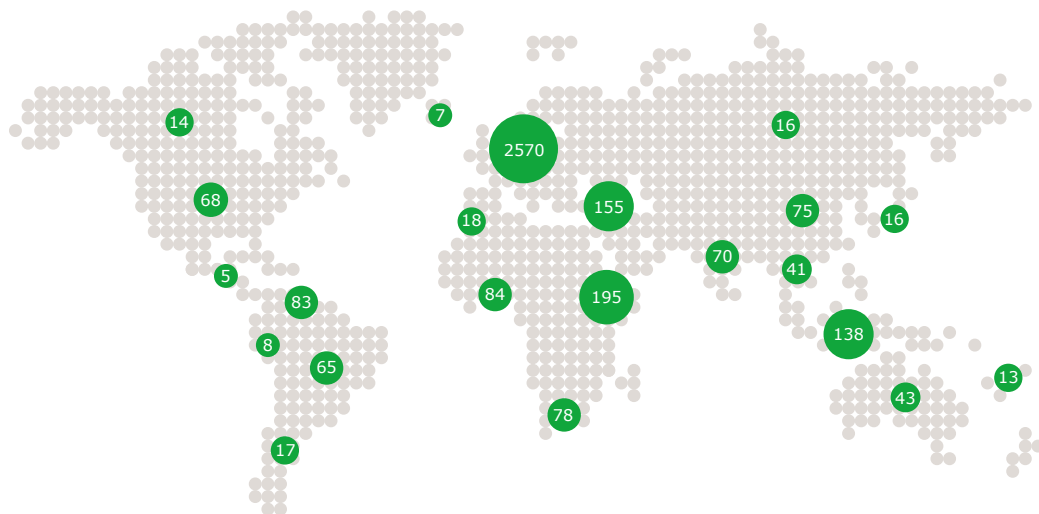
Oosterwijk, 27

Wageningen, 1



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## Wageningen worldwide



Wageningen UR is active in many regions of the world. From China to Chile and from Ethiopia to the Arctic, we work together with partners in research programmes.



# Output/scientific prominence

## Output 2013

PhD theses

273

Scientific publications in journals  
with an impact factor > 20 (e.g.  
Nature, Science)

28

## Veni, Vidi, Vici in 2013

Veni	Vidi	Vici
8	2	1

## Ranking 2013

WU-ranking in QS World  
University Rankings, Agriculture  
and Forestry

2

WU-ranking in National Taiwan  
University Ranking, World  
Universities 2012, Agriculture

1

WU-ranking in Times Higher  
Education World University  
Rankings 2012-2013, Life  
Sciences

22

WU-ranking in CWTS Leiden  
Ranking World Universities

78

WU-ranking in *Keuzegids  
Hoger Onderwijs in full time  
university education 2014*

1 (10 years running)



## Colophon

### Publisher

Wageningen UR, Corporate Communications

### Design, photo editing and illustrations

Wageningen UR, Communication Services

### Photography

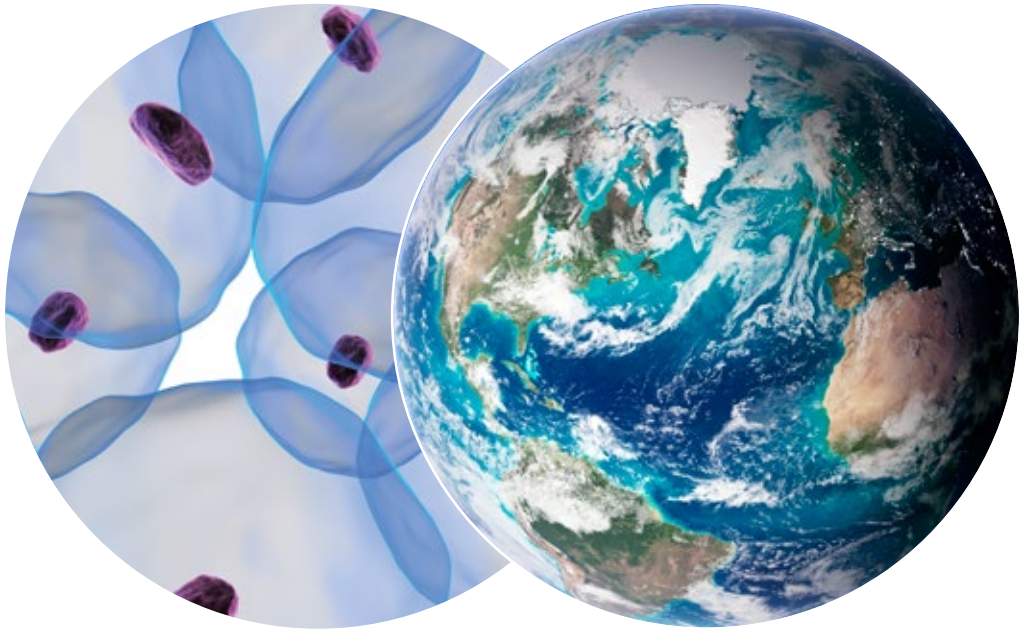
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Bart de Gouw, Hollandse Hoogte, N2Africa, Sam Rentmeester, <https://beeldbank.rws.nl>,  
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November 2014

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