The Netherlands: a producer country or an innovation lab?
Krijn Poppe, page 26
RESISTANT POTATO IS READY
Using Wageningen gene technology, potatoes can be produced which require very little pesticide to ward off potato blight. But genetic modification is a sensitive issue and a decision in Brussels is anxiously awaited.

END OF PRODUCER NETHERLANDS?
Tomato growers and pig farmers in the Netherlands are struggling, while breeders and machinery manufacturers are flourishing. Should the Netherlands bank on technology and leave bulk production to other countries?

DOING MORE WITH MANURE
Wageningen UR is trying to persuade farmers in developing countries to do more with the manure from their livestock. This could help supply energy, improve soils and cut greenhouse gas emissions. The first results are being seen in Vietnam.
UPDATE
News in brief about research and developments at Wageningen UR.

16 IMPACT: DUTCH QUINOA IN THE SHOPS
This year sees Dutch quinoa in shops for the first time. Wageningen provided suitable varieties and is advising farmers on the cultivation.

18 INTERVIEW: FRANS KOK
Frans Kok retired as professor and head of the Human Nutrition department in October. ‘It is increasingly clear to us that the key to a good diet is not individual nutrients but nutritional patterns.’

22 AFRICAN VULTURES THREATENED
They get eaten, poisoned by farmers and poachers, and used in traditional medicines. As a result African vulture populations have fallen by 80 percent in the last 50 years.

32 INNOVATION: SMARTPHONE SCREENS FOR DOPING
RIKILT Wageningen UR has developed a method of detecting banned hormones in cows.

FEATURES

40 LIFE AFTER WAGENINGEN: DESULPHURIZING GAS
University friends Jan Klok and Thierry Wessels ran into one another again in the oil and gas industry. One researches the desulphurization of gas using bacteria; the other sells this clean purification technology.

44 UNIVERSITY FUND WAGENINGEN
The Leniger Bruin Kühn Fund supports food technology at Wageningen University. We meet the founders.

46 ALUMNI
News for alumni of Wageningen University, part of Wageningen UR.

48 PERSONALIA
Information about the lives and fortunes of alumni of Wageningen University.

50 KLV
News from the KLV Wageningen Alumni Network.

Refugees on the move

‘When Europe suddenly found itself in the grip of a ‘refugee crisis’ this summer, it almost seemed as though this stream of refugees has come out of nowhere. But the civil war in Syria started causing mass migration in the Middle East years ago. Those coming into Europe now are mainly people migrating onwards because they have realized that their period of exile in the region is going to go on for a long time. They weigh up the pros and cons of the life of an illegal immigrant in the region, a long stay in a refugee camp or an expensive and dangerous crossing to Europe.

It is difficult for policy to cater for the fact that refugee situations often last longer than expected and gradually take the form of ‘accidental cities’, sometimes housing hundreds of thousands of people. In these camp cities the United Nations and NGOs become the government, and humanitarian economies grow up which gradually make these places part of the social and political landscape. We see an example in the large Dadaab and Kakuma camps in Kenya, which have been in existence since 1992. And we see it too in the four-year-old camp at Al Zaâtri in Jordan, which is already one of the biggest cities in the country. Residents of such camps come and go, open a shop, trade and make use of the urban facilities. Nomads settle there so that their children can go to school. If the prospects seem better elsewhere, a new wave of migration can be set off. That continuous movement of refugees, currently in the direction of Europe, is now starting in the Middle East. The system of provision in camps shows that host countries do not want refugees integrating, but the camps themselves become embedded. That is the ambiguity of these kinds of places. The ‘Jungle’ in Calais exists thanks to people who are travelling on to the United Kingdom, and yet the camp is becoming more and more permanent. This phenomenon raises new questions about humanitarian governance and the strategies of aid organizations and host countries.’

Anthropologist Bram Jansen is assistant professor of the Sociology of Development and Change at Wageningen University. His specialism is research on humanitarian aid to refugees.
Plant-based beef

Researchers from Wageningen University have developed a meat substitute based on pulses which has the bite of a chunk of real meat.

To produce this 'plant-based beef', the researchers from Food Process Engineering made use of something called Shear Cell Technology, with which it is possible to mould plant material until it has the fibre structure of a beefsteak. The new technology was first used to make fibres from dairy proteins. Processing plant-based proteins in pulses such as soya beans is a lot more complex but the researchers managed to identify the mechanisms by which plant proteins form structures.

'To really produce sustainably, the focus must be shifted to plant-based production,' says Professor Atze Jan van der Goot to explain the significance of the development. 'Far less energy is consumed in the production of plant proteins than of animal proteins.'

The new technique is not limited in format so it can be used to make more products besides the familiar little stir-fry pieces. Working with colleagues from the Technical University of Delft, the Wageningen researchers built a prototype machine that could produce plant-based meat cuts of several kilos. But how long it will take before the new sustainable meat substitute is on the market, Van der Goot cannot tell. ‘The prototype still needs further development for that’. Eventually local butchers should be able to produce the meat substitute themselves. They will need to use natural flavourings to give the product flavour.

The vegetarian beefsteak was presented by The Vegetarian Butcher on 1 November. Together with the Peas Foundation, this company that makes and sells meat substitutes is a key partner in the study.

Info: atzejan.vandergoot@wur.nl
Video: https://youtu.be/bNNVyVbNPq4

The Netherlands tackles food waste

Since July the Netherlands has been a pilot country for an approach intended to reduce preventable food waste by 30 percent, maximize the value of unavoidably discarded food and packaging, and lower the costs of waste management. The trial is part of the European project REFRESH, led by Wageningen UR. The aim is for the research project to result in guidelines for the industry and consumers to help them cut waste and reduce the CO₂ impact of the food system.

Info: Toine.Timmermans@wur.nl

Wageningen University in the Top 50

Wageningen University is among the top 50 universities in the world. In the global ranking published by The Times Higher Education in October, Wageningen shot up from 73rd to 47th place, the highest position of any Dutch university. And for the third year running, the National Taiwan University (NTU) Ranking 2015 pronounced Wageningen the best agricultural university in the world. Wageningen rose too in the QS World Universities Ranking 2015.

Meanwhile, the quality of Wageningen University drew praise at home in the Netherlands as well. The most satisfied students are those in Wageningen, concluded Elsevier weekly magazine from its survey to find the best degree programmes in the Netherlands. And in the Dutch degree guide Krugzicht Universiteiten 2016, Wageningen University came out top for the 11th year running, with 15 top-rated degree programmes. Info: jac.niessen@wur.nl
Tally: three trillion trees on Earth

There are 3,040,288,194,283 trees on Earth with a girth of more than 10 centimetres at chest height, says a study published in Nature in September.

This is eight times more than was previously assumed. One in five of these trees are in Russia, which makes 4,461 trees per Russian. The Netherlands, on the other hand, has no more than 20 trees per inhabitant. Researchers took the first tally on a global scale based on satellite images and 430,000 ground-based observations. Combining these with data on climate, topography, vegetation, soil composition and human activity, they were able to build models for estimating the number of trees per square kilometre all around the world. ‘We already had a fair idea of the total forest surface area and the decrease in it in the various regions,’ says Geerten Hengeveld of Alterra Wageningen UR, who was involved in the international study. ‘But to really understand the role of trees in global climate change, timber supply, biodiversity, the biobased economy and people’s livelihoods, this new knowledge is indispensable.’

Info: geerten.hengeveld@wur.nl

Royal interest in Chinese Loess Plateau

During his state visit to China in October, King Willem-Alexander of the Netherlands visited the Loess Plateau near the Yellow River – green once again, thanks in part to Wageningen research. Rector magnificus Arthur Mol was present too.

Due to centuries of erosion, much of the rich soil on the plateau has been washed into the river, causing problems downstream. Thanks to replanting, terracing and the imposition of grazing restrictions, this semi-desert landscape has become green again and has been saved for food production.

Wageningen researchers are now working with local parties on ways of dealing with the pollution of the soil and water with pesticides, and the falling volume of river water downstream now that the region has become greener.

Info: coen.ritsema@wur.nl

Innovating Incubation Biology and Hatchery Management

The poultry sector is innovating at a fast pace all around the world. In the past two decades new knowledge has been gained about the incubation of eggs, but many new questions remain to be answered. What is the best way to store and treat eggs before incubation? How does incubation temperature influence the development of the embryo? And what are the best practices during the hatching phase?

In the Incubation biology and hatchery management course, Wageningen Academy offers new insights from research and developments in the field. The course aims at enriching the knowledge of professionals. The knowledge is translated into practical applications that are useful in daily practice.

14 and 15 March 2016 | Course leaders Dr Henry van den Brand, Wageningen University, and Dr Ron Meijerhof, Poultry Performance Plus

More information on www.wageningenacademy.nl
Salt water is not a waste stream

Salt where possible, fresh where necessary, and create water cycles. That is the motto for Water Nexus, the new research programme in the field of delta and water technology which is a joint initiative of Shell, Dow Chemicals, Fugro, water and other companies and several science institutes.

Wageningen UR heads this six million euro research programme, which is funded by the business world, the Ministry of Infrastructure and Environment and technology foundation STW. ‘Water containing lots of salts is seen as waste at the moment, but forms a valuable resource in a sustainable water supply,’ explains project leader and professor Huub Rijnaarts.

At Dow in the Dutch town of Terneuzen, a closed water cycle of 25 million cubic metres of water per year is under development, using brackish water. The cycle does away with the need for a pipeline bringing fresh water from the Biesbosch nature area to Terneuzen. The method will also be of interest to other industries in regions with little fresh water and plenty of brackish water. A study is also being done on the feasibility of using salt water released by oil drilling for the cultivation of non-food crops for biobased applications.

Info: huub.rijnaarts@wur.nl

Intensive farming is drying up China

The main cause of drought on farmland in northern China is not climate change but the intensification of agriculture and fertilization.

This conclusion was published by Ryan Teuling of Wageningen University and his international colleagues in Scientific Reports in July.

Northern China is one of the most densely populated regions in the world. Agriculture there has been highly intensified since the 1980s in order to boost food production. In the same period, the soils in this region dried out faster than anywhere else in the world, causing a decrease in the volume of water transported by the big local rivers such as the Yellow River. For the study Teuling analysed satellite data from the period 1983-2012. The expansion of the area under cultivation, the increased cultivation of thirsty crops such as maize, and the increased use of fertilizer have obviously had a big impact on moisture levels in the soil. Teuling: ‘The impact is greater than that of climate change, i.e. changes in temperature and precipitation.’

Experiments with varying quantities of fertilizer also reveal a big impact on evaporation due to the increase in biomass. This can make a difference of 100 millimetres over a season. Info: ryan.teuling@wur.nl

Digital lab animal

Toxicologist Jochem Louisse of Wageningen University has developed a ‘digital lab animal’ with which to estimate the toxicity of substances throughout the human body.

In October he was awarded the Willy van Heumen foundation’s prize (15,000 euros) for research into alternatives to animal testing. The new method applies a computer model to in vitro research on individual cells. The computer model calculates where the substance has accumulated in the body and the changing concentration of the substance in the blood. The method renders much animal testing redundant and speeds up research on product safety.

Info: jochem.louisse@wur.nl
Asphalt with lignin tested for real

Since the summer a trial surface of bio-asphalt developed in Wageningen has been in place on an industrial estate in Sas van Gent in the Dutch province of Zeeland. The asphalt in the 70-metre trial strip is made of 50 percent lignin, the material which lends plants their rigidity.

Researchers at Food & Biobased Research discovered last year that lignin possesses characteristics similar to those of fossil fuel-based bitumen. Lignin adheres well, is easy to process and expands or shrinks very little in rain or sun. Lignin-rich waste streams come from the production of bio-ethanol in the paper industry. The trial will run for two years. Wageningen UR will also be studying the possible substitution of biomaterial for bitumen in roofing materials.

Info: richard.gosselink@wur.nl, https://youtu.be/m9M8d1a-AJQ

Hapsnapp gives you food for thought

Did you know that the average Dutch person consumes 60 kilos of bread per year? And that the onion is one of the most widely eaten vegetables in the world? Wageningen UR’s new app, Hapsnapp, contains another 250 odd facts like this which have come out of Wageningen research on what we eat, from breakfast to dinner. The app responds if the user reports, for example, that they have had a slice of bread for breakfast, offering new insights and food for thought - about salt levels perhaps. The app also tries to encourage you to look up more in-depth information on blogs. And it recommended a visit to the Food Camp event on Wageningen campus on 10 December. The app is an experiment and forms part of the dialogue which Wageningen UR seeks to engage in with the wider society. The Hapsnapp was launched in September at the opening of the academic year, is available for both Android and Apple, and was downloaded a few thousand times within two months.

Contact: susanne.laven@wur.nl, video: https://vimeo.com/139571215

Model calculates taste of melon

Wageningen UR has developed calculation models which can predict the flavour of fruit and vegetables. Plant breeders could use the model in their breeding programmes to preselect at an early stage and relatively cheaply. The models use several parameters for flavour characteristics which can be measured in the laboratory. For tomato, for example, the balance between sweet and sour flavours is important, and for bell peppers bitterness comes into the picture too. This type of screening is available not just for tomatoes and bell peppers but also for Galia melons and, from next year, for strawberries.

Info: wouter.verkerke@wur.nl

Automatic fries machine

Working together with StartLife and Wageningen UR, the Dutch startup Caenator has developed a new type of fully automatic French fries vending machine. The machine is quiet, odourless and safe, and uses frozen fries. Once the customer has paid it takes just two minutes to weigh, fry and serve the fries. Sauces, salt and a fork are supplied separately.

Wageningen UR helped the company address the technical challenges such as avoiding damaging the fries in transport, maintaining a temperature of -18°C next to a fryer and keeping it odourless. It also helped with drawing up the business plan.

Info: jan.meiling@wur.nl
African farmers can triple harvest

Agricultural harvests in many African countries can be tripled; those in Bangladesh can be doubled. If grain harvests do not go up, these regions will face land scarcity and food shortages within decades.

These conclusions are expressed by researchers from Wageningen UR and the University of Nebraska Lincoln in the online Global Yield Gap Atlas. The yield gap is the difference between farmers’ current average harvests and what should be possible given the potential and the available water supply.

Mapping this difference makes a significant contribution to identifying the causes of failing harvests, the regions in which new techniques or resources can have the most impact, and the right priorities for policy and research. The yield gap in Africa has not got much smaller in recent years, the researchers note.

They draw their conclusions from data on, for instance, actual harvests, the best yields achieved at research stations, and crop simulations. They evaluated crops of maize, sorghum, millet, wheat and rice grown by farmers in Burkina Faso, Ethiopia, Ghana, Kenya, Mali, Niger, Nigeria, Tanzania, Uganda and Zambia, in Bangladesh and in several western countries.

In the ten African countries farmers get on average only 20 to 30 percent of the potential harvest from their land. The yield gap is smaller in Bangladesh but there too, the harvests could almost be doubled if the farmers used better seeds, took better care of their soil, used water more efficiently and got diseases and pests more under control.

In countries such as Morocco, Tunisia and Jordan, actual production stands at 40 percent of the potential level. Figures from other countries including India, Uruguay and several eastern European countries are still to come in.

The atlas and the research data are available digitally on http://www.yieldgap.org. Info martin.vanittersum@wur.nl

Resolution appeals for soil conservation

At the Wageningen soil conference Soil Science in a Changing World in August, the soil scientists and policymakers present adopted a resolution. They made three commitments: to study which soil-related measures can contribute to realizing the UN’s sustainability objectives, to establish and support programmes for more carbon storage in the soil, and to persuade stakeholders and policymakers of the importance of soil management and conservation for food security, water supplies, biodiversity and climate change mitigation.

Info: jakob.wullinga@wur.nl

Seals travel long distances

Seals travel considerable distances, reveals a study by IMARES Wageningen UR. By tagging a few common seals with transmitters, researchers could track a seal that made several visits to Antwerp from the Westerschelde estuary. Another crossed the North Sea to Scotland and England and back again. The transmitter stays on the seal’s pelt until it moults, and communicates the animal’s geographical position and the depth to which it dives. The data gets sent whenever it comes within range of a GSM network.

Info: hans.bothe@wur.nl
MARINE BIOLOGY

Fish atlas compiles four decades of research

Two fisheries researchers at IMARES Wageningen UR and a British colleague have compiled the most complete overview so far of fish species in the North, Celtic and Baltic Seas. From the anchovy to the whiting.

The Fish Atlas of the Celtic Sea, North Sea, and Baltic Sea was launched in Ijmuiden on 18 September. This was the first time fisheries research data had been compiled from such a large area, ranging from Brittany to Norway and from the west of Ireland to Finland. This book describes 200 fish species from the waters of north-west Europe, from well-known species such as anchovy and salmon to strange-looking oarfish and tadpole fish.

The book includes a distribution map for every species, based on at least 72,000 catches with a standard net carried out by fisheries research vessels from the Netherlands, Great Britain, France, Spain, Norway and the Baltic countries between 1977 and 2013. It also contains information about the biology of every species, catch depths, length distribution in the catch and long-term trends in each sea region. The atlas represents six years of work by editors Henk Heessen and Niels Daan, both now retired fish biologists from IMARES Wageningen UR in Ijmuiden, and their colleague Jim Ellis of the British fisheries research institute Cefas. They had to trawl through enormous databases of the annual international records of stocks of commercial fish species. Heessen: ‘We did our best to make the atlas interesting not only for fisheries scientists, but also for anyone with an interest in fish.’ The authors avoid technical jargon and include text boxes with explanations of how fisheries research works and historical information. The amassed data show, among other things, that the number of fish species in the seas of north-west Europe is increasing.

Info hans.bothe@wur.nl

ECOLOGY

Handbook prevents animal road deaths

Compulsory reading for anyone involved in planning, designing, building or maintaining public works: the Handbook of Road Ecology. The handbook provides an overview of 30 years of research around the world on the impact of roads, waterways, railways and high voltage cables on wildlife, with a view to reducing the negative impact of these obstacles for animals.

In efforts to conserve biodiversity, a number of different methods have been developed for helping animals cross roads and other infrastructural barriers safely. The book also offers practical guidelines for setting up evaluation studies on the effects of these kinds of facilities. Edgar van der Grift and Fabrice Otburg of Alterra Wageningen UR contributed to this English-language book.

Info: edgar.vandergrift@wur.nl, ISBN 978 1 118 56818 7
Using Wageningen gene technology, potatoes can now be produced which require very little pesticide to stay free of potato blight. Resistant potato varieties could be a reality within five years, but genetic modification is a sensitive issue and a decision in Brussels is anxiously awaited. ‘We have four months to go before the seed potatoes start to rot.’

TEXT ARNO VAN ‘T HOOG  ILLUSTRATION JEROEN MURRÉ  INFOGRAPHICS STEFFIE PADMOS

The pathogen Phytophthora infestans which causes potato blight is literally everywhere. The infectious water mould can be in the soil in any area where potatoes are grown. This single-celled pathogen can reproduce incredibly fast and is capable of destroying a crop in a matter of weeks. To prevent this, Dutch farmers spray their potato fields 10 to 16 times a season with fungicides. As a result, potato cultivation is responsible for half of all pesticides used in Dutch agriculture. It also costs farmers 600 euros per hectare of potatoes. Overall, Dutch farmers spend more than 100 million euros every year on protection against Phytophthora, commonly referred to as potato blight. Worldwide, crop losses due to Phytophthora are estimated at up to ten billion euros a year. Last September saw the completion of a long-term project in which Wageningen researchers developed potato varieties that are resistant to potato blight. Genetic modification was used to insert genes from wild Central American potato species in these varieties. Phytophthora scarcely has any effect on them; in field trials, it proved possible to reduce the use of pesticides by 80 per cent. The genetically modified potato plants are almost identical to the traditional varieties. ‘Except when you have experimental plots where no pesticides have been used: then the upgraded varieties look a lot different,’ says project manager and agrosystems researcher Anton Haverkort from Wageningen UR. ‘They continue to grow whereas the standard plants next to them rot away. After a couple of weeks, ‘
‘We knew we would be able to produce a potato with lasting resistance within ten years’

the trial field looks like a green and brown chessboard.’
It is more than ten years since a delegation of civil servants from various ministries visited Wageningen in search of projects on the application of genetic modification in agriculture. Haverkort: ‘There was a feeling in government circles that the Netherlands was starting to lag behind. No other country earns so much from seeds, seed material and flower bulbs, but we were doing nothing with genetic modification.’
It was almost inevitable that Wageningen would come up with a project focusing on potatoes and Phytophthora, says Haverkort. It is the most important Dutch arable crop and potato blight is a major problem. Furthermore, Wageningen professor Evert Jacobsen had been working on genetic modifications of potatoes for a while and he had already discovered a few Phytophthora-resistant genes. ‘So we could get off to a flying start; we knew that we would be able to produce a potato with lasting resistance within ten years.’
The proposal soon got the go-ahead with a grant of ten million euros from natural gas revenues. And so the DuRPh project was born (the Dutch acronym stands for ‘lasting resistance to Phytophthora’). A new form of genetic modification was deliberately chosen for the DuRPh project: only species-specific potato DNA was used to make the plants resistant. That meant genes from wild potatoes that could also be crossed with modern potatoes through pollination.

TRADITIONAL PLANT BREEDING
Genetic modification that remains within the species is termed cisgenesis, as opposed to transgenesis in which DNA is used from a different species or bacteria. Transgenic maize and soya beans with genes from bacteria and viruses have given rise to many questions and much debate over the past 20 years about the risks to humans and the environment. Cisgenesis avoids some of those objections as the result is much closer to the outcome of conventional plant breeding. Haverkort: ‘By using cisgenesis, we wanted to keep a link with traditional plant breeding. Cisgenesis is somewhat trickier and more expensive because selecting the right modified plants is a little more difficult.’
In the course of the project, the researchers tracked down 15 resistance genes in wild potato species. Those genes enable a plant to recognize Phytophthora, causing a rapid immune response on first contact, so that the pathogen is unable to get a foot in the door. But resistance is never permanent. Organisms are constantly evolving and so new strains of Phytophthora could emerge over the years that even resistant plants are unable to cope with. The potato plant no longer recognizes its attacker, so the infection can take hold. Breaking through the plant’s immune system is a great deal harder, however, if it has multiple resistance genes. That is why the researchers created a chain of two or three different resistance genes and inserted them in the DNA of the potato cells. The plants that grow from these cells undergo extensive testing, not just for their resistance to the disease but also to check that they are similar to the original variety in all other respects. This method was used to create Phytophthora-resistant versions of three potato varieties — Première, Désirée and Aveka. Field trials produced convincing results. This does not mean pesticides are completely redundant, says Haverkort. ‘It would be possible to do without pesticides entirely, but when the foliage turns yellow in the autumn, levels of resistance are low too and Phytophthora could get an opportunity to attack. Then it is a good idea to spray the plants once or twice.’ It is also possible that Phytophthora will gradually evolve and therefore bypass one of the resistance genes; that is another reason for spraying occasionally, says Haverkort.
There will always be a need to closely monitor developments in Phytophthora, just as there will be for switching potato variants whenever Phytophthora looks like bypassing a resistance gene. You need plenty of substitutes on the bench, so to speak: the same potato variety but with a different combination of resistance genes every time. In this way, Phytophthora is given little opportunity to adapt to the new combination of genes. If it looks as if a resistance gene has been cracked, that variant will not be used for a few years. The Phytophthora strains that cracked the resistance will gradually lose that property again. If the resistance gene is brought back into action in the field a few years later, it will therefore be effective once more. Haverkort: ‘You can make sure that you retain control of Phytophthora and prevent your resistance genes from becoming worthless by monitoring the situation and alternating 15 resistance genes in various combinations.’

IMPRESSION
‘I visited the trial fields and they were an impressive sight,’ says Tanja van Oers, the chair of the DuRPh supervisory committee and a senior policy officer in the Plant Supply Chain and Food Quality Department in the Ministry of Economic Affairs. ‘You see the resistant potato plants growing with hardly any pesticides while the standard varieties die off.’
The ministry is very enthusiastic about what has been developed within DuRPh, says Van Oers. ‘It is a good example of a technique that is contributing to food security and
sustainability, and it can be applied using the existing table potato varieties. So you could make varieties resistant within a few years. This also fits in with one of the ministry’s goals, which is to reduce the use of pesticides.’

Sharon Dijksma, the former State Secretary for Economic Affairs, attended a talk by the researchers, says Van Oers. She said then that she hoped the private sector would continue with the application of cisgenic techniques in producing resistant potato varieties. Van Oers: ‘The development phase was funded by the ministry. Now it is up to the private sector to take this further. The technology has advanced far enough to enable cisgenic potato varieties to be brought onto the market quickly. We want to hear from companies how they intend making use of these results. We can appreciate that Wageningen would like to continue with this research; perhaps this will be possible in collaboration with the private sector. You could, for instance, consider funding...
‘Companies are also saying that the approval criteria are currently preventing them from using cisgenesis,’ says Van Oers. Because the technology is classified as a GMO technique, field trials and risk assessments are needed before a cisgenic variety can be brought on the market. ‘We hope that the outcome of an analysis by the European Commission will help in that regard.’ The Commission is working on a judicial investigation of the application of legislation to new breeding techniques. That may lead to a new classification for cisgenesis with less stringent procedures than for other GMOs. In 2012, the European Food Safety Authority (EFSA) already concluded that the risks run by consumers from cisgenic plant varieties are comparable to those from plants produced by traditional plant breeding. But early this year, a coalition of European environmental and consumer organizations, including Greenpeace and Friends of the Earth, published an open letter calling on the European Commission not to make an exception for cisgenesis. They consider the risks to be higher and think that these crops should continue to be subject to the same tests and labelling requirements.

Opponents have said for a while that inserting genes from the same species can still have similar unexpected and unpredictable effects to the effects from modification using genes from a different species. An inserted gene ends up in a random position in the plant’s genetic material and can therefore inadvertently disrupt processes, which could lead to the creation of toxic or allergic substances. It is therefore open to question whether an end will soon come to the debate on the assessment of cisgenesis, which has been going on for years.

LAUNCHING NEW VARIETIES
‘We really need a European ruling like this, as we can’t start doing our sums until we have it,’ says Graveland from the potato breeding company HZPC. ‘If there is no change in the regulations and you are required to build up a dossier with field tests and risk assessments, that will make things very difficult. Then launching a cisgenic potato variety will take ten years and cost tens of millions of euros. We could never recoup that investment. So our decision as a company on whether to add cisgenesis to our suite of techniques depends crucially on what the EU decides.’
Graveland has been a member of the DuRPh supervisory committee since 2006. He says that the project has already produced a great deal of knowledge that can be put into practice in potato breeding practice quite apart from cisgenesis. Thanks to this research, plant breeders now know how best to combine resistance genes. Now they can use DNA screening to select parent plants according to their genetic profiles and then cross-breed them. In this way, varieties can be produced with new Phytophthora resistance genes using conventional breeding methods. According to Van Oers, this application is where DuRPh has added value for organic farming too. ‘Genetic know-how from the project helps plant breeding regardless of whether cisgenesis is used. There is more than one way of achieving the same end result. The nice thing was that the organic sector had extensive contact with the research on resistance to Phytophthora.’ Although conventional breeding methods can also produce resistance to Phytophthora, that route takes longer, about 10 to 15 years, says Graveland. Cisgenesis offers another advantage to plant breeding companies aiming to corner the conservative potato market. Potato growers and food processing companies, such as the manufacturers of French fries and potato chips, are used to potato varieties that produce tubers with a known shape, starch composition and frying properties. ‘They are therefore not keen on switching to a new variety. If you use cisgenesis, you are only altering the resistance; all those familiar varietal properties remain the same. That is a real advantage when compared with traditional plant breeding.’

This is precisely why the Belgians want to use cisgenesis to create a Phytophthora resistant Bintje. Bintje is a popular French fry potato in Flanders but this variety is highly susceptible to Phytophthora. Three Flemish institutions – Ghent University, the life sciences research institute VIB and the agricultural institute ILVO – want to change that. ‘In 2011 and 2012, we got some experience through field trials in Wetteren using plants from the DuRPh project,’ says René Custers from VIB. ‘I think DuRPh has really got the ball rolling; that project is at the basis of everything that is possible at present. We now have the resistance genes, the knowledge and the means to make Bintje resistant for the long term. We don’t need to go looking for new resistance genes; we can build on the research done in Wageningen.’

If everything goes according to plan, the first field trials of the upgraded variant of Bintje will take place in 2017 or 2018, says Custers, who studied Molecular Sciences in Wageningen. ‘We want to create a Bintje with a few effective combinations of resistance genes. This will be followed by a development process with field trials and then there will have to be a commercialization process started by a potato breeding company.’ People in Flanders are also waiting anxiously for the decision by the European Commission on cisgenesis. Custers: ‘Even if cisgenic potatoes continue to be covered by the existing rules, it is debatable whether the same battery of safety tests will have to be carried out for these potatoes as is required for many transgenic crops. I hope that this will prompt a new debate because Phytophthora-resistant potatoes are a very important product. Resistant varieties can also be obtained using traditional methods but these still need to prove their worth. And they will not have a combination of multiple resistance genes, which makes it more difficult for them to retain their resistance in the long term.’

The Sainsbury Laboratory in Britain, which published an article last summer together with Wageningen UR researchers about the discovery of a new resistance gene, has also started a project to make an existing potato variety resistant to Phytophthora using cisgenesis. The technology is now sufficiently advanced that both Belgium and Britain will be able to launch a resistant variety within four to five years, estimates Haverkort.

**TUBERS HARVESTED**

There are no signs as yet of a comparable Dutch follow-up project. It is not clear what will happen to the potato variants from the DuRPh project. The tubers were recently harvested but whether they will be planted next year depends on the funding. Continuing to cultivate them would cost about 30,000 euros a year. A grant application was rejected by the Ministry of Economic Affairs, although retaining the potato variants is one item in the discussions that the ministry is holding with companies about follow-up research.

Haverkort would like to keep the DuRPh variants for monitoring and demonstrations. ‘We can let them grow as small plants in the lab, only then it takes two seasons before they can be cultivated in fields again. But we still have four months to find a solution before the seed potatoes start to rot.’

Despite this open end, Haverkort sees the results from DuRPh mainly as the perfect outcome. ‘We really got the hang of the scientific and technical aspects. The project is not a semi-failure just because the results are not yet being applied in the agricultural sector. Of course it would have been wonderful if our research had led to a change in the law, but that was not the aim. That would have been a side effect and this is something that will still take some time.’

www.wageningenur.nl/en/durph
This year sees Dutch quinoa in the shops for the first time. Wageningen provided suitable varieties and is advising farmers on the cultivation.

**Dutch quinoa in the shops**

Quinoa has become hugely popular in recent years. According to Ruud Timmer, a crop production researcher and quinoa expert at Wageningen UR, this ‘Inca cereal’ is an exceptionally healthy product that would fit perfectly in a wholesome diet. ‘Quinoa seeds contain approximately twice as much protein as rice,’ he explains. ‘In addition to high-quality protein, the seeds also contain ‘slow carbs’, carbohydrates that are absorbed slowly so that blood sugar levels remain stable.’

**AT SEA LEVEL**

Quinoa originally comes from Bolivia and Peru, where local farmers grow this crop high up in the Andes. Wageningen researchers started plant breeding with quinoa in the 1990s. They developed several quinoa varieties that do well at sea level and with Dutch daylight hours. These new varieties have another advantage. ‘The Dutch quinoa is easier to process as its seed coat doesn’t contain a bitter substance called saponin,’ says Timmer. ‘And that saves on costs.’ When the UN declared 2013 the ‘Year of Quinoa’, this ‘superfood’ was put in the spotlight. Both sales and prices exploded. Rens Kuijten, the founder and director of the Dutch Quinoa Group, took advantage of this trend. The Dutch Quinoa Group organizes the entire supply chain in the Netherlands: in addition to cultivation, it is also involved in product development, packaging and marketing. Kuijten is a pioneer who has been working with various Wageningen varieties in the Netherlands for about five years. Together with Wageningen UR, the group is now developing more expertise in growing quinoa, and the area under cultivation is expanding steadily. In 2014, 13 affiliated farmers grew 30 hectares of quinoa for the first time. That area has now increased to 250 hectares. The quinoa grown on Dutch soil is on sale in shops in the Netherlands for the first time this year.

**A WAGENINGEN VARIETY**

‘We are working with the 45 affiliated Dutch farmers to study the yields and seed quality of different varieties under different conditions,’ explains Kuijten. ‘Together with Wageningen UR, we are looking at such factors as soil type, the optimum plant density and fertilization.’

Cornelis van Eck, a farmer on the island of Goeree-Overflakkee in the southwest Netherlands, grew four hectares of quinoa for the first time this year. ‘I used Atlas, a Wageningen variety,’ he says. ‘It’s a robust variety that does well in the Netherlands.’ Not only does Atlas have the highest yield, it also gives good ground cover, which stops weeds from growing. The plants also remain upright and are easy to harvest. Van Eck has had a good year. ‘Our yields were above average and the quality was excellent. I earn more per hectare from quinoa than from other cereals,’ he concludes with a pleased look. ‘We need another two to three years to get an idea of all the risks, but I’m very optimistic about this crop.’

---

Q

‘I earn more from quinoa than from wheat’

www.wageningenur.nl/en/quinoa
Dutch quinoa in the shops
Frans Kok said goodbye to Wageningen UR in October after nearly a quarter of a century as professor and 18 years as head of the Human Nutrition department. ‘It is increasingly clear to us that the key to a good diet is not individual nutrients but nutritional patterns.’

TEXT ASTRID SMIT PHOTOGRAPHY MARCEL VAN DEN BERGH AND GUY ACKERMANS

I saw you on TV Gelderland. What was your farewell like?’ We are in Impulse, Wageningen UR’s informal meeting point and lots of people stop to talk to Kok. As the coffee machine churns out two fresh cappuccinos, he tells me he is still a bit ‘stoned’ from his farewell. ‘So much has happened in a week. First, I became a grandfather – yes, for the first time – then there was the farewell symposium with about 600 participants, after that the valedictory address and then to cap it all I was knighted.’ As we chat Kok is already trying to distance himself from his working life. He talks in terms of ‘they’, not ‘we’ and searches for the right expression for the one day a week he still spends at Human Nutrition. ‘It isn’t going to work, but what is it then?’ On those days he supervises two PhD candidates, stays actively involved in the Gelderland Valley Nutrition Alliance, keeps in touch with nutrition institutes in Indonesia, China and Africa, and advises food companies. Kok was professor in Wageningen for nearly a quarter of a century and head of the Human Nutrition department for 18 years. In that period he supervised 70 PhD candidates, saw thousands of students come and go, brought tens of millions of euros in research funding into the department and expanded it from two chair groups to five, with about 180 nutrition researchers. ‘I am leaving a flourishing group behind,’ he says. Kok is succeeded as head of department by Kees de Graaf, professor of Sensory Science and Eating Behaviour.

NEW DEGREE
Kok was in the first cohort of students to take the new degree in Human Nutrition, and graduated in 1979. His career got off to a flying start. In 1982 he obtained his PhD in Wageningen for a study of cardiovascular disease, in 1984 he got his Master’s in epidemiology at Harvard University in Boston, and in 1992 he became professor in Wageningen at the age of 42. Track record: 350 publications.

‘Nutrition science is still young’
refute hypes’
He was not the kind of professor who delves into a narrowly defined scientific field. In the 1980s, when he was working at Erasmus University and for applied science organization TNO, he was among the first to study the effects of antioxidants and free radicals on chronic diseases. He published on the subject in high ranking scientific journals such as *The Lancet* and *The New England Journal of Medicine*, but did not go on to become ‘the antioxidant professor’. Kok: ‘It suits me more to explore new subjects which are important for nutrition research. I always have my antennae out.’

Not that he is superficial, he hastens to add. ‘I can really get stuck into a project.’ That tenacity enabled him to launch Cater with Care, a joint project in which the Gelderse Vallei hospital in Ede, Wageningen UR and several companies seek to improve the diets of patients. And – only last year – Eat2Move, a public-private project focusing on good nutrition for performance and recovery by sportspeople and patients.

Asked which of the nutrition studies under his supervision has been most fruitful, he counters with a question: fruitful for nutrition research or for public health? Because there is a big difference, he says. The research projects he set up or supervised often produced nice academic publications but no spectacular new insights for public health.

A few years ago, for instance, his research group was working on a potential new risk factor for cardiovascular disease: homocysteine. The higher the blood levels of homocysteine, the greater the risk of cardiovascular disease: that was the hypothesis. And the substance could be kept under control by taking folic acid. Sadly though, a large-scale study with 800 test subjects did not deliver the hoped-for results. Nor did homocysteine studies by other international groups. It was the same with research on the suspected positive contribution of supplementary minerals and vitamins to suppressing respiratory infections. Still highly relevant research, scientifically speaking, but not a breakthrough for public health.

**Isn’t that frustrating?**

‘Yes, but nutrition science is still young. It is increasingly clear to us that the key to good nutrition is not individual nutrients but nutritional patterns. After 50 years of research we can certainly offer very clear advice on that. A healthy diet contains fruit and vegetables, wholegrain products, vegetable oils, fatty fish, dairy and nuts. And not so healthy foods are red and processed meats, sugar, salt, saturated fat and alcohol. Anyone who sticks to these guidelines and gets enough exercise is on the right track. It’s as simple as that. Only it seems a lot of people find it very difficult to maintain a lifestyle like that.’

**Has nutrition research done its job then?**

‘I don’t think so. At present we work on a one-size-fits-all basis. But people can vary

---

**FRANS KOK’S CV**

1950 Born in Ulft  
1972 Food Technology at the Agricultural College in Den Bosch  
1979 Nutrition and Health at Wageningen University  
1982 PhD research with the Dutch Heart Foundation and Wageningen University: (Target group Segmentation in the Primary Prevention of Cardiovascular Diseases)  
1984 Master of Science in Epidemiology at Harvard University, Boston USA  
1992 Professor of Nutrition and Health, Wageningen University  
1997 Head of the department of Human Nutrition, Wageningen University
in the way they digest their food. In our Belly Fat Study one person lost eight kilos and another person only four kilos on the same restricted calories. We want to understand better why that is. I think we will gradually move towards personalized nutrition, just as medicine is moving towards personalized treatments. We can now measure so many things about people using MRI scans and all kinds of sensors, that we shall be able to distinguish subgroups and in future provide them with separate dietary advice.’

Five years ago Kok wrote a book together with Broer Scholtens, former science editor of Dutch newspaper De Volkskrant. The message was ‘Eating healthily – just do it’. His motive was that he was ‘fed up with diet gurus such as Dr. Frank, Michel Montignac and Sonja Bakker’, and he wanted to make himself heard in the debate as a nutrition scientist. In one chapter he describes being a guinea pig himself. To demonstrate how quickly poor nutrition affects our health, he adopted unhealthy eating habits for a month and took little exercise. Result: he gained 2.5 kilos and his blood levels of cholesterol and inflammatory markers went up. When he afterwards resumed his normal healthy lifestyle, all the values went back to their old level in one month.

Whether the book had much impact, he is not sure. It is very difficult to convince people who already believe in a particular diet of another perspective. Nevertheless, he advises his colleagues to get involved in the debate too, through books or social media. ‘We must keep on explaining the latest scientific insights and refuting hypes,’ says Kok.

But don’t scientists partly have themselves to thank for those hypes? Scientists often go back on a finding which consumers have already run away with. So it turns out that vitamin E is not all that good for you, or antioxidants don’t protect you from cancer after all.

‘We are learning all the time. You see the same thing in medicine. In the old days you were advised to take total bedrest after a heart attack; now they get you out of bed as soon as possible.’

Two years ago your colleague Sander Kersten said nutrition scientists should always have a biological explanation for a suspected link, and should only publicize results when they have been confirmed by other studies.

‘That is impossible. Academic journals make a big fuss of those initial results too. They put them on the front page and issue press releases about them. It is our job to put that news in context. The better newspapers do that as well.’

One third of the research at Human Nutrition is sponsored by the industry. That is not good for the credibility of nutrition science. Yet you are a big fan on private funding.

‘Well, let’s just say I’m not against it. My colleague Martijn Katan, emeritus professor at the VU University Amsterdam, says ‘Stop all private funding because it only causes problems’. It is easy to say that when your own career in nearly over. I would have preferred to hear from him how young researchers are supposed to find their way in an era when public-private partnerships are the rule rather than the exception. Of course it would be fantastic if the government supported our profession financially, but that doesn’t happen enough.

‘Anyway, the industry is not only part of the health problem; it is also part of the solution. We can help think things through and conduct research that is in the interests of public health. Within companies bonuses should partly depend on how much contribution innovations make to health. In fact I don’t understand why that is not the case already.

The universities of Amsterdam, Maastricht and Groningen are getting more and more involved in nutrition research. How can Wageningen continue to stand out?

‘Wageningen is the only university with a Bachelor’s degree. The combination we offer of food technology, consumer behaviour, plant and animal sciences, as well as the alliance with the Gelderse Vallei hospital, still gives us a potential head start. You can do research here on all aspects of nutrition. So for now Wageningen is still the home of the nutrition sciences in the Netherlands. There were about 100 professors in the procession at my farewell, half of whom came from other universities.

I found it heartwarming that the vast majority of them had done their degrees in the Human Nutrition department here. We did a good job there, I thought.’

www.wageningenur.nl/hne

WAGENINGEN ACADEMY

Wageningen Academy will run a course on Protein in senior nutrition in April 2016.

The course offers new insights into the effect of protein on intestinal health and muscle mass in older adults. For more information go to www.wageningenacademy.nl/course_seniorproteins
Extinction hovers over vultures in Africa critically endangered.
They get eaten, poisoned by farmers and poachers, and used in traditional medicines. As a result African vulture populations have fallen by 80 percent in the last 50 years. Without vultures, rotting carcasses could become breeding grounds for diseases that are harmful to both humans and animals.

TEXT RIK NULAND PHOTOGRAPHY LINEAIR

A dead zebra on the savannah does not go unnoticed for long. In no time, dozens of Rüppell’s and white-backed vultures are tugging at the carcass, hissing and squabbling over the tastiest morsels. Then in flies the giant among African vultures, the lappet-faced vulture. ‘It is a magnificent sight as it hops into the fray with its wingspan of more than 2.5 metres and makes its way to the carcass,’ says animal ecologist Ralph Buij in his office at Alterra Wageningen UR, jumping up and down and flapping his arms by way of demonstration.

‘I’ve had a pair of binoculars around my neck since I was six,’ says bird expert Buij (39), who has been working in Wageningen on geese and field birds for two years now. But he also makes regular trips to Africa. Ever since he studied birds of prey and vultures in Cameroon for his doctoral research, Buij has been a member of the Vultures Specialist Group, an advisory body at the UN’s nature conservation organization IUCN.

The members of this group sounded the alarm last summer in the journal Conservation Letters. The spectacle Buij describes is going to become a rare sight, they warn. They compared distribution data on African vultures and analysed the population estimates from the past 50 years. Admittedly there are sizable blank spaces on the map where no studies have been done.
Vultures usually descend on a dead animal and pick it clean in no time. The vultures’ stomachs are ‘a one way street for most pathogens. The gastric juices of a vulture are like battery acid with a pH of about 1, which very few pathogens come through unscathed.’

VULPES AND DICLOFENAC

European vultures are faring better than their African counterparts. There are concerns, however, about the white scavenger vultures which spend the winter in Africa and are therefore subject to the dangers there, as well as often getting electrocuted by high-voltage cables.

The main vulture territory in Europe is in Spain, but the bird is under threat there now that the anti-inflammatory drug Diclofenac has been licensed for use in livestock. Vultures are extremely sensitive to this drug, which cost India and its neighbouring countries 97 percent of their populations of three species of vultures in ten years in the 1990s. The drug was banned there in 2006 and largely replaced by the harmless Meloxicam, but with their slow rate of reproduction the vulture populations are recovered very slowly.

There are strong indications that the death of so many vultures caused a big increase in the number of stray dogs in India, because there was more food left over. As a consequence, 3000 more Indians have been contracting rabies each year. ‘It is remarkable that the EU allows the use of Diclofenac when there is a good alternative,’ says Ralph Buij.

‘Millions of euros have been invested in species conservation plans in Europe, for bearded vultures and cinereous vultures for instance. The success of that can be wiped out at a blow.’

TONNES OF MEAT

If there are no vultures at the scene there are always other scavengers such as jackals, hyenas and dogs eager to get their share of the pickings. But these mammals are less efficient carrion-eaters. Moreover, if carcasses lie around longer they have more contact with each other, and could therefore pass on pathogens such as rabies and canine distemper.

‘We are wondering,’ says Buij, ‘what the consequences are if all those tonnes of meat are left lying around. The indications are that the risks of diseases spreading are greater without vultures. We need to find out in the short term which pathogens are involved, how they are transmitted, and how fast.’ This is not a far-fetched scenario. The decimation of the vulture population in India when Diclofenac was introduced there in the 1990s had a real impact on public health (see text box). African vultures could use some positive PR about the useful job they do. At the moment they tend to be the whipping boys of the savannah and they are subject to a wide range of threats. Vultures get eaten, poisoned by farmers and poachers or killed for use in traditional medicines, relates the article in Conservation Letters.

Although there is no registration of any kind, poisoning seems to be the number one cause of death. Vultures are often collateral damage in the battle against lions and hyenas which steal cattle. To eliminate the carnivores, farmers put out animal carcasses treated with lethal doses of insecticide. And vultures are the unintended victims.

Elephant poachers are liberal with poisonous chemicals too, but in their case vultures are the prime target because they betray where the poachers are at work. After killing five elephants it takes poachers a whole afternoon to remove the tusks. But the first vultures start circling above them within half an hour, alerting competitors or anti-poaching units to their location.

So poachers rid themselves of these ‘informers’ by poisoning the dead elephants they leave behind.

MASS SLAUGHTER

‘A large carcass is a major attraction,’ says Buij. ‘Vultures keep track of each other from a distance and can cover hundreds of kilometres in a day, so they come from far and wide. So this kind of poisoning
‘A vulture can fetch 100 dollars, one or two months’ wages’


NATURE MANAGEMENT


makes for mass slaughter, sometimes with hundreds of victims. If game wardens don’t get there fast enough, the dead vultures become carrion themselves, attracting still more vultures. Then the catastrophe is complete. Vulture populations are highly sensitive to death among adult birds. These birds have long lifespans and often only fledge one young per year or two years. So the population hardly grows at all.’ Meanwhile, poachers have begun to harvest parts of the dead vultures. The heads in particular are worth a lot of money in West and Southern Africa, where they are an ingredient in traditional medicines. But the claws, feathers and eggs are also used to treat diseases, ward off evil spirits or as lucky charms. ‘In countries like Nigeria and Benin you see hundreds of dead vultures for sale on markets every year, mainly for use in traditional medicines but sometimes for consumption as well. As populations grow in these countries and vultures become rarer, the prices are shooting up. A vulture can now sometimes fetch 100 dollars, which is one or two months’ salary, and in Cameroon 6000 dollars was once offered for four hooded vulture eggs. How can you blame someone for killing a vulture or plundering a nest when he could send his kids to school with the proceeds?’ Although the threats are considerable, the vulture specialist group is not throwing in the towel. ‘We are proposing a set of measures including the regulation of imports, sales and use of insecticides such as carbofuran, aldicarb and parathion, which are often used to poison vultures and lions. They have been banned in Europe but can be bought cheaply all over Africa. An import ban could at least put the brakes on the mass slaughter.’

Buij is also hoping for more funding. ‘In many countries there isn’t even any money to manage nature reserves or equip patrols. When you see what we in the Netherlands invest in protecting species such as the black-tailed godwit or the hamster, it is monstrous how little money there is for conserving much more biodiversity than that.’

Vultures may not be the best of ambassadors for the African savannahs. They are impressive birds but to many people also rather unappealing carrion-eaters with ugly bare necks. Buij thinks more emphasis on its role in cleaning up carcasses could boost the vulture’s image, and he also hopes to make use of the elephant’s greater appeal. ‘Elephant poaching has escalated out of control. We’ve really got to tackle that more effectively in the short term. For every elephant that is killed now, dozens of vultures die too.’

WAGENINGENWORLD 25
The end of the Netherlands as a producer?

Tomato growers and pig farmers in the Netherlands are struggling; breeders and machinery manufacturers, on the other hand, are flourishing. Would the Netherlands be better off banking on technology and leaving bulk production to other countries? The LEI is pondering that scenario.

Text KORNE VERSLUIS Photography AEROPHOTO SCHIPHOL infographic GLOEDCOMMUNICATIE
Bought any roses recently? The chances are they came from East Africa, not as in the past the Netherlands. Nine million roses are flown into Schiphol airport near Amsterdam every day. And the number will probably go up again next year. Meanwhile, the number of rose farms in the Netherlands is declining fast. In 2000 there were still 765 rose producers in the country; by 2014 more than 80 percent of them had stopped, leaving only 142. They cannot compete with East African countries where labour costs are low and the climate is perfect for growing roses.

Bad news for Dutch business, you might think. But that does not seem to be the case. According to Statistics Netherlands (the central bureau for statistics), the rose export business has suffered very little from the big drop in production. Most Kenyan roses are bought and sold through the flower auction in Aalsmeer near Amsterdam. Not much has changed for Dutch rose breeders either: they continue to dominate the world market.

The rose trade is therefore the clearest example of the trend for the Netherlands to earn more and more of its money from the processing and throughput of foreign agricultural produce and from selling knowledge in the form of technology. Plant breeders, seed potato producers and machinery manufacturers earn more and more money abroad. Vegetable seed producers, for example, get about 70 percent of their turnover from abroad. So for them, Dutch farmers seem to be less and less important.

At the beginning of 2015 the agricultural economics institute LEI Wageningen UR organized a debate about the position of the Netherlands as a major agricultural producer. The institute posed the question of whether the Netherlands would be better off concentrating on the knowledge-intensive sector related to agriculture, and saying goodbye to the large-scale production of meat, eggs and potatoes.

Several of the agricultural sectors in the Netherlands are struggling, argued Wageningen economist Krijn Poppe during the debate. Dutch greenhouse horticulture has been beset by problems for years. With its strong emphasis on the export of bulk goods, the Netherlands is extremely vulnerable to fluctuations in world trade. The Russian re-exports 24% of agricultural exports are re-exports: products from elsewhere are processed and re-exported.
boycott of European fruit and vegetables hits the market gardeners of the Westland district, near Rotterdam, in their wallets. Not because they exported especially large quantities of tomatoes and cucumbers to Moscow but because even a small surplus of tomatoes and cucumbers has a big impact on the price. So a small change on the global market can have serious consequences for horticulturists, who already have to work with small profit margins. Another example can be found in the pig farming sector. For decades, the Netherlands, along with Denmark, was western Europe’s biggest pig producer. The Germans, British and Italians ate more pork than they produced and Dutch pig farmers benefitted from that by supplying them with cheap pork. Now German pig farmers have upped their production and Dutch pig farmers are in trouble. According to the Rabobank one in five of them are in financial difficulties. Poppe: ‘People often point to the Dutch role in the world food supply in 2050. The demand for food will grow and the Netherlands has an opportunity to play a role in meeting that demand. The question is what is the best way for us to do that? By supplying the whole world with milk powder or by strengthening our position as an innovation laboratory?’ In that future scenario Dutch agriculture would primarily be a showcase for knowledge-intensive companies such as livestock breeders, plant breeders and manufacturers of greenhouses and machinery. LTO director Thijs Cuijpers was in the audience at the start of this year when Poppe gave his talk. He does not see much future in the idea. ‘Of course it is good that people are thinking about the future but I see no reason to write off the Netherlands as a producer country,’ he says now. ‘On the contrary. All those knowledge-intensive companies in the agriculture sector came about precisely because we have innovative farms. It is a myth that you can separate the two. The milking robot is a Dutch invention. It wouldn’t have been invented here if we hadn’t had highly productive dairy farms. Production and innovation go hand in hand.’ Ruud Huirne, director of Food & Agri Nederland at the Rabobank and professor by special appointment at Wageningen University, agrees with Cuijpers. ‘I don’t see any future in that story about the end of the Netherlands as a producer country. Without a strong home base the knowledge-intensive sector will disappear abroad.’ Agriculture-related industries are under threat already, he says. ‘Last year animal feed manufacturer Nutreco was in danger of being taken over by a foreign company. Intervet, the veterinary

**Revenue**

The added value of the agricultural sector for the Netherlands is €48 billion euros, including supply, processing and distribution. That is 8% of Dutch earnings from all the sectors put together.

**Proportion of primary production**

Primary agricultural production generates 22% of the added value (€10.5 bn). The rest comes from supply, processing and distribution, including that of raw materials from abroad.

**Revenue from export**

About 70 cents (70%) of every euro of added value in the agri sector comes from income from export.
pharmaceutical company, has practically left already. A weakened home market won’t improve our position, it seems to me.’

But what about the rose sector? Does that not prove that the Netherlands can play a central role without large-scale production? Huirne: ‘It seems that way for now, but I don’t know how long it will stay that way. And I can think of a counterexample. Turkey production has completely disappeared from the Netherlands, and with it the relevant knowledge. There is no one left in Wageningen who knows anything about it. Knowledge follows production. As the turkey disappeared, so too did the courses and research on the subject. I would predict that the same thing will happen in the chicken sector if it shrinks a lot. The knowledge-intensive sector is fine, but those companies just follow the production.’

WORLD MARKET LEADER

One company which owes its growth to the Dutch poultry sector is Marel, a world market leader in the production of slaughter lines for chickens, ducks and turkeys. Theo Bruinsma is special projects director at the company and chair of the association of Dutch manufacturers of machinery for the food industry. The Netherlands is the world market leader in the production of slaughter lines for chickens. Bruinsma: ‘We sell 97 percent of our slaughter lines outside the Netherlands. We only have one competitor, who is based in Holland too. Between us we account for 90 percent of the world market.’

The Icelandic parent company Marel took over the slaughter line production section of the Dutch machinery manufacturer Stork. According to Bruinsma, Stork ended up in the chicken sector by chance in the 1960s. The company had two main branches in Amsterdam and Hengelo. In search of a new location with qualified staff, it opened a branch in Boxmeer in the province of Brabant. ‘There we got more and more orders from the Plukon and Hendrix chicken slaughterhouses. That wasn’t a market Stork went looking for but with the growing poultry industry in the region the orders just started coming in.’

You might think the idea of moving away from the Netherlands as a producer country and concentrating efforts in the knowledge-intensive sector would suit Bruinsma because Marel and the other machinery manufacturers he represents would benefit from it. But this is not the case. ‘I do not see any advantages for us in a shrinking sector in the Netherlands.’

So there is not much support for the end of the Netherlands as a major producer.

For decades, the Netherlands was western Europe’s biggest pig producer. Now many Dutch pig farmers are in trouble.
But Poppe is not proposing to chase all farmers and horticulturists out of the country. He is only suggesting giving a less prominent role to production. ‘I can imagine that in negotiations about trade treaties the Netherlands could more readily accept agreements that are detrimental to the pig farmers, for example, if they were offset by favourable agreements on intellectual property. Or that the Netherlands would accept stricter environmental regulations that are disadvantageous to livestock farmers if it is clear that they promote innovation. And we could make even more effort to attract research labs to our country.’

Environmental measures to stimulate innovation are all very well, responds Ruud Huirne, but you must treat farmers fairly. ‘You can’t do things that cause the farmers to fall behind the foreign competition without offering them a viable business model. If you impose stricter standards, they have to be able to recoup their investments through their products. Now farmers often get landed with the costs without there being any benefits to offset them.’

‘You can’t do things that cause the farmers to fall behind the foreign competition without offering them a viable business model. If you impose stricter standards, they have to be able to recoup their investments through their products. Now farmers often get landed with the costs without there being any benefits to offset them.’

Machinery manufacturer Theo Bruinsma, who grew up on a farm himself, is not impressed by Poppe’s suggestions. ‘I am inclined to argue for more protection for poultry farmers, not less. I know quite a few chicken farmers who are in despair. They are doing their level best and working correctly, and yet they are still always in the dock. The way people see our sector is quite crude. Our image is dominated by the animal rights movement, which thinks everything we do is terrible. When actually we really are doing some good things here in the Netherlands.’

His own company is affected by this too. The company is privately proud of their new slaughter lines using gas sedation, which has been proven to be more humane than the old method. These slaughter lines cleanly kill thousands of chickens per hour and divide them efficiently into the cuts that consumers the world over want to buy. Not much of a chicken is wasted. ‘But we cannot communicate that proudly. The sector has become too disconnected from the general public and that is partly our own fault. People no longer know how their food is produced and we leave the industry’s image in the hands of the animal rights movement.’

And yet the Dutch animal welfare political party and campaigners for animal welfare are good for his company, says Bruinsma. ‘The animal welfare party is part of an ecosystem that forces us to innovate. Just like the squatters in the 1980s, who didn’t build any houses but did play a useful role in the debate about housing. We do need some opposition in the debate. For us it is important for the whole ecosystem to stay in place. The Netherlands has a lot of players very close together in a small area: Wageningen UR, critical consumers, innovative poultry farmers, high-tech companies. Together we form an incubator for new ideas. How many chickens the Netherlands produces itself is not the crucial factor: that is the ecosystem as a whole. As long as that stays healthy there is a big chance that the next innovation will come from the Netherlands and that we’ll stay here.’
Smartphone screens cows for doping

RIKILT Wageningen UR has developed a method of detecting banned hormones in cows. A small measuring instrument combined with a smartphone can be used on the farm to check whether a farmer is giving his animals the prohibited hormone rBST.

In August this year, Susann Ludwig and fellow researchers at RIKILT published an article in the journal PLoS ONE in which they describe a test that gives a strong indication of whether cows have been given the banned hormone rbST. Ludwig, who received her doctorate for this subject in Wageningen, was aiming to create a test that could give a result on the farm. ‘Mobile phones are an incredibly interesting option. Everyone knows how to use them and the data link lets you share the results immediately,’ she explains. She is now at the Eindhoven University of Technology and working on the further development of mobile tests for banned substances.

Recombinant bovine somatotropin (rbST) enhances milk production in cows. A cow that has been injected with the hormone will produce roughly ten per cent more milk. Using rbST is legal in many states in the USA, but the EU banned it in 2000. The main reason for the ban is that cows treated with the hormone are more likely to get udder infections and other health problems.

Ludwig’s test does not measure the presence of the hormone itself, it detects the antibodies that cows make when they are injected with the hormone, which is a foreign substance. These antibodies are detected using a small device that Ludwig developed in collaboration with an American start-up. In the device, LEDs illuminate a milk sample with UV light and sensors measure the fluorescence. The device sends the measurement results to the smartphone, which performs calculations to see whether a sample is suspect or not. Ludwig’s test is not yet ready for use on farms. Anyone who wanted to market such a test would need to develop it further. That is why RIKILT is concentrating on...
a test that can be carried out in the laboratory for the time being. Saskia Sterk, the cluster manager for Growth Promoting Substances at RIKILT, is working with colleagues on the final touches to another rbST test. Like Ludwig’s test, rather than detecting the actual hormone it detects antibodies that the cow makes as a reaction to the exogenous hormone.

SEIZED
Sterk says that it is highly likely that rbST is being used in Europe despite the ban. Ampoules of the illegal hormone have been seized, for example. But it is unclear how widespread use of the hormone is because there are no cheap tests for detecting its use. ‘The new test will solve that problem and we will be able to see whether Dutch farmers are using rbST. We will probably be carrying out the first tests in practice in 2016.’ The fast test does not provide enough proof for legal purposes, explains Sterk. ‘Evidence of the banned substance itself is required for a fine or conviction. Our cheap screening test is based on substances that cows produce in response to the hormone. Additional measurements with a mass spectrometer are needed to provide proof of the hormone itself.’ That examination is relatively expensive. The combination of cheap screening and additional measurements makes it possible to test large quantities of milk. Sterk thinks the development of fast mobile tests linked to a smartphone is a promising option, including tests for banned substances. ‘If inspectors can decide in the field whether or not a sample is suspect, that will save on a lot of expensive lab investigations.’

‘We will probably be carrying out the first tests in practice in 2016’
Doing more with manure

Wageningen UR is trying to persuade farmers in developing countries to do more with the manure from their livestock. This could help supply energy, improve soils and cut greenhouse gas emissions. The first results are being seen in Vietnam.

TEXT RENÉ DIDDE  INFOGRAPHIC PETRA SIEBELINK, WUR  PHOTOGRAPHY NHÁ DT
There are 150,000 biogas installations in Vietnam. Not in large factories or businesses but on ordinary people’s farms. ‘This means 750,000 people are already cooking on gas they generate themselves using the manure from their livestock,’ says Steven von Eije, sustainable energy advisor in Dutch development organization SNV World.

There are many advantages to biogas. For Vietnamese women it is a much safer and healthier cooking fuel than wood, and saves them a lot of time spent collecting firewood. This leaves the local vegetation more intact as well. And biogas installations are by no means complicated high-tech stoves, Von Eije assures me.

‘The anaerobic digestion takes place in an almost completely underground, airtight stone dome connected to the barn by a wide plastic pipe. Farmers rinse the manure into the pipe with water. The gas gets to the cooking stove through a small PVC pipe, or through a hosepipe if it has further to go. Behind the digester is a tank in which the digested manure is collected. Fresh supplies of manure push the slurry effluent out of the tank. And that slurry, also known as digestate, is full of nutrients such as nitrogen, phosphate and even potassium. The composition is not always optimal but for many crops on many different soils the bio-slurry makes an excellent fertilizer. And that is precisely the point SNV World wants to make, with the help of knowledge and expertise from Wageningen UR Livestock Research. ‘We want to contribute to the development of a circular economy in which there are hardly any waste products and all the resources are kept in circulation,’ says Von Eije.

**THIRTY MILLION FARMERS**

There is still some way to go, however. Only 40 percent of the farmers in Vietnam who have a biogas installation are currently using this organic manure on their land, shows a study by Wageningen UR. ‘And if you consider that only 2.5 of the 30 million farmers in Vietnam have a digester, there is still a long way to go,’ says Theun Vellinga, a researcher at Wageningen UR Livestock Research. ‘We get the impression that the farmers who do not have a digester make slightly better use of their farmyard manure: 60 percent of them put it on their fields. Apparently the farmers with a digester think the material left in the digester is exhausted.’

Vellinga and researcher Karin Andeweg are following the development of this Livestock and Manure Management project (LMM) closely. ‘By showing what you can do with the digestate, you can bring about a change of mindset among the farmers,’ says Andeweg.

SNV World and Wageningen UR Livestock aim to achieve this by offering a lot of training in the coming years. In a four-day ‘training-of-trainers’ course this autumn, 100 trainers are being equipped to teach Vietnamese farmers about the valuable contents of the digested matter. ‘The idea is that each of these trainers will demonstrate the advantages of this organic fertilizer to two groups of 20 farmers on an appealing model farm in their region,’ says Von Eije.

‘Preferably with examples of bigger, healthier vegetables as solid evidence of its value as fertilizer.’ The training of these 4000 farmers will take place in five different provinces in Vietnam, three in the north and two in the south.

Through this project Wageningen UR transfers knowledge about anaerobic...
THE PERFECT MANURE CYCLE

In practice the nutrient cycle is not often closed. About three quarters of the nutrients consumed by livestock end up in the manure. If that manure is not made good use of, valuable nutrients are lost and artificial fertilizer has to be used to grow crops.

Spreading the manure on the land and in the biodigester also increases the energy supply and the condition of the soil, as well as reducing greenhouse gas emissions.

Import of livestock feed
In the ideal scenario it is not necessary to import livestock feed as this is grown in the country. That way no nutrients end up outside the cycle.

Emissions
Ideally, all the manure is used and no minerals go to waste.
In many developing countries, about 50% of the manure goes unused. This lead to greenhouse gas emissions, groundwater pollution, offensive odours and health risks.

Importing artificial fertilizer
Ideally, no nutrients have to be imported in the form or artificial fertilizer in order to provide the crops with sufficient nutrients.

Manure from livestock is collected
Methane gas from the digester is used for cooking
Digestate is used on the land as fertilizer

Valuable substances are left behind in the digestate

N  P  K  S  B  M  Mn
An imbalance in the manure cycle is an issue not just for Vietnam but worldwide. The import of livestock feed, mainly from South American countries to countries in Europe and Asia, leads in a country such as the Netherlands to a surplus of nutrients in the form of manure, and in South America to a shortage. A simple solution is available: restore the disturbed balance by returning the surplus of manure in dried form.

‘The trade in transportable manure could be valuable for farmers both here and there,’ says Theun Vellinga of Wageningen UR Livestock Research. Especially now that the milk quotas have been abandoned, Dutch dairy farmers will increasingly come up against the limits for emissions of nitrogen and phosphate.

The Netherlands could turn the ‘manure crisis’ – a surplus of 700 million tonnes per year – to its advantage by making manure fertilizer pellets with it. That is not very difficult technically, but so far all attempts have ended in a financial flop – like Promest in Helmond in the 1990s. ‘There are projects in the pipeline for studying what has to happen to make processed manure marketable and create a market for it,’ says Vellinga. ‘We have submitted a research proposal to the European Commission. We want to involve all the stakeholders in the manure chain in order to create a fertilizer that will sell well.’

‘Not using manure goes against common sense’

BOOSTING HARVESTS

Combining anaerobic digestion with the application of the leftover digestate in the fields effectively kills two birds with one stone. Not only does the biogas extracted from the manure supplement the often inadequate energy supply in many developing countries, but the leftover digestate can also help improve the poor soils and often marginal harvests of field crops. ‘The digestate contains the crucial nutrients nitrogen, phosphate and potassium,’ explains Andeweg. ‘And that is not all. The slurry is also rich in trace elements such as sulphur, boron, manganese and magnesium.’

Spreading this product on the fields leads to bigger rice harvests and benefits key cash crops such as tea, coffee and sugar cane as well, says Andeweg. ‘If livestock feed is produced on the farm as well, the cycle is closed too.’

And that is not all. Besides this wealth of inorganic matter, which is undisturbed by micro-organisms, the manure also contains highly valuable organic matter, adds Vellinga. ‘During the digestion process only some of the carbon in the manure gets converted into energy. Seventy percent of the organic matter is still there afterwards. That can be used to help increase the humus level in the soil, and then the soil retains more water and plants grow better.’

The lack of awareness of the advantages of manure goes hand in hand with the strong belief that artificial fertilizer is the only answer for raising agricultural productivity.
In Vietnam, China and India artificial fertilizer is used in large quantities. ‘That happens less in Africa and South America but in Asia the productivity of crops is definitely kept up by using artificial fertilizer. A number of Asian countries subsidize its use,’ says Vellinga.

In the long term, however, the farmers in these countries are worse off, believe the Wageningen researchers. ‘If you use artificial fertilizer you don’t do anything about the amount of organic matter in the soil,’ says Andeweg. Moreover, the production of nitrogen for artificial fertilizer is energy-intensive and phosphate is a finite resource, with phosphate mines around the world becoming exhausted. ‘Mind you, we are not against artificial fertilizer. Sometimes the nutrient needs of a crop can be met perfectly like that,’ says Vellinga. ‘But we would like to reverse the order,’ adds Andeweg. ‘First use the mineral and organic value from the digested manure and then supplement it with artificial fertilizer if necessary.’

If all manure, whether digested or not, was used in the fields, the Wageningen researchers reckon the use of artificial fertilizer in Vietnam could be halved, while harvests of rice, tea, coffee and sugar cane would stay the same or even increase.

**COMPOSTING**

There is another explanation for the negligible use of digestate, thinks Theun Vellinga. ‘The slurry is liquid and therefore difficult to store. We should do research on how you can dry the manure and convert it into a product that’s easy to transport and to process. People often don’t have tanks so the manure needs to be solid enough to stay on a cart.’

To achieve this, the researchers are thinking in terms of composting the manure leftovers to make a more solid product, using for example leaves, livestock feed waste, soil or ash from stoves. Farmers could then cover it and store it until it is ready for spreading on the fields. ‘We need to find out what the most feasible methods are for each country and each region,’ says Vellinga.

**COMMON SENSE**

‘Knowledge about using manure efficiently has been pushed into the background by the large-scale use of artificial fertilizer,’ agrees Eddy Teenstra. He has been seconded to the Manure Kiosk web portal by Wageningen UR. The Kiosk, based at the World Food Organization (FAO) in Rome, is a joint initiative by Wageningen UR and the FAO, and consists of a database of 23,000 publications on manure. As well as an outlet for scientific and policy publications, the website also provides factsheets and best practices from the field, edited by Teenstra, as a source of inspiration for users. The website is free and accessible to anyone. Together with institutes in Asia, Africa and South America, Teenstra carried out a survey in 34 countries last year of the obstacles for improving manure use. ‘The lack of awareness and knowledge is the biggest bottleneck. Not using farmyard manure goes against common sense.’

Common sense tells us that livestock only uses a maximum of 30 percent of the nutrients in the feed for the production of milk, meat and eggs. Teenstra: ‘The rest comes out the back end. Isn’t it a pity that you first ‘invest’ money and effort in livestock feed and then just let 70 percent of it go to waste? That’s just throwing money down the drain.’

www.manurekiosk.org
www.ccacoalition.org
Old university friends Jan Klok and Thierry Wessels ran into one another again in the oil and gas industry. One researches the desulphurization of gas using bacteria; the other sells this clean purification technology.

TEXT ALEXANDRA BRANDERHORST PHOTOGRAPHY HARMEN DE JONG

Now that oil prices are falling, the oil and gas industry is facing a major challenge. Cheaper systems are needed for the extraction and processing of oil and gas, and they also need to be cleaner and more sustainable,’ says Thierry Wessels. He obtained his degree in Biotechnology in 2008. Now he works in the sales department of the international company Frames, which sells systems for separating and purifying oil and natural gas.

‘We are able to extract oil and gas in increasingly remote locations, drilling ever deeper into the ground,’ says Wessels. But that does give rise to problems, notes his former fellow student Jan Klok. ‘The easy sources are becoming depleted, so now they are drilling in more polluted gas fields,’ explains Klok.

After graduating in Biotechnology in 2009, he obtained a PhD in Wageningen for research on the desulphurization of gas using bacteria.

Current purification processes use harmful chemicals. Moreover, they take place at high pressures and high temperatures. ‘Purification using bacteria doesn’t require chemicals and uses much less energy. There are also fewer safety risks. The end result is a clean gas flow and a non-toxic sulphur product,’ says Klok.

WORLDWIDE TESTING
After his PhD, Klok continued his research as a process technology scientist with Paqell, a collaborative venture between Shell and Paques, which designs systems for biological gas desulphurization. At present Klok also works one day a week as a scientific project manager at Wetsus, the knowledge centre for sustainable water technology. ‘Paqell now has various patents and we are testing the system at different scales. We have 14 units in place at gas fields all over the world. Our method is very cost-effective and we can handle increasingly high levels of sulphur and contamination.’

However, it is difficult to convince the oil and gas industry of this. One of the products Wessels sells is this purification system with bacteria. ‘It is a very conservative industry, where companies prefer to use the same technology they’ve had for the past 100 years. People think that bacteria are difficult to control and may suddenly all die,’ adds Klok. ‘But you really have to make a huge effort to kill them. If you give them huge amounts of poison, at most it’ll send them to sleep.’

POT-BELLIED PIG IN THE HOME
After they graduated, Wessels and Klok lost touch. But they happened to bump into one another four years ago through their work. Wessels: ’A colleague mentioned some bright guy at Paqell. That turned out to be Jan.’ Now they work together and see one another on a monthly basis. ‘Jan investigates
how to improve things and I look at how we can explain the added value to purchasing officers at companies,' says Wessels. It was the same in their student days. Klok: ‘If calculations were required, I did them, and if a presentation and sales pitch was needed, then it was Thierry’s turn. People called us the blind man and the cripple.’

They have known one another from day one of their Biotechnology degree in 2001. They hit it off immediately. ‘The group in Wageningen was a real mix and there were a lot of alternative types. That wasn’t my scene or Thierry’s either. That we got together was only natural,’ says Klok. They often lunched together and when Klok moved to the Argo student house Iolkos in Hoogstraat, Wessels took over his room on

‘I was a bit offended that the head was recommending a farmers’ university to me’

JAN KLOK
Age: 32
Works: Process technology scientist at Paqell from 2013; also scientific project manager at Wetsus since July 2015.
Haarweg. He later moved to the Ceres house De Kogel in Niemeijerstraat. ‘It always helps break the ice with customers if you tell them that you spent years living with nine other lads and a pot-bellied pig,’ laughs Wessels.

Klok threw himself into competitive rowing, got injured and then concentrated on coaching competitive rowers instead. Like Wessels, he was a member of the Ceres student society. Klok also spent years playing keyboards in Malac Banda, a gypsy band. ‘All those tunes I used to practice over and over again used to drive my flatmates in Iolkos crazy.’

He still plays music with other former Ceres members in the ska and rock band Overinflated.

Wessels spent a year in the Senate, Ceres’ governing board, while Klok sat on Argo’s
WHERE DO BIOTECHNOLOGY STUDENTS END UP?
A total of 329 people have graduated with a Master’s in Biotechnology since 1 January 1999. Information on their current job is available for 107 of them. More than half of these alumni are working at universities and 18 per cent at research institutes. About six per cent are working in healthcare, five per cent in the food industry, six per cent in ‘other industries’ and five per cent for an engineering or consultancy firm. Source: KLV Wageningen Alumni Network

Doubts about lab work
Before going to Wageningen, Wessels, who grew up in Zeist, did a year of Aerospace Engineering in Delft. But he missed the chemistry and biology, so he switched to Biotechnology. ‘I knew at once that I was in the right place but I did start to have doubts when we got given more and more lab work.’ His graduation subject of biochemistry convinced him that he was not made for a career as a scientist. ‘You get caught up in your own research in a narrow field.’ Wessels then did an eight-month stint as an intern for Heineken in Congo. The brewery in Kinshasa wanted to improve the quality and flavour of the beer and speed up the fermentation process. ‘It was an unusual experience. To get people on board for a year. That was when he met his wife Susanne van Reedt Dortland, who was on the board of the student rowing club Njord in Leiden. Wessels fell for Laurine van den Ban, a Management, Economics and Consumer Studies student whom he met via someone on his course who shared a house with her.

On the road a lot
After his internship in Congo, Wessels did like the open day,’ recalls Klok. Once there, he soon realized that doing calculations and modelling appealed more to him than standing in the lab with pipettes. ‘Modelling is really about building a logical sequence of steps.’

For his final internship at the KWR Watercycle Research Institute in Nieuwegein, he carried out research on using UV light to kill bacteria in water, combining modelling with lab work. ‘I was able to get the maximum out of the research study by developing the model first, experimenting, testing the model in practice and then adjusting it. I thought that was awesome.’

Klok then learned about solving problems in an extra module – waste water treatment – in Environmental Technology. ‘I enjoyed that and it appealed to my idealistic side. In Biotechnology, I had learned how to make products that earned a lot of money; that was a different approach to that of solving problems.’ As luck would have it, Environmental Technology had a PhD position available, financed by Shell, for research on the desulphurization of gas using sulphur-oxidizing bacteria.

Board for a year. That was when he met his wife Susanne van Reedt Dortland, who was on the board of the student rowing club Njord in Leiden. Wessels fell for Laurine van den Ban, a Management, Economics and Consumer Studies student whom he met via someone on his course who shared a house with her.

Do not hallucinate.
THE LENIGER BRUIN KÜHN FUND

Incentive for food technology scientists

The Leniger Bruin Kühn Fund supports food technology at Wageningen University, this year with the first Leniger Lecture, and in 2016 with a visit to a congress for two outstanding students. And there is more in the offing.

TEXT YVONNE DE HILSTER PHOTOGRAPHY GUY ACKERMANS

They still have to figure out the details but the idea is crystallizing. ‘If everything works out, we will be helping a scientist from Latin America to spend a sabbatical as a visiting researcher at Wageningen,’ says Cecilia Bruin-Kühn, who together with her husband laid the foundations for the Leniger Bruin Kühn Fund.

For the sabbatical, they are focusing on projects related to sustainable waste processing and the reuse of residual matter from agricultural or industrial processes. ‘Take the example of the skin and pulp from coffee beans, which are currently used – if at all – as compost, but could contain valuable compounds. By turning waste streams into something of value, food technology can help enhance sustainability and add value to society, which fits in with Wageningen UR’s mission.’ This ties in with one of her reasons for becoming involved with the fund. ‘I wanted to help Latin America.

The sabbatical for a foreign assistant or full professor is all about “teaching the teacher”.

SOMETHING IN RETURN

Her husband Solke Bruin started the named fund in 2008. It was given the name of Professor H.A. Leniger as well, the man who set up the Food Technology, Food Chemistry and Food Microbiology degree programmes at Wageningen (see box). Two years later, Cecilia joined the fund too.

Both the founders have a background in food technology, food safety and the private sector. Cecilia Bruin-Kühn used to work for Unilever and has spent years as an international consultant in R&D and legislation relating to product approval and labelling. Solke Bruin, who is taking it easier these days, studied at Wageningen and got his PhD there, then worked at Shell before becoming professor of Food and Bioprocess Engineering at Wageningen University in 1974. In 1982 he left to work for Unilever’s Dutch R&D department. After he retired he established a chair at Eindhoven University of Technology. ‘I got into a conversation one day with Rob Tazelaar of the University Fund Wageningen. I said I wanted to do something in return for my academic field,’ says Bruin, who is still grateful for the government grant that enabled him to complete his studies. ‘I also wanted to encourage collaboration with other disciplines, as innovation is often the result of cross-fertilization.’

PROFESSOR LENIGER

Prof. H.A. Leniger (1911-2003), who was educated at Delft University, became professor of Agricultural Technology in Wageningen in 1950. In response to the growth of the food industry, he set up the Food Technology, Food Chemistry and Food Microbiology programmes. Leniger was rector magnificus from 1972 to 1975. Up to the Second World War he worked as a tea expert in the Dutch East Indies.

http://edepot.wur.nl/320683.
This resulted in the first Leniger Lecture in June. Bruin: ‘Wageningen doesn’t have an equivalent of the famous Kruyt Colloquium at Utrecht University, but we hope this will now develop at Wageningen too.’ The symposium, which was organized by the Food Process Engineering group on behalf of the Leniger Bruin Kühn Fund, was well attended by students, researchers and people from the business community. The guest of honour was Professor Peter Lillford from the University of Birmingham. He talked about ‘Future foods and designs for health and sustainability’.

Bruin and his wife were very pleased when the chair group suggested inviting Lillford. ‘When I was working at Unilever, he had a similar position at Unilever in England and we became friends. And as the icing on the cake we had Louise Fresco introducing the speaker,’ says Bruin.

SHARING KNOWLEDGE
A third aim of the Leniger Bruin Kühn Fund is to provide support for outstanding students. That idea arose last year as the couple walked around the biannual World Congress of Food Science and Technology, which took place at Cecilia Bruin-Kühn’s alma mater, McGill University in Montreal. ‘At one point I was standing there among the students and PhD candidates showing their posters and talking enthusiastically about their research,’ says Solke Bruin. They were bubbling over. But to my surprise, there was no one from Wageningen.’ That prompted the couple to approach the chair groups in the field of food technology with a proposal to sponsor one or two students every two years so that they can attend a conference and present a poster. Cecilia Bruin-Kühn: ‘We know how important this is for acquiring experience and getting to know other people in your discipline.’

The chair groups nominated four students, all of whom had achieved a grade 9 (out of 10) for their Master’s thesis. Bruin and his wife eventually selected Frank van der Veer and Anja Schröder for the 2016 IUFoST Congress in Dublin. ‘It was a difficult choice to make but it was also a pleasure to be able to judge the four theses and pitches by this new generation of food technology scientists. We sincerely hope that the fund’s objectives and activities will encourage others to contribute too because together we can achieve even more for students, researchers and science.’

‘It was a pleasure to be able to judge the four theses’
Mansholt Award goes to Simon Groot of East-West Seed

The University Fund Wageningen has given this year’s Mansholt Business Award for Sustainable Entrepreneurship to Simon Groot, the founder of East-West Seed.

The international vegetable plant breeding company with 4000 employees spread across seven countries is an example of how commerce and development cooperation can go hand in hand, says the jury. Simon Groot (80) comes from a West Frisian market gardening family. When the family business was sold in 1980, Groot decided to put his financial assets, expertise and experience to good use helping small farmers in Southeast Asia. ‘The farmers were carrying out their own plant breeding. Our improved seed let them produce more and earn more. We also gave them advice on the best cultivation methods. That increased our market and boosted the economy.’

Groot was handed the award on 7 September during the official opening of the academic year at Wageningen University. He will be using the accompanying cheque for 25,000 euros for scholarships and aid for local development.

‘Urbanization reinforces calls for local food’

The alumni attending the meeting of The Hague/Rotterdam alumni group in Museum Boerhaave on 22 October were addressed by Louise Fresco, President of the Executive Board of Wageningen UR. Indeed, the meeting was all about food innovations, the theme of the exhibition Foodtopia that Fresco put together for the museum earlier in the year.

Fresco spoke to an audience of over 100 alumni on such subjects as the challenges posed by urbanization for the global food supply. Farmers migrate to the city, while city dwellers become alienated from food production and there are calls for local food – a lasting trend, according to Fresco.

The second speaker was Joszi Smeets, director of the Dutch Youth Food Movement, which campaigns for a fairer and healthier food system. She focused on the opportunities for making the food supply chain shorter and restoring contacts between food producers and consumers. She also pointed to the role of diet in health. Figures show that obesity, high blood pressure and cholesterol and not eating enough vegetables and fruit are the main mortality risk factors, after smoking.

Foodtopia is on show through to 3 January 2016 in Museum Boerhaave in Leiden.

Alumni contribute to Belmonte

In the past few months, alumni raised 30,000 euros for the Belmonte Arboretum in Wageningen. That money is intended for the conversion and furnishing of the coach house. This conversion is part of the management plan for the next 10 to 20 years. The costs are covered by an EU grant. In 2012, the Belmonte Arboretum Foundation took over the management of the place from Wageningen University. The University Fund Wageningen is helping raise funds because the botanical garden is part of Wageningen’s heritage.

Rector visits Kenyan alumni

A number of alumni in Kenya keep in contact via social media, but they are spread across various small, informal groups. The University Fund Wageningen (UFW) used rector Arthur Mol’s visit to Kenya as an opportunity to organize a meeting for all the alumni there. A good 20 alumni attended the event in Nairobi. They may organize further activities as a way of reaching more alumni and staying in contact with Wageningen.

The UFW provides support for activities that connect alumni to Wageningen. Info: alumni@wur.nl
‘Campus looks bright and inviting’

‘It’s lovely to see everyone again,’ says Marco de Bakker. ‘It must be a good 10 to 15 years ago in some cases.’ He thinks Wageningen has changed an awful lot, though. ‘There are quite a few new buildings.’

Most people think the new campus is an improvement. ‘It looks bright and inviting. De Dreijen always seemed much more menacing,’ says Roy Tummers (Environmental Protection) in the afternoon during the official part of the reunion day. Four students from the 1990 cohort talked about their careers: an entrepreneur (in Vietnam), a mayor (in Wijk bij Duurstede), a professor (in Utrecht) and a water board department head (in Reest en Wieden). During the discussion, some alumni wondered whether today’s students are sufficiently well-equipped for working in a company. One alumnus notes that they are too modest in the way they present themselves compared with students from other universities, so they never really seem like civil service trainee material. One of the people at the reunion, businessman René Kilian, came especially from Denmark. He acquired additional skills as a student by having a lot of extra-curricular activities. ‘I learned most from what I did outside my degree course.’

Following in Odysseus’ footsteps

Roel Bout (MSc Soil Science, 1995) was travelling alone by yacht across the Ionian Sea off the Greek island of Ithaca when he took this photo. ‘My thoughts were not only on the wonderful scenery but also on Homer’s tale of Odysseus, the king of Ithaca and the man who came up with the Trojan horse, and his journey of self-discovery. That was basically what I was doing too. After years of working for the government, I’d resigned because I wanted to work outdoors rather than spend my time in meetings. I worked in the French wine sector, went on courses in financial trading in Switzerland and New York, harvested cork in Portugal and worked in the Greek yacht hire business. I took Wageningen World with me as reading material.’ Bout returned to the Netherlands last year. He is currently running an odd jobs business and writing a book on the options trade for private individuals. ‘Small investors can do fine alongside professional options traders as long as they have the right strategy.’

Interest in parents’ day is growing

The information day for parents of first-year students, which was instigated three years ago, is getting higher attendance figures every year. The parents’ day on 3 October attracted 800 parents, plus 400 first-years and other family members such as brothers, sisters and grandparents. There were presentations and tips for the first year at university, guided tours round the Forum and around campus, and a walk through the town centre where local businesses had organized activities. The University Fund Wageningen was at the parents’ day showing the good employment prospects for graduates. The Wageningen themes of climate, food, water, health and biobased production are important throughout the world. It takes graduates almost four months on average to find a job. They are twice as likely as graduates from other universities to end up working in research.

Info: hermien.miltenburg@wur.nl
PERSONALIA

Prof. Raoul Bino, WU PhD 1986 and Managing Director of the Agrotechnology & Food Sciences Group at Wageningen UR, has joined the top team at the Agri & Food top sector. 1 September 2015.

Bettina Bock PhD, WU Rural Sociology 1988 and a rural sociologist at Wageningen University, has been appointed professor holding an endowed chair in Population Decline and Quality of Life in the Northern Netherlands at the University of Groningen. 1 September 2015.

Tijs Breukink PhD, Erasmus University Rotterdam Business Economics 1987 and a member of Wageningen UR's Executive Board, has been appointed a member of the supervisory board of the Gelderse Vallei hospital in Ede. 31 September 2015.

Prof. Frans Brom, former professor of Ethics and chair of the Scientific Integrity Committee at Wageningen UR, has been appointed director секретary of the Scientific Council for Government Policy (WRR). 15 August 2015.

Hedwig Bruggeman MSc, WU Animal Science 1988, has been appointed business unit manager of the Centre for Development Innovation (CDI) at Wageningen UR. 1 November 2015.

Susan Duinhoven PhD, WU PhD 1992, has been appointed CEO of the Finnish corporation Sanoma. 23 September 2015.

Prof. Louise Fresco, WU Rural Sociology of the Non-Western Regions 1976, President of the Executive Board of Wageningen University, is ranked first in the Opzij Top 100 most influential women in the Science & Education category. 15 October 2015.

Marian Geluk MSc, WU Molecular Sciences 1989, has been appointed director of the Food & Nutrition Top Institute (TIFN). 1 August 2015.

Atze Jan van der Goot PhD, University of Groningen Chemical Technology 1991, assistant professor in Food Process Engineering at Wageningen University, has been appointed professor holding a personal chair. 1 October 2015.

Prof. Alfred Hartemink, WU Soil and Water 1994, has been appointed head of the Department of Soil Science at the University of Wisconsin-Madison, USA. 1 July 2015.

Riet Hilhorst PhD, WU Molecular Sciences 1980, has joined the governing board of the Royal Netherlands Chemical Society. 27 May 2015.

Prof. Thea Hilhorst, WU Rural Sociology of the Non-Western Regions 1988, has been appointed professor in humanitarian aid and reconstruction in disasters and conflicts at the Erasmus University Rotterdam. She will continue to work part-time at Wageningen University. 1 October 2015.

Prof. Bert Holtslag, WU PhD 1987, professor of Meteorology at Wageningen University, has been elected a fellow of the American Meteorological Society (AMS). 12 October 2015.

Wouter Kohlen PhD, WU PhD 2011, researcher within the Laboratory for Molecular Biology at Wageningen University, has been awarded a Veni grant. 17 July 2015.

Prof. Frans Kok, WU Human Nutrition 1979 and professor at Wageningen University, has been appointed Knight of the Order of the Netherlands Lion. 15 October 2015.

Prof. Hans Mommaas, WU Rural Sociology of the Western Regions 1982, has been appointed director of the Netherlands Environmental Assessment Agency (PBL). 1 November 2015.

Aalt Dijkhuizen PhD, WU Agrarian Economics 1977, former chair of the Executive Board of Wageningen UR, has been appointed a top expert in the Horizon 2020 Policy Support Unit by the European Commission. 4 August 2015.

Bart Parmet MSc, WU Tropical Land Development 1990, has been appointed director of strategy for the Province of Overijssel. 1 December 2015.

Qu Dongyu PhD, WU PhD 1996, has been appointed vice minister at the Ministry of Agriculture in the People’s Republic of China. June 2015.

Adriaan Rijnsdorp PhD, University of Groningen Animal Ecology 1980, professor at Wageningen University and researcher at IMARES Wageningen UR, received the Outstanding Achievement Award at the Annual Science Conference in Copenhagen. 21 September 2015.

Gerdien Van Schaik PhD, WU Zootechnics 1995, has been appointed professor of Monitoring and Surveillance of Farm Animal Health at Utrecht University. 1 October 2015.
IN MEMORIAM

Mr F.W. Alberts MSc, WU Land Development 1975, passed away at the age of 65. 20 June 2015.
Mr A.L. Alons MSc, WU Phytopathology 1970, passed away at the age of 74. 30 April 2015.
Mr G. Bikker MSc, WU Forestry 1973, passed away at the age of 70. 17 October 2015.
Mr P. Cox MSc, WU Rural Sociology of the Western Regions 1987, passed away at the age of 83. 14 June 2015.
Mr J.G. van de Grootevheen MSc, WU Food Technology 1979, passed away at the age of 61. 12 December 2014.
Ms C. Hartman-Dröge MSc, WU Horticulture 1950, passed away at the age of 91. 28 September 2015.
Mr J. Heeres MSc, WU Phytopathology 1968, passed away at the age of 75. 11 August 2015.
Mr M. Heuver MSc, WU Agricultural Plant Breeding 1958, passed away at the age of 84. 30 September 2015.
Mr N.G. Hogenboom PhD, WU Horticulture 1965, passed away at the age of 77. 17 June 2015.
Mr O.W. Hoogerhuis PhD, WU PhD 2003, passed away at the age of 72. 25 July 2015.
Mr M. Heuver MSc, WU Agricultural Plant Breeding 1958, passed away at the age of 84. 30 September 2015.
Mr K.J. l’Istelle MSc, WU Land Development B 1981, has passed away.
Mr C. Kaai MSc, WU Horticulture 1959, passed away at the age of 87. 25 September 2015.
Mr I.P. Kirpensteijn MSc, WU Forestry 1959, has passed away.
Mr A.O. Klomp PhD, WU Tropical Plant Breeding 1965, passed away at the age of 79. 11 August 2015.
Mr C. Koorenneef MSc, WU Water Purification 1966, passed away at the age of 76. 8 July 2015.
Mr G.M. de Lange MSc, WU Biology 1982, passed away at the age of 59. 20 September 2015.
Mr J.P. Manzi BSc, WU MSc student of Environmental Sciences, passed away at the age of 32. 8 August 2015.
Mr P.P.C. van Meer MSc, WU Forestry 1967, passed away at the age of 75. 29 July 2015.
Mr H.G. van der Meer MSc, WU Agricultural Plant Breeding 1970, passed away at the age of 73. 3 October 2015.
Mr G.H. de Moed MSc, WU Biology 1989, passed away at the age of 48. 25 May 2014.
Mr J. Heeres MSc, WU Phytopathology 1968, passed away at the age of 75. 11 August 2015.
Mr M. Voogd MSc, WU Forestry 1992, passed away at the age of 52. 31 August 2014.
Mr E. Westphal PhD, WU Tropical Plant Breeding 1966, passed away at the age of 77. 17 September 2015.

PERSONALIA

Prof. Louis Schoonhoven, University of Groningen 1962, emeritus professor of Entomology at Wageningen University, received the Jan Wolkers Prize for the best nature book. 19 October 2015.

Louis Stuyt PhD, WU Land Development B 1980, won the Water Republic innovation award for food production methods that are less susceptible to salination, which he developed together with Melle Nickel BSc (WU International Land and Water Management 2011). 23 August 2015.

Jan van Tatenhove PhD, WU Rural Sociology of the Western Regions 1987, has been appointed a professor holding a personal chair in Marine Governance within the Environmental Policy Group at Wageningen University. 1 October 2015.

Prof. Jack van der Vorst, WU Agrosystems 1994 and professor of Operations Research and Logistics at Wageningen UR, has been appointed managing director of the Social Sciences Group at Wageningen UR. 15 September 2015.

Prof. Michel Wedel, WU PhD 1990, has been appointed Distinguished University Professor at the University of Maryland in the USA. 16 July 2015.

CORRECTION

The previous issue incorrectly stated that Arend Jan Hendriks (WU Zootechnics 1983) had passed away. Since 1998, Hendriks has had a 300-hectare dairy farm with 400 dairy cows in the village of Bukowiec, in northwest Poland. Hendriks lives in the Netherlands.
Water Delight: Colourful debate across themes

Do we need more women in water management, or simply more diversity in social and other competencies? And how can we implement great Dutch plans elsewhere? Engineering, environment, gender issues, and economic sustainability: all aspects of international water management were touched upon during the first large interdisciplinary debate of KLV on 20 October 2015

Five KLV study circles were involved - Network Land & Water, Network Environmental Sciences, Study Circle Agricultural Economics, Women’s Network Wageningen Alumni and Wageningen Debating. KLV played a facilitating role.

The debate was organised as part of KLV’s policy pillar public debate and dialogue. However, it was also a pilot full of opportunities for the study circles, says Eddy Moors, chair Network Land & Water: ‘If you organise something as a network, the group that attends is often small compared to the energy it costs to put the event on. When KLV proposed the idea of this debate, we thought: “fine, but we also want to see 100 to 200 people attending”.’

Moors knows that you need a popular subject or an animated speaker to achieve this. A crowd puller was found in Henk Ovink, who as the first Dutch Special Envoy for International Water Affairs conveys our approach at an international level. He attracted a diverse group of about 130 people to Wageningen.

The debate
In 20 minutes, Ovink gave an overview of the worldwide water problems. The conflict in Syria that started due to drought, the heavy floods in Germany two years ago, and hurricane Sandy. And in all honesty, our earth is not particularly blue: all of the fresh water together forms a drop just 170 miles in diameter. Water is the biggest risk in the future, when there will be more emergencies with a larger impact than now. The problem is complex. Climate change is a slow process. For example, 26 cm of sea level rise in one hundred years is a lot for an island, but little for politicians. (Or, as the Americans would say: ‘Climate change is slower than congress’.)

We lack a long-term vision, but according to Ovink, a long-term approach with short-term interventions is needed. With funding that is transparent and accountable, and with local collaborations in which everyone is always welcome to join.

Three PhD students posed a proposition. The public responded using a green card to say they agreed and a red card to say they disagreed. After that, Ovink and the audience engaged in a lively discussion.

Regional above local?
The first PhD student, Debora de Block, stated: ‘a regional, ecosystem-based approach gives a more sustainable solution than a local approach. At one location people take protective measures, while a factory slightly further on discharges its waste. That is why you should consider the Delta in its entirety.’
Most of the audience agreed with the proposition, as did Ovink. ‘However’, he said, ‘you also need local interventions, as not everything is possible at the regional level.’ A few people in the audience also dared to place question marks. There are often many stakeholders involved within and outside of the area, and it is difficult to manage that complexity said one participant. Furthermore, the proposition oversimplifies the problem, because in practice there is rarely a clearly defined area.

Too much concept and design?
‘In the Netherlands, we are stuck in the concept and design phase,’ stated PhD student Karianne de Bruin. ‘This is insufficiently linked to the construction and maintenance phases. We need to know our clients and better express the costs and benefits in monetary terms.’

Ovink also sees opportunities, but is less pessimistic. For example, the new Suez Canal is a superb piece of engineering. Attributing value is still a problem though. How do we export knowledge to places where the capacity and finances are lacking? The key: local partners. Ovink: ‘Without that connection with the community, everything will fail. Construction will be initiated but not completed, and no maintenance will be performed. And no, such collaboration is hardly ever spontaneous. You really need to roll your sleeves up and work through the difficulties without giving up.’

More female competencies?
Last proposition. ‘The water sector is male dominated, especially abroad, and we need more feminine competencies’, argues PhD student Janwillem Liebrand.

This proposition elicited a lot of discussion. Ovink states the nuance: feminine does not necessarily mean ‘from or by women’. This is about social competencies that the water sector can make good use of. Nevertheless, it is important to involve women. Especially in developing countries: it is often the women who are responsible for water, who start small companies and who ensure that children go to school.

One participant said we need to look more from the perspective of minorities in general and not just women. In fact, the conclusion appears to be that it is diversity in general what is needed.

Follow-up
Eddy Moors invited everybody to contribute to a paper about the subject. After that, it was time for a drink. The participants could look back at an interesting debate with strong speakers. The discussion might have lacked a clear focus but as somebody also said: ‘We might not have reached a clear conclusion due to the range of views expressed, but in the space of two hours we have gained a really good idea of the factors involved.’

Moors was also satisfied with the good turnout and fine balance between speakers and discussion. ‘The next meeting could definitely be a bit livelier, though. The younger participants did not get involved until later in the discussion. Perhaps we can loosen up the debate with a general strong proposition. We will now do an evaluation. KLV has the ambition to organise a conference once every two years in collaboration with the study circles and I think there is enough momentum for such a follow-up.’
Teaching programmes for water issues in Latin America

“We have been working with the Water Institute at the UMSS, a university in Cochabamba (Bolivia) for more than 20 years”, says Jeroen Vos of the Water Resources Management group at Wageningen University. The idea arose there to apply the interdisciplinary Wageningen approach to water topics elsewhere in Latin America too. That Wageningen approach, explains Vos, consists of a combination of technical know-how about water quality, water quantity and the irrigation requirements of crops and an understanding of social issues such as the allocation of water and power relationships. Using money from the EU, the chair group helped set up a network for lecturers at universities in Bolivia, Colombia, Ecuador, Mexico and Peru. Exchanges and training courses were used as a way of setting up or refreshing Master’s programmes in water management. ‘We did not do the teaching, as that is something the lecturers are perfectly capable of themselves’, says Vos. ‘But we do help with the exchange of ideas and teaching methods in order to improve the education programmes, put together teaching materials and encourage students to do field work.’ In all five countries, that has resulted in Master’s programmes that are now attracting about 20 new students a year – and this number is growing. But it has also led to courses for water researchers in the Water Justice Alliance, which is concerned with the fair distribution of water. The EU project has now come to an end but the involvement continues in the form of exchanges for lecturers and students from Latin America and Wageningen.
Info: jeroen.vos@wur.nl

Teaching programmes for water issues in Latin America