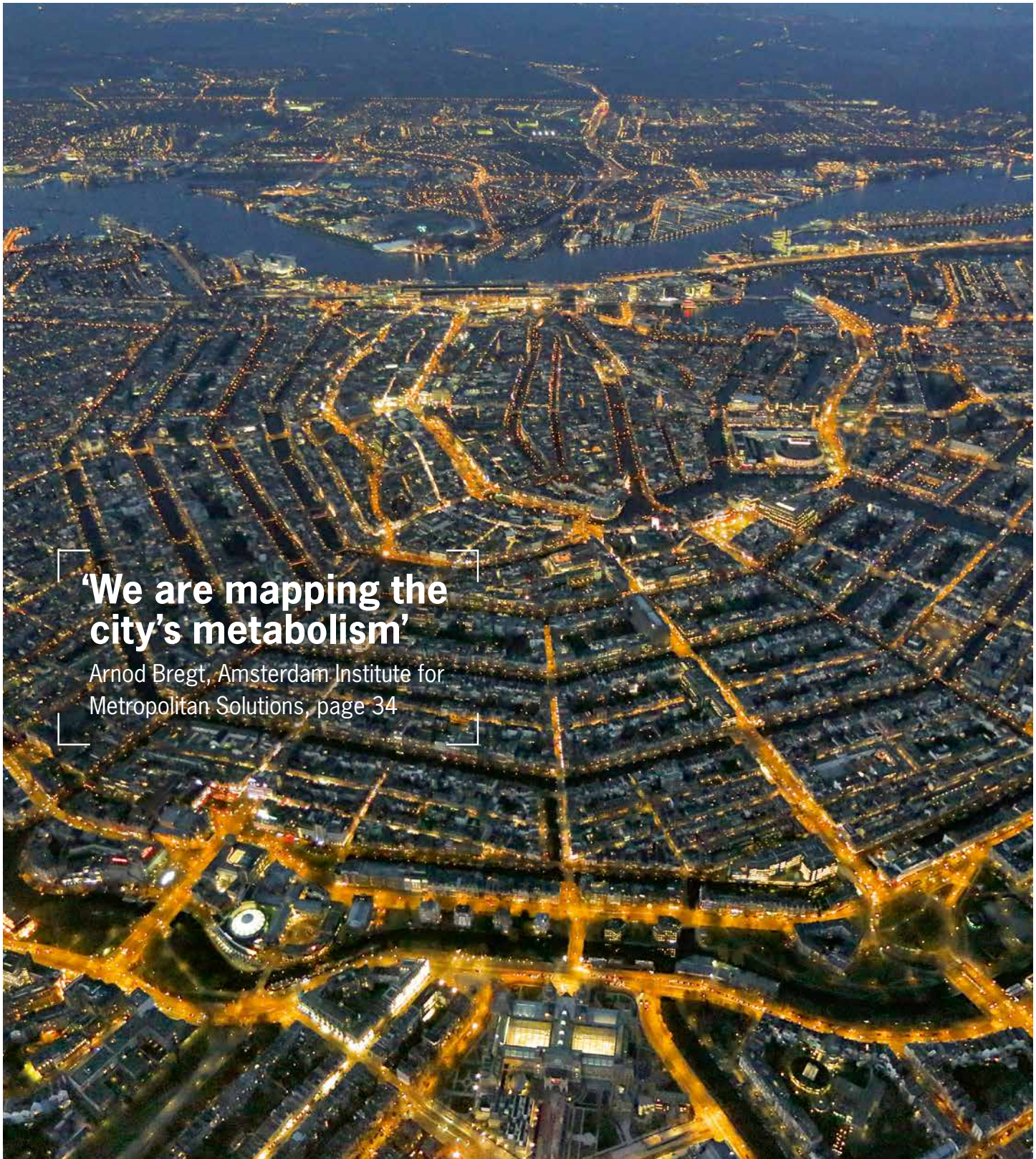
WAGENINGEN WORLD

MAGAZINE OF WAGENINGEN UR ABOUT CONTRIBUTING TO THE QUALITY OF LIFE

no.1 2015



‘We are mapping the city’s metabolism’

Arnod Bregt, Amsterdam Institute for Metropolitan Solutions, page 34

Undernourished seniors | The **tundra is melting** | **Shell’s age** comes to light | **Saltwater** farming
New animal lab protects people | Spreading **plant knowledge** in Africa | Volunteers on **ebola** frontline

WAGENINGEN UR
For quality of life

COLOPHON Wageningen World is the quarterly magazine for associates and alumni of Wageningen UR (University and Research centre) and members of KLV, the Wageningen Alumni Network. A PDF version of the magazine can be found at www.wageningenUR.nl/en/wageningen-world **Publisher** Wageningen UR, Marc Lamers, **Editorial Board** Hans Bothe, Yvonne Fernhout, Ben Geerlings, Francine Loos, Jeanette Leenders, Jac Niessen, Irene Salverda, Erik Toussaint, Delia de Vreeze **Editor-in-chief** Pauline Greuell (Corporate Communications Wageningen UR) **Magazine editor** Miranda Bettonville **Copy editor** Rik Nijland **Alumni news** Alexandra Branderhorst **Translation** Clare McGregor, Clare Wilkinson **Language editor** Clare McGregor **Art direction and design** gloed*communicatie*, Nijmegen **Cover picture** Aerophoto-Schiphol **Overall design** Hemels Publishers **Printer** Tuijtel Hardinxveld-Giessendam **ISSN** 2212-9928 **Address** Wageningen Campus, Akkermaalsbos 14, 6708 WB Wageningen, PO Box 409, 6700 AK Wageningen, telephone +31 317 48 40 20, wageningen.world@wur.nl **Change of address alumni** www.wageningenUR.nl/en/alumni.htm **Change of address associates** (mention code on address label) wageningen.world@wur.nl **Change of career details** alumni@wur.nl

The mission of Wageningen UR (University & Research centre) is 'to explore the potential of nature to improve the quality of life'. Wageningen UR includes nine specialist applied research institutes and Wageningen University. These institutions have joined forces to contribute to finding answers to crucial questions related to healthy food and a sustainable living environment. Wageningen UR has a staff of 6,500, 10,000 students, 35,000 alumni and 40 sites, with a turnover of 662 million euros. Institutes of Wageningen UR: Alterra, LEI, Plant Research International, Applied Plant Research, Wageningen UR Livestock Research, Central Veterinary Institute, Wageningen UR Food & Biobased Research, IMARES and RIKILT.

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FEATURES

PHOTO GUY ACKERMANS

Soil in the spotlight

'Fantastic that 2015 has been declared international year of the soil by the United Nations. There is increasing recognition of the crucial role of the soil for understanding and solving global problems in the fields of climate, water, biodiversity and food.
'Attention to this has been lacking in recent decades. There is a great natural variation in soils and a very wide range of threats, such as pollution, salt and loss of nutrients and organic matter, as well as drought and wind and water erosion. So there is no straightforward yardstick for quantifying soil degradation, as there is for water quality or rise in temperature. That makes it difficult for governments and policymakers.
'That is why there is an international effort to catch up and to arrive at harmonized methods of classifying soil degradation properly, on a scale of 1 to 10 for instance. That will also make it possible to gain insight into the effect of conservation measures, which will be reflected in an improved grade. You need a simplified approach like this in order to embed soil conservation more fully in policy.
'The time is ripe for this. Researchers working on important UN conventions, such as those on controlling climate change, conserving biodiversity and combatting desertification, are convinced by now that the soil is the common denominator in these problems. That is a great step forward. It led to the designation of the year of the soil, and it is noticeable in Brussels too. For years they were talking mostly about water and the climate; now they are talking about the soil as well.
'In order to keep up this awareness-raising process, we have launched the Wageningen Soil Network. Together we are going to communicate the importance of soil research, to secondary school students for instance, and to policymakers as well. The media we shall use will include videos, exhibitions and press releases. And we shall make clear that action is required. Worldwide, 25 percent of the land surface is already suffering serious degradation.'

Coen Ritsema is professor of Soil Physics and Land Management at Wageningen University

AGRICULTURAL ECONOMICS

Russian boycott has not affected prices

The Russian boycott of European fruit and vegetables has had no effect on the exports and prices of Dutch tomatoes, apples and pears. This conclusion was drawn by LEI Wageningen UR after a comparison of the price and exports over recent months with the trends in previous years. The conclusions are remarkable because the Dutch horticultural sector demanded government support when the boycott was announced. Vegetables which the Netherlands hardly exports to Russia, including bell peppers and cucumbers, were not included in the analyses. *Info: siemen.vanberkum@wur.nl.*

PLANT DISEASES

Donation for banana disease research

Wageningen UR has received a donation of more than 1.7 million from the Dioraphte Foundation for its banana research for the next five years. The donation will make it possible to expand banana expert Gert Kema's team working on Panama disease and to start strategic lines of research. Dioraphte supported Kema's earlier research on another feared fungal disease, Black Sigatoka. *Info: gert.kema@wur.nl*

PHOTO HOLLANDSE HOOGTE

FOOD INNOVATIONS

PHOTO DAVID VAN DAM

Fresco is guest curator food exhibition

Wageningen UR president Louise Fresco collaborated as guest curator on the creation of the FOODTOPIA exhibition in Museum Boerhaave in Leiden. The exhibition about food innovations through the centuries includes ideas from Wageningen, and is designed to be accessible and interactive.

For the exhibition Fresco put together a personal top 10 of noteworthy food innovations for the future which could help avert a global food crisis. Among them are the in vitro burger, recently added to the Museum Boerhaave collection, a camera which can determine how fresh fish is, and a method for the safe conservation of fresh food using radiation. In FOODTOPIA, Museum Boerhaave, the national museum for the history of the natural sciences and medicine, treats visitors to a tour of a century of Dutch food innovations. One example from the archives is Hugo de Vries's mutation theory from around 1900. De Vries, a botanist and geneticist, thought new species appeared on the scene quite suddenly. This theory nourished the idea that a better world was possible in which people could create new plants and animals and there would be enough food for the ever-growing world population. Another example is the development of margarine as an alternative to butter which would stay fresh longer. The first margarine was produced in the second half of the 19th century, but only in the 1950s did new technology make it possible to give it a buttery flavour. The exhibition has an extensive supplementary programme with lectures by well-known scientists in the fields of nutrition, food technology, environment, ethics and cultural history, as well as children's lectures and an educational programme for secondary students. On this the museum is collaborating with Wageningen UR and the Biological Sciences and Society Foundation. FOODTOPIA runs until Sunday 1 November.
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BIO-INTERACTIONS

New research on bee health

Wageningen UR, natural history museum Naturalis and the Dutch centre for bee research (NCB) have launched a multi-year study of bee health and winter deaths.

The Bee Council, which has also set up an action programme on bee health, will oversee the quality and independence of the study. Beekeepers will be asked to help with the field research.
Research by Wageningen UR and the universities of Leiden and Nijmegen on wild bees in museum collections has shown that a drop in the number of flowers in the landscape is a key reason for the decline in wild bee species. For this research the pollen being carried by 57 bee species preserved before 1950 was analysed. The analysis showed that the size of the population of flowering plants which attract a bee species correlates with the size of that bee population. Large bees and bees which become active later in the season are less apt to thrive. The study appeared in PNAS at the end of November.
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EDUCATION

Course for 34,000 students

Before the launch of Wageningen University's first free course taught through the internet, interest was expressed by 34,000 people in 195 countries. Most of those who signed up for Professor Sander Kersten's lecture series Introduction to Nutrition were between the ages of 25 and 35 and from western or emerging economies.

Experiences at other universities show that only a fraction of those who sign up usually complete the whole MOOC (Massive Open Online Course). A second Wageningen MOOC started at the end of January: Growing our Future Food. A decision will be taken this autumn on the next two MOOCS to be launched in 2016. *Info: ulrike.wild@wur.nl*

REMOTE SENSING

Satellite sees vole plague

The vole plague in the south of the Dutch province of Friesland has damaged 12,000 hectares of grassland so badly that it can be seen on satellite images. This came out of a study by Alterra Wageningen UR of the images on www.groenmonitor.nl, which keeps track of the biomass of the Netherlands. The voles dug tunnels under the grassland and ate the roots so that the grass died. As a result, in January whole regions of south Friesland had bare or half-bare ground instead of green meadows. Reports of a vole plague in Friesland were already coming through last September. The first damage was visible on satellite images at the beginning of November, says Alterra. One of the reasons for the vole plague was the hot dry summer followed by a mild winter. At present there is no solution in sight. *Info: gerbert.roerink@wur.nl*

WAGENINGEN ACADEMY

Food & Agribusiness Seminar EFAS

The European Food & Agribusiness Seminar EFAS is the only executive education event of its kind in Europe that offers top-ranked executives interaction with agribusiness industry leaders from across the global food system. The next edition will take place from 18-21 October 2015, in Rome. At the core of the seminar are real-time business cases to report and describe how agribusiness industry leaders are driving change in their businesses in an increasingly complex, uncertain and demanding global marketplace. This year, in the presence of Professor Louise Fresco, President of Wageningen UR, EFAS will focus on the role of companies in leading the response to the needs and demands of society for improving nutrition and health, sustainable agriculture, food security, food safety and biodiversity.
More information: www.wageningenacademy.nl/efas

VIROLOGY

Chikungunya virus's weapon discovered

Researchers at Wageningen University and their colleagues from Leiden and Australia have discovered why humans fall ill when infected by the Chikungunya virus. A protein in the virus blocks essential processes, including the production of RNA and protein in infected cells. Normally, these processes can keep a virus under control. The discovery provides some starting points for developing antiviral treatments.

The virus, which has been raging for months in the Caribbean and other places, is carried by tiger mosquitoes. Symptoms such as high fever, skin rashes and severe joint pain can go on for months. In 2013, Wageningen University developed a prototype vaccine which provides total protection in mice. The effectiveness of the prototype is now being tested on monkeys in collaboration with Top Institute Pharma and the Erasmus Medical Centre.

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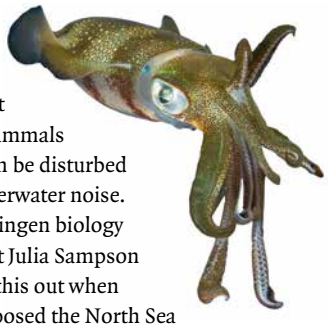
MARINE BIOLOGY

Noise bothers cuttlefish



It is not just mammals that can be disturbed by underwater noise. Wageningen biology student Julia Sampson found this out when she exposed the North Sea cuttlefish, or sepia to noise.

At pitches which humans hear too, and at moderate volumes, the cuttlefish changed colour, while at loud volumes they spouted ink and swam away. Samson published her findings in the *Journal of Experimental Biology*.

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PLANT BREEDING AND CULTIVATION

Dutch soya production is taking off

Soya farming is still pioneer territory in the Netherlands. But a farmer can already achieve harvests per hectare that bear comparison with those in Brazil and the United States.

Soya was originally a subtropical crop, just like maize. The first varieties suitable for the Netherlands came onto the market three years ago, and in 2014 soya was grown on 100 hectares of land. The average yield was 2.9 tonnes per hectare, comparable with summer grain harvests, and the biggest yield was nearly 4 tonnes.

Most Dutch soya is sold to the food industry, for soya milk for instance. 'But there are also organic dairy and poultry farmers who add organic 'nedersoya' to their feeds. Because it is not easy to find organic and guaranteed GM-free protein crops, and they are expensive too,' says Wageningen UR researcher Ruud Timmer from Applied Plant Research in Lelystad.

Wageningen UR is working with the agricultural cooperative Agrifirm on a study on the cultivation of Dutch soya. The team is doing trials with a variety of soil types, fertilizers and distances between plants with a view to raising soya production. This is necessary because land is much more expensive in the Netherlands than in Brazil. But the market value of Dutch soya is higher too because it is not genetically modified and does not come from cleared rainforest.

With a view to keeping farmers informed, Wageningen UR and Agrifirm organized the second Dutch Soya Day at the end of last November. This time the practically oriented discussions focused largely on nitrogen fertilizer and new varieties which ripen faster and deliver bigger yields. Timmer: 'The current breeds can be harvested around 1 October. You would rather harvest earlier, in September, because the weather is better then.' Wageningen UR is working on new varieties together with German and Belgian colleagues, who are busy establishing soya farming there too. 'In the short term we are dependent on what plant-breeding companies elsewhere in Europe bring onto the market.'

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FISH MIGRATION

Groningen eel spotted in Westerschelde estuary

An adult eel has succeeded in reaching the sea through the fish pipeline at Delfzijl, in the north of the Netherlands. A signal from its transmitter was picked up at the mouth of the Westerschelde estuary on the southern Dutch coast.

Together with Van Hall Larenstein Applied Science University, IMARES Wageningen UR had fitted the eel with the transmitter so as to keep track of it during migration. Eel grow up in fresh water and migrate to the sea to breed. As far as we know, the fish swim 6000 kilometres to the Sargasso Sea in the Atlantic Ocean near the island of Bermuda.
During the migration from fresh waters to the sea, however, the fish have to get past dams, pumping stations and sluice-gates. This can pose problems. To remove the barriers, the northern water board started a project called 'Making way for fish'. In this project several fish passages and kilometres of nature-friendly waterway banks are being created and studied. The glass eel with the transmitter – of breeding age and called Ali by the researchers – was used to validate the fish passage at Delfzijl. Sometime after the release of the eel, the researchers were surprised by a message from Belgium. The network of Belgian research institutes for fish migration research, LifeWatch, had picked up a signal at the mouth of the Westerschelde of a fish that was unknown to Belgian researchers. After a bit of detective work, it turned out to be the Groningen eel that went to sea at Delfzijl.
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ENVIRONMENTAL TECHNOLOGY

Blue energy on the dike

On 26 November, King Willem-Alexander of the Netherlands officially opened the world's first pilot plant for 'blue energy': energy generated by using the difference in charge between particles in salt and fresh water. The knowledge the plant is based on originally came from Wageningen University's environmental technologists. The first lab tests in 2006 produced a capacity of 0.1 watts, just enough electricity to turn a small propeller. The new pilot plant will produce 50,000 watts.
Upscaled in the Netherlands, this discovery could take the form of 'energy dikes'. The Dutch dikes would then have the potential to produce a maximum of 3000 megawatts. Because the water is filtered, it is important to study the ecological and economic effects of the technique. Info: martin.baptist@wur.nl

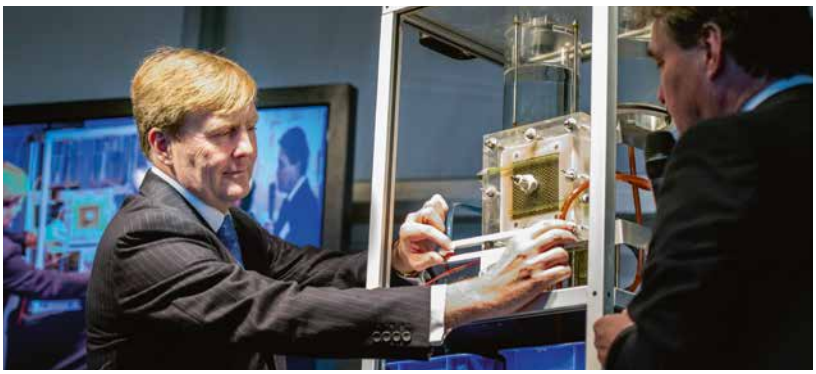

PHOTO HOLLANDSE HOOGTE

CLIMATE

More CO_2 does not boost forest growth

Tropical trees have not started growing faster due to the increase in CO_2 in the atmosphere. This is important news for the projections of the international climate panel IPCC, which form the basis of international climate policy.

Since 1850, when industrial development in Europe was in full swing, CO_2 levels in the atmosphere have increased by about 40 percent. 'Almost all climate models assume that CO_2 stimulates the growth of trees in the tropics,' says Peter van der Sleen of Wageningen University, who contributed to this research reported on in *Nature Geoscience* in January. 'This would mean that tropical forests can capture some of the extra CO_2, as it were. Our study show that this is probably too optimistic an assumption.'
Experiments have shown the CO_2 can stimulate the growth of trees through changes to the leaves. In order to measure these changes in tropical rain forests, the wood of trees in Bolivia, Cameroon and Thailand was analysed. This analysis showed that the trees had on average suffered less water stress than 50, 100 and 150 years ago. The big question was whether this improvement in the water supply led to an increase in the growth of the trees.
The trees' growth rings were a source of information about the growth, physiology and environment of the trees over a long period. In none of the forests studied, however, was evidence found for an increase in growth over the last 150 years.
This does not make tropical forests any less important for the global carbon cycle, however. Co-author Pieter Zuidema: 'These forests contain vast quantities of carbon and deforestation causes massive emissions. Our study only shows that in existing forests the projected additional growth due to an increase in CO_2 has not occurred.'
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PLANT BREEDING

Bitter cucumbers as medicine

Chinese researchers have identified the elements that can make cucumbers extremely bitter. They owe the discovery, published in *Science* at the end of November, in part to professor of plant physiology Harro Bouwmeester of Wageningen University and his colleagues from Japan and the United States. The knowledge about the genes involved is key because the bitter substances suppress tumours. So the knowledge can be used to breed extremely bitter cucumbers for medicinal purposes. In the plants the substances prevent damage by gnawing animals.
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INFORMATION SUPPLY

Website maps agriculture sector

The website launched last year for research results from LEI Wageningen UR – agrimatie.nl – has been expanded. Besides information from the CBS statistics and the LEI Farm Accountancy Data Network, since January the portal has also offered agricultural trade data and data on long-term developments in agricultural prices. This way the site offers information about economic results, sustainability indicators, surface areas, livestock, labour, prices, soil use and crop protection and can be searched by sector, theme or project. The English version is called agrofoodportal.nl.
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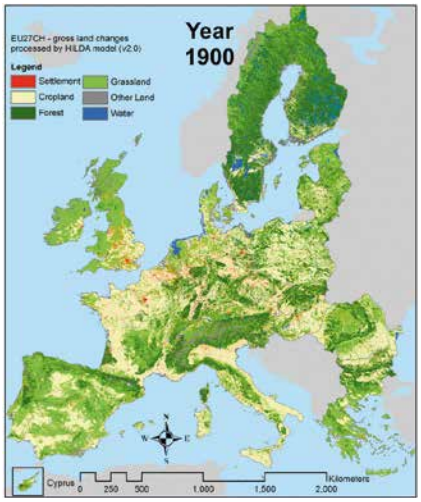
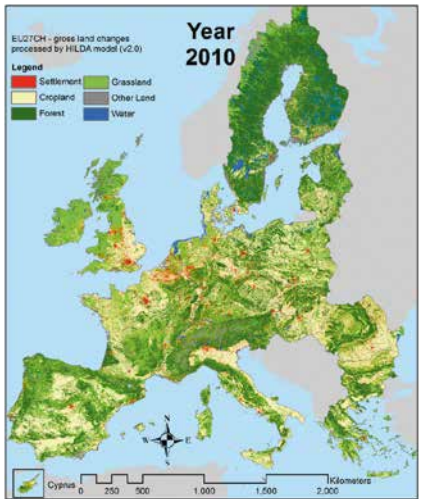
LAND USE





Both forests and cities gain ground in Europe

The European landscape has gained a lot of forest in the past century, observed PhD candidate Richard Fuchs of Wageningen University, using satellite images and information from encyclopaedias, online archives and maps.

For his research Fuchs reconstructed changes in land use in order to determine the influence of climate change on them. After fossil fuels, changes in land use are the main cause of global CO_2 emissions. 'Around 1900 there was hardly any forest left in Europe because wood was the raw material for almost everything,' says Fuchs. The decline in the use of wood, the reforestation programmes after World War II, and the abandonment of marginal land by farmers all contributed to a turnaround. In total, about half the land in Europe has changed in character. The maps which Fuchs makes also show that Europe's cities have grown even more than its forests: since 1900, the built-up land surface of Europe has more than doubled.
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TOXICOLOGY

Hobby chicken lays eggs with more dioxins

Eggs from chickens kept as a hobby generally contain higher levels of dioxins and PCBs than eggs from the shops, shows research by RIKILT Wageningen UR together with GGD public health services, National Institute for Public Health and the Environment RIVM and the Dutch Food and Consumer Safety Authority NVWA. The study was set up after some high levels of dioxins were found in samples of eggs provided by a few hobby poultry-keepers near Harlingen. Measurements then taken all around the Netherlands revealed no regional differences and no source. The main reason is likely to be eating soil. The final report contains recommendations for domestic poultry-keepers. *Info: ron.hogenboom@wur.nl*

MARINE ECOLOGY

Grey seal eats porpoise

The dozens of badly mutilated harbour porpoises washed up on Dutch beaches every year are not victims of fisheries or shipping but of grey seals. This has been confirmed by research by IMARES Wageningen UR, Utrecht University and research institute NIOZ. Their DNA analyses and dissections confirm earlier findings by Belgian and French researchers.

Between 2003 and 2013, dissections were carried out on more than 1000 beached porpoises – small whales that resemble dolphins. Most of the mutilated animals were young and in excellent condition. They were missing large chunks of nutritious fat. Microscopic research on the wounds of three of the porpoises which were washed up dead showed that they were wounded when still alive, ruling out the possibility that they were consumed as carrion. The DNA of three different grey seals was found in the fresh bite wounds. The diet of the grey seal consists mainly of fish, but it is possible that some grey seals prey on porpoises as well. Numbers of both porpoises and grey seals in Dutch waters have increased dramatically in the past few decades. It is not known how the seals get hold of the porpoises.

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PHOTO HOLLANDSE HOOGTE

CHAIN MANAGEMENT

PHOTO HOLLANDSE HOOGTE

Leftover food made into soup and omelette

Every day supermarkets and distribution centres discard fresh food products. To date, this waste flow has been incinerated, composted or processed into livestock feed. Some of it, however, is still safe to use in foods such as soup, smoothies or quiches. Research by Wageningen UR at the organic supermarket EkoPlaza shows that 'upcycling' is practically feasible too. In the pilot, delicatessen De Oorsprong used leftover organic potatoes and vegetables from distribution centre Udea in frittata (vegetable omelette) and soup. EkoPlaza put these products on the shelves with a label mentioning the use of waste products. As long as it cost no more than its equivalent without waste ingredients, many consumers preferred to buy the upcycled product. Thanks to the strong sales, the frittata and vegetable soup using discarded food are now for sale at all EkoPlaza branches.

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GREENHOUSE HORTICULTURE

PHOTO JAN SNEL

Research on LED lights for energy-saving greenhouses

Energy consumption in Dutch greenhouses could be halved by installing LED lighting in all greenhouses. To this end, technology foundation STW will be investing 2.3 million in horticulture expert Leo Marcelis's research at Wageningen University over the next five years. Philips, LTO Glaskracht and several plant breeders and growers will be contributing one million euros between them. Crops can be exposed to light of any colour using LED lighting. Research will be done on tomatoes with a view to clarifying how this can be used to control the growth, development, quality and resilience of plants. The plant breeders will also help develop new varieties for LED light cultivation.

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Powerfood for seniors

Elderly people living independently often run the risk of becoming undernourished. Wageningen UR is researching how that can be prevented using products and meals enriched with extra protein. But how do you market such products? Most elderly people do not feel old and have no idea of their nutritional status.

TEXT ASTRID SMIT **INFOGRAPHIC** GLOEDCOMMUNICATIE **PHOTOGRAPHY** HOLLANDSE HOOGTE

Mrs. Augustin (80) from Haarlem has been living along since her husband died two years ago. She is doing her best to carry on with her life. She does her exercises every morning, she cycles, she walks, she sings in a choir, she goes to watch her granddaughter play hockey every Sunday and she regularly baby-sits her great granddaughter. And she cooks for herself most days: endive, beetroot, sprouts or red cabbage, usually with potatoes and a piece of meat or fish. 'I think I'll have kale this evening, with a little sausage from the butcher's. I sit up at the table to eat. I never eat in front of the television.'
Not all elderly people do this, however. Some rarely cook for themselves anymore. They might have a cup of soup in the evening, heat up some leftovers or just have a sandwich. Not very wise. If they go on doing this for long, they run the risk of becoming undernourished. And this happens to as many as 17 percent of the over 65 age group receiving home care, as well as to 7 percent of elderly people living at home without home care, according to the LASA (Longitudinal Aging Study Amsterdam). These elderly people are more prone to sickness and less likely to recover fast. According to statistics from a 2014 national survey of health care problems, 17 percent of elderly patients in residential care are undernourished too. This so-called disease-related undernutrition alone costs the government 1.8 billion euros per year, says SEO Economic Research, affiliated with the University of Amsterdam, in its 2014 report *Undernutrition underestimated*. To this can be added the healthcare costs of those living at home, which the SEO did not quantify for lack of adequate information. Hospitals and care homes began to take steps to combat undernutrition several years ago, and it has decreased slightly as a result. The hope is that this kind of improvement can now be achieved for those living at home as well – a growing group as the elderly are living independently for longer these days.

> **'Extra protein? That is something for pitiful, sick people'**

LOSS OF TASTE

Exactly what leads to undernutrition is not quite clear. It is often related to illness, and sometimes elderly people find daily life so demanding that they do not have the energy to go shopping and cook for themselves. Or their appetites are affected by grief and

UNDERNUTRITION AMONG THE ELDERLY

Undernutrition in the Netherlands is largely illness-related. Seventeen percent of residents of retirement and nursing homes are undernourished, and the percentage is the same for elderly people receiving home care. Among elderly people living at home without care, 7 percent are undernourished.

Undernutrition percentages

Living at home without home care

Living at home with home care

Residents of retirement and nursing homes

Source: SEO 2014, Ondervoeding onderschat.

loneliness following the death of a partner. Besides which, our sense of taste diminishes as we get older, along with our eyesight and hearing. Many old people enjoy meat, for instance, less than they used to. 'What you often see is a negative cascade of small events,' says Stefanie Kremer of Wageningen UR Food & Biobased Research. 'Old people may have had the flu, which leaves them feeling under the weather and lacking energy. Shopping and cooking get neglected, so they do not eat well and get even weaker.' Elderly people are often slow to notice that they have lost weight, and if they do notice it they do not see it as a problem, showed a survey of 850 members of SenTo, the Seniors network of the future set up by Wageningen UR as a way of obtaining an overview of the causes of undernutrition. 'They think losing weight is just part of old age. And some women who were too fat all their lives are even happy about it: 'Nice slim legs at last.' What they don't realize is that they have lost muscle mass and the strength that goes with it,' says Kremer.

MORE MUSCLE MASS

The nutrient that the elderly particularly tend to go short of is protein. The Dutch Health Council advises 0.8 grams of protein per kilo per day for both young and old – more than many elderly people get. Moreover, scientific research has suggested that the elderly may need 1.2 grams per kilo per day. These proteins are important for the muscles, among other things. If elderly people consume extra protein, they function better physically. If they also do some strength training, the protein helps to increase their muscle mass too, showed Wageningen nutrition researcher Michael Tieland in 2013 in a PhD study of fragile elderly people. In 2011 the Health Council published a highly critical report on undernutrition and the elderly, claiming that there was no evidence yet that supplementary protein delivered any health benefits such as shorter hospital stays or a lower death rate. 'There is a lot of research in this area, but its quality is under par,' says the Health Council. But according >

RESEARCH ON TASTE AND SMELL

Wageningen UR does a lot of research on the nutritional needs of specific target groups such as the elderly. The Senior Network of the Future (SenTo) is one such study, in which more than 800 people fill in questionnaires about the health, weight and social lives, and participate in taste and smell tests at the Restaurant of the Future, the research restaurant in Wageningen.
In the Cater with Care project, Wageningen UR works with the Gelderse Vallei hospital and parties from the food industry on enriched foods intended to prevent undernutrition and improve the health of the elderly and healthcare patients. High-protein menus are developed in collaboration with partner Food Connect. And in a new project called Food4Care, research is planned into how doctors, home care workers, ready meals suppliers and pharmacists can work together to prevent undernutrition among elderly people living at home by combining their medical dossiers with their nutritional status in order to deliver a total package to their doors.

PHOTO'S BART DE GOUW

to Lisette de Groot, professor of Nutrition and Ageing at Wageningen University and former member of the committee which wrote the critical report, science has progressed since then. 'A couple of meta-analyses came out in the last few years which show that extra protein intake among the elderly really does deliver health benefits. I think we shall have harder evidence of this in a few years' time - when other results have been published too.'
Meanwhile, the researchers at Food & Biobased Research have already taken the next step. They are researching how to maintain or even raise protein consumption among elderly people, and to do so through their usual meals and foodstuffs. Because findings show that prescription protein drinks do not usually boost protein consumption because they do not taste good.

WALLPAPER PASTE

SO PhD candidate Canan Ziylan at Food & Biobased Research is developing protein-rich ready meals. Are there ways of making these meals so that they still taste good? This turned out to be harder than expected, says Ziylan, who is working on this project with the company Food Connect. 'The problem is that ready meals get reheated at home. This can cause the extra proteins we add to denature. We made protein-enriched mashed potato, for example, which turned into a kind of wallpaper paste when reheated.' Ziylan has now solved that problem, and the improved mashed potato was served to 120 members of SenTo two months ago. 'I am now processing the data and seeing whether they liked this enriched mashed potato as much as the standard stuff. I also asked about how full they felt. Because if the protein-enriched mashed potato fills them up for longer, it still won't get us very far. Then the old people will probably skip their protein-rich dessert, or their next meal, and they still won't get enough protein.'
Ziylan aims to develop 15 new enriched ready meals and then start an intervention study in which elderly people at risk of undernutrition are offered ready meals for a number of months, some enriched and some not. Then she will see to what extent this intervention has helped. Will it boost the old people's protein status? And do the meals hold their appeal, even when the old people eat them day in day out for months? 'Of course we mustn't have them stopping after a month because they are bored of the meals.'
Meanwhile the Nutrition Alliance, a collaboration between Wageningen UR and the Gelderse Vallei hospital, has launched another project: Cater with Care. The aim of this project is to develop tasty products which fit into people's everyday eating habits, but are either naturally protein rich or enriched with protein. The products include soups, juices and bread. Also collaborating on the project are the NIZO, catering company Sodexo and four food producers (Heinz, Pure4You, Carezzo, and Stichting Promotie Kalfsvlees).
The companies make the products and Wageningen UR tests them among elderly people. Project leader Herman Peppelenbos of Food & Biobased Research: 'We are now working on getting hold of enough test subjects at the hospital. We hope to finish off this intervention study around the summer.'
In the study test subjects receive products – some enriched and some not – without knowing themselves which variant they are eating. Then PhD candidate Janne Beelen assesses the effect of the products on the old

people. Do they finish their meals? What do they think of the taste? And do the products change the test subjects' protein status or increase their muscular strength? The test subjects are monitored for 12 weeks after coming out of hospital. The products are not only of interest for hospital patients but also for people living at home. If the trial is a success these products could simply be sold in the supermarkets, to help prevent undernutrition.

> 'It is difficult to strike the right tone with the elderly consumer'

STRIKING THE RIGHT TONE

But there is a long way to go before this happens. How do you market these products? It is not easy, says consumer scientist Kreker, precisely because the average elderly person has no idea he or she needs these products. Most elderly people do not feel old and have no idea of their nutritional status. They tend to deny the physiological ageing of their bodies. 'Extra protein? That is something for pitiful, sick people. Not for us active, healthy seniors still in the prime of life': this is how most of them see it, says Kremer. 'So we shall first have to make the public aware of the problem and then we shall have to strike the right tone. Otherwise these products will just stay on the supermarket shelves.'
PhD candidate Louise de Uijl, also at Food & Biobased Research, has been studying whether these elderly people can be divided into categories. With this in mind she looked at old people's emotions during mealtimes. Which positive and negative words do they associate with having a meal? She questioned 392 members of the SenTo panel of elderly people. About half of these elderly people had moderate levels of emotion in relation to food. Health and taste are important to them, they try something new now and then but they are not looking for culinary surprises. Den Uijl thought up a fictional exemplar of this group and called her 'Mrs. Jansen'. She is quite different to her counterpart 'Mr. de Jager'. He enjoys his meals and really likes to have something different on his plate. One quarter of the elderly belong to this group. Then there is 'Mrs. de Roos', who represents one eighth of the participants. She does enjoy her food and care about health, but what matters most to her is the people she eats with. Lastly there is the disinterested critic, 'Mr. Zuurbier', who shows little interest in his meals. He has negative feelings about food and runs the highest risk of becoming undernourished. One eighth of the participants are this type of eater, concluded Den Uijl in an article published in September in the scientific journal *Appetite*.
'We hope to use these results to provide more guidelines for producers of ready meals, as well as for supermarkets,' says Kremer. If they want to get through to Mr. de Jager, they will need different packaging and advertising than they will to appeal to Mrs.de Roos. She likes a nicely laid table with animated people engaged in conversation, and is less interested in the exact ingredients in her meal. Mr. de Jager, on the other hand, will probably go for a piece of salmon with blue cheese or venison with cranberry sauce, and does not care who his fellow diners are.

RIGHT TO GOOD FOOD

Kremer: 'It is really difficult to get it right when you address the elderly consumer. We know now, for instance, that the cereal 'Special K', which targets figure-conscious women between 20 and 40, is amazingly popular with elderly women. We need to find another tone. Especially now the baby boom generation is turning 65. That is a self-confident group of people who think they have a right to good food.'
It can also be difficult to identify the elderly people living at home who are at risk of undernutrition. They themselves do not usually notice it in time. And until recently, nor did home care workers, who had neither the time nor the understanding to address the issue. That is changing now and health-care workers have started keeping an eye on their patients' diets. It would be good if GPs and their assistants also checked old people's nutritional status during appointments, thinks Peppelenbos. 'If we made that standard, something could be done sooner.' But it may be that in future, GPs, home care workers, producers of ready meals and pharmacists will all cooperate on preventing undernutrition. Peppelenbos has just had a project proposal accepted for research into this possibility. It was the Bennekom pharmacist Harm Geers who came up with the idea. When pharmacists deliver medicines to people's homes, why not the right nutrition as well? This is going to be done now in the Food4Care project. Medical information about an elderly person living at home will be combined with their nutritional status so that a total package can be delivered to their door: a tasty meal and the right pills.
Mrs. Augustin does not need all this yet. She likes to pick up her medicines and do her shopping herself. 'I hope to be able to keep on doing that as long as possible. Because your own cooking always tastes best.' ■

www.wageningenur.nl/food-nutrition-elderly

Volunteers on ebola frontline

Bart Kooi and Heleen Klos of the Central Veterinary Institute (CVI) in Lelystad, part of Wageningen UR, went to Sierra Leone as volunteers to set up a mobile ebola lab. 'We did the first round of tests on our own blood.'

TEXT ALBERT SIKKEMA **PHOTOGRAPHY** BART KOOI, WAGENINGEN UR

Heleen Klos and Bart Kooi at work in a container lab in Koidu

'The lab is in Koidu City, the capital of the most eastern province of Sierra Leone,' emailed Bart Kooi in January while working there. 'Koidu is the diamond centre of the country,' he says. 'It was one of the flashpoints during the civil war. We were able to set up our 'hospitainer', a large shipping container with a lab, on the compound of a local clinic, the Wellbody Alliance.'

West Africa has been battling an outbreak of the ebola virus for a year now. Clinics do not have the capacity to assess all patients to see whether they have ebola, flu or malaria and then put them in quarantine if necessary. For this reason, the Netherlands provided three mobile labs for Sierra Leone and Liberia. These labs can only be run by specially trained staff with experience of testing under a very strict safety regime. Volunteers Bart Kooi and Heleen Klos of the CVI have led the way. 'I am happy that I can use my training and expertise to do something to help stop ebola,' says Kooi, who volunteered for the work. 'This feels better than donating money and hoping it will be put to good use. I am aware of the risks and the controllability of highly infectious diseases, because we work with them in our institute too.'

SETTING IT ALL UP

'Since the moment we arrived we have been working 12 hours a day,' says Kooi in his email. 'Everything here still had to be set up and organized. What is more, our hospitainer was too small for everything we needed. So we had a fence built around the lab and created an outdoor area where we can collect samples safely. A large consignment of lab material arrived from the Netherlands on 10 January. With that we could set up the laboratory and conduct all sorts of tests to check that the apparatus and procedures were working properly. We did the first full round of tests on our own blood.'

'We tested the first real blood samples on 13 January, when a Red Cross ambulance brought us the first batch. Six hours later

'You don't shake hands and you don't touch anyone'

City, Sierra Leone.

the first PCR test results were ready and we saw on our screen that we had positive samples. That really was an extremely sad feeling – alongside the excitement of having completed the first test successfully. The next morning we heard that one of the patients we had tested had died. That really brings you right down to earth: ebola is for real. Even if you can't see any signs of it in Koidu, people are dying of ebola.'

'On the streets, it looks like business as usual. But there are an awful lot of check-points along the road, you see billboards warning about ebola, and there are buckets of chlorinated water dotted around for dis-infecting your hands. And at official places such as District Ebola Response Centres your temperature is taken when you go in.'

'There is a 'no contact' regime in force here, so you don't shake hands or touch anyone. And then you have to be very conscious of what you are doing. In and around the lab we wear protective clothing of course, although not as heavy-duty as what nurses wear in the hospitals. If you pop into town to pick up a couple of things in the super-market, you avoid physical contact with people.'

'Everything here is amazing. The life on the streets, the people, the dust, the plastic bottles of petrol being sold everywhere along the road, the bad roads and the open air abattoir complete with vultures. But what has touched me most is people's enthusiasm, their friendliness and their positive attitude, even after years of civil war and now this ebola epidemic. I find that really incredible and humbling.' ■

DONATING DAYS OFF

For Bart Kooi and Heleen Klos, this work was not part of their job. They were sent out for four to six weeks by Netherlands Enterprise Agency RVO, and worked in Sierra Leone with Partners in Health. Besides Bart and Heleen, six other CVI colleagues have volunteered to do a stint staffing the ebola lab. The volunteers take unpaid leave but Wageningen UR took the line that they should continue to receive their pay. The organization is paying part of their salary and colleagues could contribute by donating some of their days off.

Saltwater Farming

Farmers all around the world are faced with advancing salinization. Adapting crops and farming systems is now a crucial task for agricultural science. Reusing water, getting plants accustomed to salt, and new varieties offer prospects of success. 'We are getting more and more requests for research on irrigation with brackish water.' **TEXT** ARNO VAN 'T HOOG

ILLUSTRATIONS IEN VAN LAANEN & SCHWANDT INFOGRAPHICS

Given optimal water, nutrients, light and temperature, modern varieties of wheat, potatoes and rice do exactly what the farmer expects them to do. But fewer and fewer food crops get to grow under optimal conditions these days, says Gerard van der Linden, head of the Abiotic Stress research group in the Plant Breeding department at Wageningen UR.

More and more agricultural regions face water shortages and year after year there is more salt in the soil because irrigation water and fertilizer leave behind small quantities of salt after evaporation. The agricultural area exposed to this kind of salinization is growing worldwide by an estimated 250 to 500 hectares per year. And in low-lying delta regions there is additional salinization due to rising sea levels and falling volumes of water being brought down by rivers. 'For many years we have bred food crops for high production. Now we shall have to put more effort into improving their stress tolerance,' says Van der Linden.

Salt in the soil causes two kinds of stress in plants. The first is osmotic stress caused by a shortage of water. Osmosis is the movement of molecules in the direction of the place with the highest salt concentration. Even if the soil is saturated, if there is a lot of salt in the water, the plant experiences the effects of drought. 'With more salt in the ground it is much harder for plant roots to extract water from the soil. Whereas that water is badly needed for transporting various substances in the plant, as well as for keeping its cells firm.'

Plants could simply restore the balance between the salt concentrations inside and those outside by absorbing more salt. But this creates a second kind of stress: sodium – the main ingredient of kitchen salt – is highly poisonous to the plant, explains Van der Linden. 'Sodium takes the place of potassium in the plant, preventing various proteins from working properly. This disrupts photosynthesis and other important processes.'

LOWER YIELDS

The combination of a water shortage and the toxic effect of salt mean that salinization quickly leads to slower growth and lower yields of food crops. But plants are not all equally sensitive: some crops can cope better than others with salt in the soil, explains Greet Blom, who researches silt farming systems at Plant Research International.

In a report she published in the middle of last year, there are several graphs showing how fast the yields of different agricultural crops fall as concentrations of salt in the soil rise. Rice is much more sensitive than wheat or barley. At a concentration equivalent to six grams of kitchen salt per litre, rice refuses to grow, whereas barley and wheat continue to do so, albeit with a 40 percent lower yield. Only at a salt concentration of around 15 grams per litre do wheat and barley give up the battle. To put this in perspective: chicken stock contains 5 to 6 grams of salt per litre; seawater contains an average of 35 grams per litre.

'Those, at least, are the data on salt sensitivity that are known from the literature,' comments Blom. 'At a guess you could end up with higher salt concentrations, by forcing plants to adapt.' Exposure to salt initially leads to stress and delayed growth, but if plants are able to adapt, they may then be able to tolerate those salt concentrations.

One method of forcing plants to adapt is partial root zone irrigation, says Blom. Instead of watering the whole plant at a go, in turns one half of the plant gets slightly salty water and the other does not. Agricultural researchers are also testing this system as a way of getting plants accustomed to water shortages, by exposing half the plant at a time to drought. 'It appears that plants react to this kind of mild stress by activating their hormone system. That gets various physiological mechanisms going, which can lead to adaptation. I find that a very interesting strategy to work out further.'

According to Blom, it is important not to try to fight salinization but to develop farming systems in which production is still possible with slightly saline water and soils. 'We are getting more and more requests from abroad for research on irrigation with brackish water.' One possibility is to avoid watering from above, because many crops are extra sensitive to salt on their leaves. Another strategy is mulching: creating a layer of straw or leaves which reduces evaporation and with it salinization, as well as insulating the soil from high temperatures.

FISH AND DATE PALMS

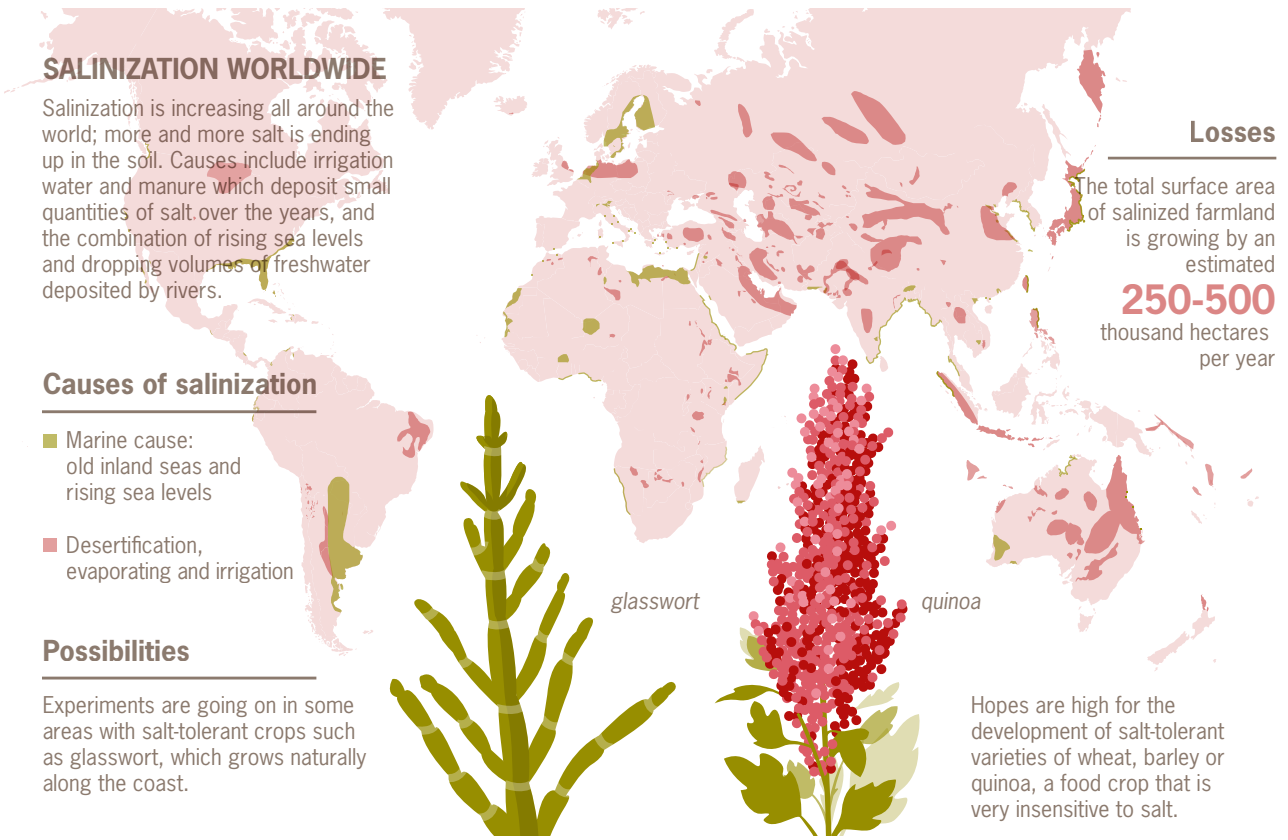
In desert areas such as Egypt, research is going on into the use of brackish groundwater for a combination of agriculture and >

'Through the exposure to salt, diseases get more of a chance'

fish farming. Some species of fish such as tilapia thrive in brackish water, and the idea is to use waste water from fish farms to irrigate date palms, sugar cane and other crops which are not so sensitive to salt. There are already several companies in Egypt which combine farming tilapia with producing wheat, fruit and horticultural crops. Moreover, there are some major investments ahead in the use of brackish groundwater, according to an Alterra report that came out in May last year. The report was positive about the feasibility of this in Egypt as long as a few legal and technical hurdles are removed.

In the Netherlands, silt farming is already under way on a small scale, for the cultivation of glasswort for instance (see box). That is primarily a culinary specialty rather than an energy-rich food crop for mass consumption. For that purpose, a leading role in silt farming may be reserved for quinoa, a crop that has gained enormous popularity among Western consumers as an alternative to rice and potatoes. 'Quinoa is very exceptional,' explains Van der Linden. 'It is one of the few food crops that are extremely insensitive to salt. At concentrations of 15 grams per litre, this plant still does fine. There are even varieties that grow in seawater. Quinoa may well become the new staple crop.'

Van der Linden and his colleague Robert van Loo are doing research on the salt tolerance of quinoa. Exactly how the plant manages it is not entirely clear. The crop has developed a range of mechanisms for limiting the



consequences of osmotic stress and for removing toxic sodium from the sensitive parts of the plant. Quinoa stores sodium in the vacuoles of the leaves. Vacuoles form the cell's central water reservoir. Sodium there cannot do any more damage and the rest of the cell carries on functioning normally.

KEEPING SODIUM AT BAY

Insight into the mechanisms at work in quinoa can help improve other agricultural crops. There has already been progress in the field of plant-breeding, says Van der Linden. In Australia, for instance, a new wheat variety has been introduced which grows better on the naturally saline farmland there. 'Australian researchers found a gene called HKT in wild wheat varieties, which ensures that the plant keeps sodium at bay in the roots. That hereditary characteristic was then bred into a commercial wheat variety, bringing about yields that were 25 percent higher.'

Cross-breeding with HKT varieties which make plants more salt-tolerant is a fruitful strategy, thinks Van der Linden. He is studying the HKT gene in barley varieties with a view to making it possible to breed for greater salt tolerance. In Asian research on breeding rice, the same strategy produced a new variety that does better in low-lying delta areas such as Bangladesh, where frequent flooding leaves salt behind in the soil.

Described like this, it may sound as though the problem of salt tolerance in agriculture is already largely solved, but that is not the case, says Van der Linden. 'There is no holy grail that will solve all the problems once you can find it. And it is never just about one characteristic; it is a question of the total picture of stress tolerance, growth, yield, disease resistance and taste characteristics. Take the tomato for instance: if you grow tomatoes in slightly more saline conditions, they become much more vulnerable to mildew. Through the stress of exposure to salt, diseases get more of a chance.' Salt also affects the taste of the tomato, and you never know what the consumer will think of that. 'In short, that is the big challenge for plant breeders,' says Van der Linden. 'How do you improve stress tolerance in combination with all those other characteristics?' ■

www.wageningenur.nl/saline-agriculture

GLASSWORT IN THE PADDIES

It is not only in dry regions that salt causes trouble for farmers. Salinization can also hamper crop farming on low-lying land behind the dikes of coasts and deltas. A few dozen farmers in the Netherlands have made a virtue of a necessity by starting to grow glasswort. This is a decidedly salt-loving plant which grows wild along the banks of the Oosterschelde estuary and the Wadden sea coast. 'The market for glasswort is small,' says Greet Blom, who did research on cultivation systems and their economic feasibility in the context of the Zeeuwse Tong project. 'It is mainly popular in up-market restaurants.' The cultivation system resembles that of a rice paddy: diked fields in which the salt water levels can be raised at lowered at will. It is a very labour-intensive crop, says Blom. Salt-loving weeds grow like wildfire and weeding has to be done by hand because weed killer would get straight into the groundwater.

The farmer can easily spend 40,000 euros on labour per hectare of glasswort. When you add other investments – especially in seed – the costs go up to 89,000 euros per hectare. This means the crop needs to fetch a hefty price per kilo. It is currently managing to do so but the margin is small and the competition with imported glasswort is fierce.

GLOBAL FORUM FOR INNOVATIONS IN AGRICULTURE

Gerard van der Linden and Greet Blom will be speaking about saltwater agriculture in March at the Global Forum for Innovations in Agriculture (GFIA) in Abu Dhabi. The conference deals with innovations in the field of climate smart agriculture, food losses, urban farming and water. Wageningen will be represented by Louise Fresco and about 10 other researchers in various fields.
www.innovationsinagriculture.com

Shell's age comes to light

A shell was world news last December. The mussel turned out to bear the world's oldest human inscription. The dating was done using grains of sand in the shell in Jacob Wallinga's Wageningen lab. 'We use luminescence dating to determine when grains of sand were last exposed to light.'

TEXT RIK NIJLAND **PHOTOGRAPHY** WIM LUSTENHOUWER VU, JOSÉ JOORDENS, UNIVERSITEIT LEIDEN EN GUY ACKERMANS

It is as though a nightclub has dimmed the lights. There is a soft golden light behind the special airlock door at the Dutch Centre for Luminescence (NCL) in Wageningen. Because the samples in this laboratory are sensitive to white light, they are protected from the office lighting in the building. Last December the centre attracted attention worldwide with a publication in Nature by Leiden archaeologists presenting a freshwater mussel shell inside which is a geometric pattern scratched by *Homo erectus*, a distant ancestor of the modern human. This is by far the oldest human 'drawing' ever found, hundreds of thousands of years older than the previous record, an 80,000 year-old drawing by *Homo sapiens*. According to Scientific American, this was one of the 10 most important scientific discoveries of 2014. The dating of the shell was crucial to this publication, and that came from this laboratory, set up by Jakob Wallinga, professor of Soil Geography and Landscape at Wageningen University. 'We use luminescence dating to determine when grains of sand in a sample were last exposed to light,' he explains. To do this, it does not matter whether the sand was deposited by a river and then covered by the following layer, or was an ingredient in mortar used to build a wall.

QUARTZ AND FELDSPAR

In the dark, the main components of sand, quartz and feldspar, change under the influence of the natural radioactivity in the surroundings. Year in, year out, electrons in the quartz and feldspar are worked loose by that radiation. Some of them do not return to their original position but get embedded into the crystal structure, landing up in an electron trap. Only when the grain of sand is exposed to light again, are the electrons 'freed' to return to their original positions. And at that point a flash of light is emitted. In his lab, Wallinga uses the strength of that flash of light to determine how much radiation the sand has received. With a margin of error of 5 to 10 percent, he can deduce from this how long the sand has been shut off from light. After 150,000 years at the most, the electron trap in quartz is full and the clock stops; in the case of feldspar, it can go back almost 500,000 years. A researcher is currently working on another electron trap

Jacob Wallinga in the lab.

in quartz with which it may be possible to go back millions of years.

EXCAVATIONS ON JAVA

The Centre does not work exclusively for Wageningen UR. Other universities and institutes contribute to its funding too and make use of its expertise. When the archaeologists in Leiden wanted to date their unusual shell, they therefore came knocking at Wallinga's door. The engraved mussel is one of the hundreds of shells found in 1891 at a dig by the banks of the Solo river on Java, where Dutch doctor Eugène Dubois discovered the remains of *Homo erectus*. This primitive humanoid probably ate mussels there and threw away the shells, which then filled up with sand. Between the two halves of the shell lay a big lump of caked soil. For the dating, Wallinga managed to extract enough grains of sand from the middle of this lump which had not been exposed to light. He did have to make a crucial assumption. The radioactive clock in the subsoil ticks very steadily but the tempo varies with the soil type: clay is more radioactive than sand. So Wallinga usually takes a big spadeful of soil from the location of the sample back to the lab, to establish the background level of radioactivity. But Dubois' discoveries have been lying in the natural history museum in Leiden for more than a century. 'We therefore assumed that the same type of soil was present around the shell as we found inside it. We determined the radioactivity on that basis.'

> 'It was clear that the dating was important'

In the first instance Wallinga only obtained from Leiden the caked contents of other shells from the same dig, and not the engraved jewel in the crown. 'But it was clear that our dating could be of great importance. External reviewers insisted that we should examine the contents of the shell itself. In the end we were given those contents too.'

ELECTRON TRAP

The conclusion remains somewhat cautious. The electron trap in the quartz was completely full; in the feldspar it was almost full, so the dating fell just short of reliable levels of precision. For this reason a conservative lower limit was chosen: the shell was discarded at least 430,000 years ago. The upper limit is 540,000 years. Using a different dating method (potassium-argon), a team from the VU University in Amsterdam determined that the sand in the sample was formed in a volcanic region and therefore only got into the shell later. After this success, Wallinga's work is picking up momentum. 'We are talking to the researchers in Leiden and Amsterdam about how we can follow this up. Not with research on shells that have been lying in a museum for 100 years, but finding new material dating it straightaway. That would be fantastic. For a long time, the focus of the research on the origins of the human race has been in Africa; now Asia is becoming more and more important.' ■

www.nlc-geochron.nl

Mussel shell with inscription by Homo erectus.

Animal lab protects people

The Netherlands is affected by more and more infectious animal diseases such as avian flu which can make people ill too. In order to do thorough research on this, a lab is being built at which live infected farm animals will be kept. No virus can escape from the lab. 'Even the DNA is destroyed.'

TEXT ALBERT SIKKEMA **PHOTOGRAPHY** MAARTEN SPOEK

At the end of last year when a highly pathogenic strain of avian flu broke out on four poultry farms in the Netherlands, it was 'all hands on deck' at the Central Veterinary Institute, part of Wageningen UR. The laboratory in Lelystad was working overtime to check all the specimens from poultry farms for the highly infection H5N8 virus. There were strict safety protocols for the analysis of the specimens in the lab to prevent the virus from escaping or infecting the analysts.

The avian flu is a zoonosis: an infectious disease that can be transferred from animals to humans and thus have human victims. Other familiar examples are BSE, mad cow disease and Q fever. An outbreak of Q fever has struck thousands of people since 2007, most of them living near goat and sheep farms. Research by the CVI delivered insight into this disease and its epidemiology which helped in fighting it.

'We also want to be prepared for the arrival of new zoonoses in Europe,' says director Andre Bianchi. He cites the Rift Valley virus, the West Nile virus and the Crimean-Congo virus (see box). 'We are experiencing a lot more threats now,' says Bianchi. 'Two thirds of infectious diseases can infect both animals and people.'

For this reason, on top of its existing laboratories for exposing the presence of diseases, the CVI is building an extra secure shed for housing test animals with infectious diseases. Here, researchers can infect chickens, pigs, sheep and cattle with a zoonosis and monitor the behaviour of the dangerous disease in the animal, how it spreads within a group and whether vaccination is possible. This is the first laboratory in the Netherlands in which zoonosis research can be done on large farm animals. The ministry of Economic Affairs, Agriculture and Innovation has contributed to the costs of the building (as did the province of Flevoland), and of the research.

DNA DESTROYED

The new national facility was opened in February. At first glance, the lab is not much more than an experimental shed. Once inside, it becomes clearer why the building cost 9.5 million euros. Because not a single pathogenic bacterium or virus must be allowed to escape the research facility, all the manure, bedding and water is destroyed in special destructors in the cellar of the lab. The corpses of the animals themselves are also treated in >

NEW THREATS

Besides known zoonoses such as the highly pathogenic avian flu and Q fever, there are new infectious diseases threatening the Netherlands. The top 3 according to the CVI:

Rift Valley Fever is caused by infection with a virus found in cows and sheep, and is spread by insects and the blood and milk of infected animals. People infected with the disease can suffer headaches, bleeding and liver problems. The disease originated from the Rift Valley in Kenya, but in recent years has been heading for Europe via North Africa.

The West Nile virus is another insect-borne disease which originated in Uganda but is already present in Algeria, Romania and the United States. In the United States the disease killed nearly 300 victims in 2012. The virus is found in mammals, birds and humans and is already endemic in countries around the Mediterranean.

Crimean-Congo fever comes about through infection with a virus transferred from animals to humans by ticks. In humans it can lead to bleeding, high fever and in some cases, death. The virus can develop in cattle, sheep and goats, which do not fall ill themselves. The *Hyalomma marginatum* tick, common in Africa, Asia and eastern Europe, is the main carrier of the disease. The tick has now advanced to just south of Paris.

a large destructor with a combination of high temperatures, high pressure and acids until nothing remains of a sheep or pig but a dough-like lump. 'Even the DNA is destroyed,' says Henk Sloetjes, head of the department of Animal Health and Biotechnology at the CVI. The price of this machine alone: 1 million dollars.
The building is also equipped with extensive facilities for preventing viruses or bacteria from escaping from the lab or infecting the staff. Everyone entering must undress completely, for instance, and don clothing and underwear provided by the CVI. Before entering infected rooms, researchers put on boots, protective clothing and masks. To enter the building they have to go through three chambers, each sealed off with submarine doors, before they reach the stalls. The doors can only be opened with a code and a finger vein ID – the unique pattern of veins in a fingertip. The doors only open in turns so that the air cannot move between the chambers, while negative pressure ensures that no air passes from the infected area to the clean area. Moreover, all the air in the chambers is purified before the staff come from the barn to the clean area.
After visiting an infected space – a stall, the operation or dissection room – the researchers take their boots off, rinse their protective clothing with disinfectant, hang them up and throw out the clothes they had on under it. In the next room it is compulsory to shower for three minutes, after which they can get dried and dressed.

HIGHEST SAFETY LEVEL

Security in research laboratories working with infectious diseases is expressed in the Bio Safety Level (BSL). There are four safety levels, with BSL4 imposing the highest safety standards, which ensure that viruses and bacteria cannot spread. A distinction is made between the safety of the staff, indicated with the letter h, and that of the animals, indicated with a v. The new facility for zoonosis research at the CVI has safety levels h-BSL3 and v-BSL4. The safety level at the CVI is there-

fore not high enough to treat ebola patients, explains Bianchi. Protection against that extremely infectious disease requires the highest human Bio Safety Level, h-BSL4. 'You need that level of safety when there is a high risk of death from the infection. If that risk is lower, or if vaccines or antibiotics are available that can prevent or cure the disease, then safety level 3 is enough. That applies to our research on rabies, for example, a very nasty infectious disease in mammals. The colleagues doing that research have been vaccinated against the disease.'

Working with high-risk animal diseases is nothing new for the CVI. Since the nineteen seventies, the institute has been studying diseases such as foot and mouth disease in a High Containment Unit. 'Foot and mouth disease is a highly infectious disease affecting cows, but is not dangerous for humans. So safety level h-BSL2 was enough. We could also do research on swine fever and the low pathogenic avian flu, which are not dangerous for humans either. But in the last 10 years we have been faced by more and more zoonoses such as Q fever and the high pathogenic avian flu. Research on these animal diseases has to be done in an h-BSL3 lab. For that we created a couple of labs with extra protective measures for the staff within our existing facilities. In these labs we could already do lab tests with diseases such as avian flu and Q fever, but not with live infected farm animals. We also had to go to great length to keep things safe when we did dissections on infected animals and when transported infected material off the site. All that is much better organized now that we have brought the stalls, the dissecting room and the destruction process under one safety regime.'

TESTING VACCINE

Bianchi expects an increase in demand for research and knowledge on zoonoses. 'It will be a matter of establishing what type of virus we are dealing with, where it lodges in the animal, how a virus or bacterium spreads and how to develop a vaccine.'

> **'We are increasingly having to deal with zoonoses'**

In the new facility the CVI can track down pathogens faster and better and can test vaccines on pairs of animals. In the first instance, vaccines need to ensure the animals no longer fall prey to the disease, explains Bianchi, but it also needs to be made clear whether the virus can spread via the vaccinated animal. 'We can test than now by infecting vaccinated animals with the zoonosis and then introducing it into unvaccinated animals.'

The national facility is not intended exclusively for CVI researchers but also for veterinary researchers at Utrecht University, for example, and virologists at the Erasmus Medical Centre in Rotterdam. One of these is flu researcher Ron Fouchier, who heads the national influenza centre in Rotterdam. Fouchier already has very secure facilities for research on zoonoses such as avian flu.

'In our facility we can do tests on chickens or ferrets in cages but not on large farm animals like pigs. So the new facility in Lelystad is a good addition for our joint research. Now we can do better research on swine fever, for instance.

Fouchier collaborates with the CVI on avian flu, with the CVI focusing on research and diagnosis of the virus in poultry and Fouchier on monitoring wild birds that could transmit the disease. He also supervises, together with the CVI, a PhD researcher who is investigating why one avian flu virus spreads so much more easily among poultry than another. 'We have a strong overlap in expertise, but we are collaborating better and better so as to pool all the knowledge on zoonoses.' ■

www.wageningenur.nl/cvi/zoonoses

WAGENINGEN ACADEMY

For an update on knowledge about controlling infectious animal diseases, Wageningen Academy offers a course on Epidemiological tools for controlling infectious animal diseases.

For more information see www.wageningenacademy.nl

The tundra is melting

Disturbing its vegetation has a dramatic impact on the tundra. Within a couple of years the permafrost is affected and the ground literally collapses. With massive additional emissions of the greenhouse gas methane as a result. **TEXT** NIENKE BEINTEMA **PHOTOGRAPHY** BINGXI LI, WAGENINGEN UR

The endless tundra in the arctic region looks like a changeless landscape, literally frozen in time. Yet this region is extremely vulnerable to collapse. One small change can have a big impact, as Monique Heijmans and her colleagues from the Nature Management and Plant Ecology chair group discovered. They removed the shrubs from 50 trial plots and monitored the plots for several years. The effect was dramatic: the permafrost, the permanently frozen subsoil, began to thaw and the tundra subsided. The area started to emit methane, a greenhouse gas 30 times stronger than carbon dioxide. This discovery merited publication last November in the authoritative journal *Nature Climate Change*.

One quarter of the surface of the northern hemisphere has permafrost in the soil, mainly in Canada and Siberia. The permafrost forms an impenetrable layer, metres deep. Only the top few decimetres of the tundra thaw in the summer. Plant roots, animal life, fungi and bacteria are all restricted to this uppermost layer. The permafrost

‘Small interventions can bring about big climate effects’

explains why the Arctic soil is so swampy in many places. The upper layer is badly drained because of the frozen ground beneath it. The result is the unique ecosystem of the Arctic lowland tundra, with its shrubs, grasses, mosses and lakes.

COLLAPSE

‘It is not news that the tundra is vulnerable,’ says Monique Heijmans. ‘The people who live or do research here know that. But our study has now made people in a much wider circle sit up and listen. The results show that it doesn’t take much to cause a literal collapse.’

Heijmans and her colleagues have been working since 2007 in the remote Kytalyk Wildlife Reserve in the Yakutia region in north-eastern Siberia, about 6500 km east of Moscow. A vast area full of lakes, rivers and their flood plains. ‘I think it’s beautiful,’ says Heijmans. ‘It is gently rolling thanks to old river beds and former lakes. The skies are very beautiful. Especially in the middle of the night when the sun doesn’t go down.’

The researchers set up a long-term experiment in the reserve. ‘We had 10 circular trial plots of 10 metres across,’ explains Heijmans. ‘In half of the plots we cut down the shrubs above the ground.’ These shrubs were *Betula nana*, dwarf birch, which forms a closed canopy at a height of no more than 20 centimetres. ‘We left the other bushes and grasses.’

They chose this experiment because it was clear that there is an interaction between tundra shrubs, climate and the state of the tundra. Heijmans: ‘In some places the ground is subsiding because of the thawing permafrost, after which the shrubs drown in pools of water. What will be the consequences of the loss of those shrubs? Will the thaw speed up then? That question is also relevant in the context of direct human disturbance to the tundra. In places where oil is being extracted or where seismic exploration is going on in search of oil, large tracts of tundra are stripped of their vegetation. That is also done for other infrastructure such as roads, buildings and airports. With this in mind, the Wageningen team wanted to do experimental research into the precise role of these shrubs.

INSULATING BLANKET

Within a year changes were taking place below the bare plots. The permafrost thawed to 5 centimetres deeper than usual and that increased to 15 centimetres over the four years of the experiment. The plots began to subside and became inundated. After five years they had subsided by more than 16 centimetres. In the depressions more than 10 centimetres more snow stayed lying than on the control plots. ‘That snow forms an insulating blanket,’ explains Heijmans. ‘The soil therefore does not freeze as hard in the winter as it normally would.’ In other words: a self-reinforcing process had been set in motion.

And not only because of the insulating snow. The newly formed lakes are also darker than the surrounding tundra, and absorb more sunlight and therefore heat. This reinforces the warming and with it the thawing of the permafrost.

‘What’s more, we took measurements that showed that the wet, disturbed tundra emitted methane,’ says Heijmans, ‘whereas the control plots actually store methane. On a world scale, then, what you see here is another self-reinforcing effect on global warming.’

Enormous quantities of organic material are stored in

the permafrost, containing as much carbon as all the currently living plants and animals in the world put together: more than 1600 gigatonnes. If the permafrost thaws, some of this carbon gradually seeps into the air in the form of greenhouse gas, as fungi and bacteria in the thawed soil break down the organic material which was hitherto stored in the permafrost. And it is not just carbon dioxide that is released, but methane as well.

MOTION ADOPTED

The news drew attention last November, including from the Dutch daily newspaper *De Volkskrant*. The very next day the Dutch Party for the Animals and the Socialist Party tabled a motion which was subsequently adopted. The motion asked the Dutch government to make a stand at international climate negotiations for keeping the arctic region free of oil and gas extraction. 'In itself, we shouldn't expect too much of that,' says professor Frank Berendse, group leader and senior author of the article in *Nature Climate Change*. 'The economic interests are enormous and anyway, there are powerful players like the US and Russia in that debate, and their attitude is none too cooperative, to put it mildly. But it is still important that politicians pay attention to unexpected feedback loops. And to the fact that small interventions can bring about big climate effects.'

Heijmans agrees. 'It is a very clear first signal,' she says, 'but now of course we want to take this further. We want to look at what happens in the long term. And colleagues from Amsterdam and Switzerland are working on measuring methane emissions on a far bigger scale. Of course you would like to be able to translate these small-scale experiments to a bigger scale – and ideally to other ecosystems as well.' Big differences can be observed even within the tundra ecosystems, she emphasizes.

ABSORBING HEAT

The shrub vegetation in Alaska, for example, is expanding now that temperatures are rising, without the tundra there collapsing. 'This is because it is higher, drier tundra,' says Heijmans, 'where the plants don't drown if the permafrost thaws. The shrubs are different too, and taller.' However, the shrubs in Alaska create a reinforcing effect of their own: they are darker than their surroundings, so they absorb heat. They also trap more snow than bare tundra does, so that the ground does not freeze as hard. 'So it is difficult to generalize,' concludes Heijmans. 'You will have to conduct specific experiments per region. That is a good example of how unbelievably complex that ecology is.'

'This study illustrates the enormous importance of long-term research,' says supervisor Frank Berendse. 'We have monitored these tundra plots for seven years, and we are still doing so. But less and less funding is available for this kind of research.' Everything has to deliver immediate results, he notes. 'In slow-growing ecosystems such as the tundra, especially, it is often a slow process.' ■

'SHORTS ARE NOT AN OPTION'

Monique Heijmans and five colleagues have been spending a couple of weeks every summer in a very remote part of north-eastern Siberia. 'We stay at a field station in a wildlife reserve that you can only reach by boat,' she says. Once there, you can only get around on foot, because it is a very swampy area.'

The researchers work in amongst the water birds and sometimes see Siberian cranes, reindeer, arctic foxes, wolves and muskoxen. Now and then a brown bear passes by as well. 'But most of all we see mosquitoes,' laughs Heijmans. 'You have to wear a mosquito net the whole time, otherwise it is unbearable. And that is quite a nuisance because it can easily be 30 degrees in the summer. But even then shorts are not an option.'

The field station consists of a few wooden huts and containers. Electricity comes from solar panels, water from the stream. A local cook prepares the meals over a wood stove. In the summer there is hardly any human activity in the area. Very occasionally a villager comes by to pick berries or fish. 'They often share some of their catch with us. The fish is delicious.'

Chinese interest in fertilizer

A group of 200 salespeople from the Chinese artificial fertilizer company Stanley visited Wageningen UR in January to hear about the latest developments around fertilizer. 'With knowledge from Wageningen UR we hope to be pioneers in China and beyond.'

TEXT YVONNE DE HILSTER **PHOTOGRAPHY** MARCEL VAN DEN BERGH

One grey Tuesday morning 200 men and women, most of them in navy blue suits, filed into a classroom in Orion on the Wageningen campus. All snapping themselves or each other with cameras or phones. Today the group would be introduced to the Dutch approach to fertilizer use, with its norms, fertilizer injectors and manure processing system. As none of those present actually spoke English, the Chinese post-doc Ningwen Zhang accompanied fertilizer experts Janjo de Haan and Wim van Dijk of Applied Research Lelystad to translate their story as they went along. Many of the listeners took notes on the notepad provided in their information folder. Fertilizer producer Stanley from the town of Linyi in the province of Shandong initiated the visit to Wageningen itself. The company was formed in 1992 and has a staff of more than 8000, a turnover of 8.1 billion euros and more than 2000 of its own sales outlets in China.

LONG-TERM STRATEGY

'European agriculture is performing well. So a company like Stanley is keen to come and get some insights for its long-term strategy,' explains Yu Tong Qiu of Wageningen UR, who helped organize the programme in Wageningen. 'Thanks to its high position in the global rankings, Wageningen UR is increasingly well-known in China, and that is how Stanley became aware of it.' The company paid for the training and the organization of the day.

The visit to Wageningen was part of a week in which Stanley travelled around western Europe visiting a number of companies, taking along its best salespeople as a reward for their work. While the salespeople were in the training, the director of product strategy and several sales managers held talks with representatives of Wageningen UR.

Stanley, a fast-growing company, is a market leader in China in the field of compound fertilizers, and it is keen to develop new products. 'With the knowledge of Wageningen UR and longer term collaboration, we hope to be pioneers in China and beyond, explains director of product strategy Jihua Zhang. To this end, one of the topics of the day was training for R&D staff in the field of trace elements and the prevention of runoff of fertilizer ingredients. 'Later we will continue talks with Stanley about the content of this training. And whether people will come to Wageningen or we will provide training locally,' explains Xiaoyang Zhang, account manager for China at Wageningen UR and contact person for Chinese companies and organizations. Stanley director Jihua Zhang was satisfied with the results of his visit: 'Important doors have been opened.'

The story told by fertilizer experts De Haan and Van Dijk was very informative, said Chen Quan, a fairly senior salesperson from the province of Hebei. 'It was nicely geared to the practice in the field.' A colleague was impressed by the attention paid to different substances in fertilizer and the level of detail at which fertilizer is scrutinized in the Netherlands. 'The Dutch

approach to fertilization is very complicated. The methods of measuring the level of fertilization and the technology for applying it with several injectors are new to me.'

STUDYING HERE

Walking across to the Forum for another photo call, a lady asks Ningwen Zhang about the possibilities for her son to study at Wageningen. This seems to be a question that interests many of the visitors. 'Because that will equip their children to come and work for the company later,' explains Ningwen Zhang. After a hot lunch in Orion, the Chinese pile into the bus that will take them to the experimental farms in Lelystad. Here, Chinese Master's students are ready to translate the information given by staff. The visitors look around, full of interest, and snapping away with their cameras. They ask a lot of questions, just as they did during the break in the morning lecture: how does this machine work, how expensive is that method, what are the yields? The language barrier and the schedule prevent a more searching discussion. It is soon time to move on. Germany tomorrow. ■

http://www.wageningenur.nl/manure

WAGENINGEN: MORE THAN A CAMPUS

Chinese fertilizer producer Stanley's visit to Wageningen UR is just one example of the way Wageningen UR works on knowledge transfer. Wageningen regularly welcomes interested groups from all over the world. And Wageningen Academy and the Centre for Development Innovation provide courses both in the Netherlands and abroad. For example, Wageningen Academy offers a course on manure- and co-digesters in Wageningen and a course on postharvest technology in Shanghai. For more information see: www.wageningenur.nl/wageningenacademy and www.wageningenur.nl/cdi

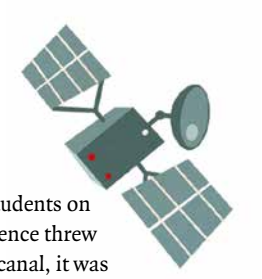
NEW INSTITUTE FOR URBAN PROBLEMS

Engineers in

Researchers in Amsterdam have started mapping out the city's metabolism. In the new Amsterdam Institute for Metropolitan Solutions, they hope to find solutions to metropolitan problems related to energy, water, waste, food and traffic.

TEXT RENÉ DIDDE **ILLUSTRATION** YVONNE KROESE
PHOTOGRAPHY MATS VAN SOOLINGEN & HOLLANDSE HOOGTE

Amsterdam



When at the end of June 2014, students on the MSc in Geo-Information Science threw PET bottles into an Amsterdam canal, it was not just a piece of hooliganism by a bunch of partying 'Wageningers' on a city trip. It was part of a serious trial. The bottles were equipped with a sensor making it possible to keep track of them with a GPS. Within a few days the bottles had travelled quite a way through the canals. The researchers also noticed that a few of them were fished out of the canal the next day by the municipal waste disposal service.

'I was inspired by this kind of 'trashtracking' when I saw it at the Massachusetts Institute of Technology (MIT) in Boston, and I copied it immediately,' relates Arnold Bregt enthusiastically. As professor of Geo-information Systems at Wageningen University, Bregt is involved in the new Amsterdam Institute for Advanced Metropolitan Solutions (AMS), in which Wageningen UR, the Technical University of Delft and MIT are collaborating.

The test with the plastic bottles was just one small project that coincided with the launch of AMS. It served to highlight places where garbage collects and where garbage collectors on boats can easily fish it out of the water. Hundreds of experiments of this kind, as well as larger research projects, often implemented by Amsterdam residents and visitors, are expected to deliver a huge database of useful information over the coming years.

'Photos of cars parked in the wrong places also provide information about litter'

LIVING LAB

AMS has an ambitious goal: finding new solutions to the problems facing big cities around the world in the areas of energy, water, waste, food and traffic. Not worked out in theoretical thought experiments, but developed and implemented in the midst of society by residents, companies and tourists, in a 'living lab'. Residents will also help to set the research agenda. AMS will work along three main lines. There will be an AMS research network, an AMS data platform in which research results will be made available to projects, and an AMS Master's programme (see box). Three projects have already started in the research network. 'In the project Urban Pulse, we want to map out the city's metabolism. What goes into it, in terms of energy, water and good, and what comes out, in terms of products and waste?' explains Bregt. In another research project, Rain Sense, sensors on street lampposts and umbrellas will enable an app to function as a kind of local rain radar, providing insight into where the rain falls in the city, and how much. You can then check on your smartphone whether your carpark, a tunnel or a metro station has been flooded by a downpour, says Bregt. These sorts of things only happen a couple of times a year at present but are likely to be more frequent in future. Geo-information about where rain falls and which are the most low-lying parts of the city should also help in taking steps to create a climate-proof city in which the public transport system is less vulnerable to flooding than it is now.

SHARING PHOTOS

Understanding and predicting traffic flows is the topic of a third research project: the Urban Mobility Lab. In this project, good use is made of information shared online, such as photos and tweets. Photos shared by tourists on Flickr show, unbeknown to the photographers, the most popular routes through the city. Tweets from residents about accidents automatically make it clear where the accident hotspots are in the road system. Where bus and tram passengers get on and off provides new information, and the routes taken by trucks cast light on traffic jams and bottlenecks in the city. 'This provides scope for taking targeted measures,' says Bregt.

Tens of researchers from Wageningen UR, TU Delft and MIT form the academic heart of AMS. MIT, famed around the world for ingenious measurement methods like the plastic bottles, makes its knowledge available so that movement in the city becomes visible. AMS also consists of a network of companies such as KPN, Shell, IBM, Cisco and Accenture, which are looking for a concrete starting point for their involvement, in the data platform for instance. Also participating in AMS are the research institutes TNO and ESA, numerous services of the municipality of Amsterdam, Waternet, Alliander, the harbour company and Waag Society. AMS has its headquarters in the imposing Royal Institute for the Tropics (KIT). Here, AMS director Renée Hoogendoorn explains that the parties met when they entered in a competition run by Amsterdam municipality. 'The then councilor Carolien Gehrels thought Amsterdam lacked the engineer's mentality,' says Hoogendoorn. 'The mentality that seeks practical solutions to help the city make progress.' The jury, led by Royal Academy of Sciences celebrity Robbert Dijkgraaf, considered the proposal of Wageningen UR, TU Delft and MIT the best. These parties had found each other through their executive boards.

TRAFFIC PROBLEMS

Migration to the city is increasing all around the world, says Hoogendoorn. 'People expect to be able to create a better life there than in >

Gauges on lampposts provide street-level information about rainfall in Amsterdam.

the countryside. The down side is that there is increasing pressure on a small area, with all the problems of traffic, waste and sometimes energy that that entails. What is more, new problems are cropping up all around the world, such as climate change, which is causing both flooding and droughts. These very complex problems can no longer be addressed by the old, separate disciplines.'
So a multidisciplinary approach is the order of the day, says Hoogendoorn. Mobility, food, water, waste and energy are the themes which researchers from different disciplines will be addressing. The research should also produce insights that are helpful for other big cities.
Wageningen UR will of course be contributing its expertise in scientific fields such as food, environmental technology and climate, as well as its social science and organizational expertise. It will address important themes such as water and vegetation in the city, neighbourhoods which generate their own electricity, more extreme rainfall and higher temperatures, says Hoogendoorn. 'Wageningen UR has the theme of 'metropolitan solutions' in its strategic plan. TU Delft did the same with 'intelligent cities'. Delft will contribute knowledge about building and civil engineering, and architecture,' says Hoogendoorn, who studied engineering at Delft himself.

SOURCING FUNDING

AMS has been allocated a budget of 50 million euros for 10 years by the municipality of Amsterdam. Wageningen University and the TU Delft will each contribute 20 million per year in the form of researchers and supervision of students and PhD candidates. Hoogendoorn: 'Researchers can apply as long as they come up with innovative projects with an international aura about them. And they must succeed in sourcing at least 50 percent of the funding from other financiers.' This brings the real budget to 250 million euros for 10 years. This approach is beginning to work, reports Bregt. 'I recently got an EU research project funded. I will be including Amsterdam in it as a case.'
The participants will also be studying applications of the immense set of data produced by residents and users in the 'living lab' of the city. That should produce 'feasible recommendations' for policy and government. It may sound rather abstract, but Arnold Bregt and Renée Hoogendoorn are trying to make it concrete. 'An example would be new instruments for improving Amsterdam's traditionally poor record in the area of waste,' says Bregt.
As an example he cites the photos being taken every day from traffic wardens' cars in order to fine people parked in the wrong places. 'Those photos are only used once now. But they also show information about full garbage containers, broken waste bins and litter,' says Bregt. 'Then the municipality can empty the containers more often, repair bins or send in more road sweepers.'
The city's waste disposal behaviour can also be improved when an element of fun and gaming is introduced, suggests Bregt. Following the example of the Efteling theme park, where 'Holle Bolle Gijs' statues of a greedy boy shout to be 'fed' with waste paper.

THE PROOF OF CONCEPT

There are already dozens of projects going on in Amsterdam in the fields of the environment, climate, traffic, energy and waste. Green roofs, water storage, electric rental cars and charging points, solar panels and roofs, wind turbines in the extensive harbour area. This raises the question of exactly what the added value of the scientists is. 'There is already a lot of local dynamism,' agrees Arnold Bregt. 'But I think we can add the engineer's mentality to that. In other words: after the wild ideas stages, keep going and demonstrate the 'proof of concept'. Now a lot of initiatives grind to a halt after a promising start, and they often depend on isolated individuals and egos.'

URBAN ENGINEERING PROGRAMME

Besides dozens of research projects and a data platform, the Amsterdam Institute of Metropolitan Solutions (AMS) will also be running a Master's programme. The two-year programme will be run jointly by Wageningen UR and the TU Delft. MIT in Cambridge US and the University of Amsterdam will both contribute to the programme as well.
It is the express aim that residents set the research agenda, emphasizes Erik Heijmans, one of the programme directors from Wageningen. 'In Amsterdam West, residents are dissatisfied with the quality of the water in their canal. Students come up with solutions such as dredging the canal or putting mussels in it. But they also warn the residents not to throw bread into the canal.'
The Master's programme should start up in 2017 and be offering about 200 places by 2020. The students on the programme will do fieldwork in Amsterdam but will follow courses in their own city, keeping in touch online. Using massive online open courses (MOOCs), lectures on the new programme can by then be made accessible to many thousands of students all over the world.

Plastic bottles fitted with a sensor so they can be tracked by GPS to provide a picture of where garbage collects.

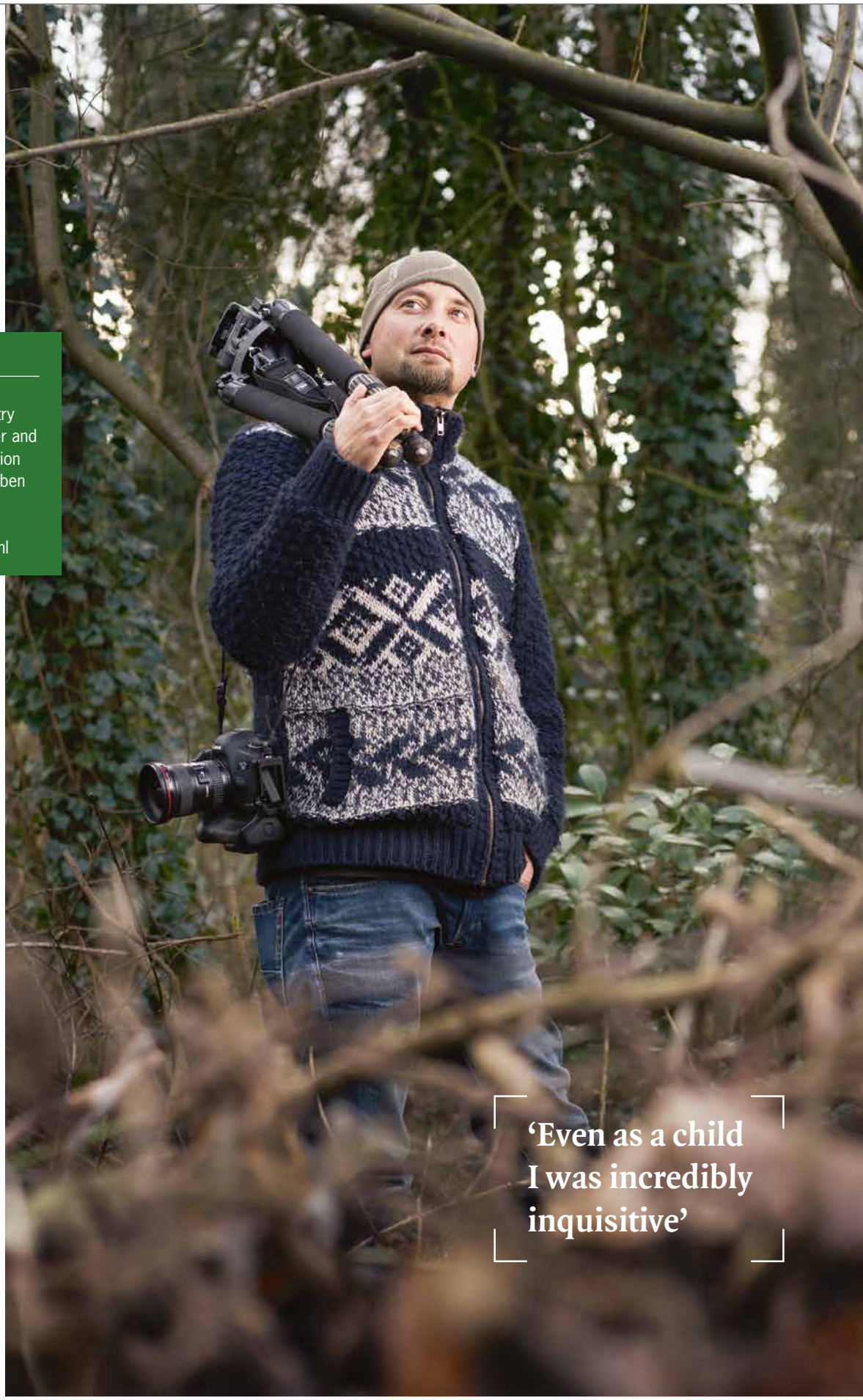
To this end, AMS aims to get more departments of the large municipal system working together. The spatial planning service, Waternet, Alliander, and the waste company AEB have expressed the wish to collaborate more. 'That can lead to surprising collaborations, which we can make use of,' says Bregt. It requires more bureaucratic cooperation, for instance, to place solar panels on roofs and then ensure the electricity is supplied to offices and apartments. He also talks with enthusiasm about a Wageningen-designed walker equipped with sensors with which loose tiles, too high pavement edges and sunken pavements were identified this spring. 'This will help Amsterdam to cater better for the ageing population,' says Bregt. The big event SAIL later this year will also form part of the living lab. 'Crowdsensing will be used. This is measuring a crowd in order to be able to respond to stress situations better,' says Renée Hoogendoorn in Amsterdam.

Both Hoogendoorn and Bregt admit the programme is ambitious. 'We've hardly been going six months yet,' says Hoogendoorn. 'Looking at what has been set up already and which parties are already working together, it makes me happy. The collaboration with the various Amsterdam municipal services is going very well too.'

The municipality agrees. 'AMS started not long ago,' says Sebastiaan Meijer, publicity officer for the municipality. 'They are now in full swing and are giving international talent a start in science. We expect concrete contributions to innovative solutions which we in the city can apply, in the areas of environment, water, traffic and energy.' ■

www.ams-amsterdam.com

'We can add the engineer's mentality'



RUBEN SMIT

Age: 43
Studied: 1991-1996 Forestry
Works: Nature photographer and filmmaker, owner of production company for nature films Ruben Smit Productions.
See www.rubensmit.nl and www.rubensmitproductions.nl

‘Even as a child I was incredibly inquisitive’

FORESTERS 24 YEARS ON

Knowledge and beauty, land and emotion

Forester Ruben Smit had a national breakthrough with *De Nieuwe Wildernis*, his film about the Oostvaardersplassen nature reserve in the Netherlands. His fellow student Ferry Pikavet was involved in the area too, but as estate manager. They each contribute to nature conservation in their own way.

TEXT ALEXANDRA BRANDERHORST **PHOTOGRAPHY** HARMEN DE JONG

Old canals cut straight lines through a snowy landscape, like a stave on sheet music. The photo was taken from the air. Deer are grazing on the banks of the canals. 'The straight lines in the landscape are symbolic of our way of thinking. The best part of it is the way the deer are dotted around them like musical notes. Nature doesn't stick to straight lines. This is one of my best photos,' says Ruben Smit of a picture in his photo book about the Oostvaardersplassen. Smit, who graduated in Forestry at Wageningen in 1996, has made a name for himself as a nature photographer and filmmaker. Recent work includes features for broadcaster Vara's nature programme *Vroege vogels* and *De Nieuwe Wildernis*, the popular and prizewinning nature film about the Oostvaardersplassen which came out in 2013.

The atmosphere in his pictures is created by his use of light and of sharp and soft focus. 'First of all, the composition and the light have to be good. Then it needs to have a story to tell. What exactly is an animal doing, and why? When I see animals, I can get to the story very quickly. That's because of my Wageningen background and scientific knowledge.' In a colony of grey seals he spotted a young seal that had just been abandoned by its mother. Young seals have to learn to fend for themselves in the space of three weeks. 'I wanted to film that in a way that made you feel the orphaned seal's despair from the look in its eyes. I look for the soul of an animal, by looking very carefully and putting myself in the animal's position.'

Smit's fascination with nature developed when he wandered around the Waterleiding dunes near his parental home in Heemstede. At the age of 13 he was the youngest researcher ever to count breeding birds for a national study of the effects of grazing. When he was in his first year at secondary school, his mathematics teacher told him about the Forestry degree programme at Wageningen and an uncle told him about the many yellow wagtails in the Wageningen water meadows. A picture of a deer shown at an open day was decisive. In 1991, Smit went to Wageningen.

FLAT IN THE HAGUE

'Ruben knew all about plants,' recalls Ferry Pikavet, who started on the Forestry programme at the same time. 'All that was new to me; I grew up in a flat in The Hague.' His parents used to take him to the Veluwe countryside on holiday and that is where his interest in large wildlife started. Unlike Smit, who was not interested in student societies, Pikavet was an active member of Ceres. He was also a founder member of The Chestnut Blues Band, in which he played the drums for four years.

Pikavet soon noticed that he was not cut out to be a 'hardcore' forester. He took a lot of ecological courses. On an internship he studied the mineral metabolism in mouflons and deer in the Hoge Veluwe national park. 'By chance Ruben happened to be lying flat out somewhere studying mice. I looked him up. I myself can enjoy sitting still and watching an animal for a couple of hours, but then I need to tell someone about it. Interaction with other people is important to me – I'm a real people person.'

When he graduated in 1998, forestry jobs were scarce. Many of his course mates ended up working in IT or in insurance, but that was not what Pikavet wanted. After a year he started as junior estate manager at a firm in Barendrecht, near Rotterdam. 'The combination of forestry, country estates and people appealed to me, and I had already started a course on estate management.' The work entailed managing country estates and the grounds of stately homes, advising owners and taking care of rent, maintenance and the financial side of things. It also meant maintaining relations with municipal councils, leaseholders and rental tenants. >

FERRY PIKAVET

Age: 43
Studied: 1991-1998 Forestry
Works: estate manager, advisor on land issues and branch manager at Van Lanschot Nannenga Naus Rentmeesters. See www.vlnn.nl

‘Land and real estate are emotion’

WHERE DO FORESTERS END UP?

Between 1987 and 2008, there were 614 graduates from the Forestry programme. We know something about the current occupation of 383 of them: 19 percent work for an advisory or consultancy firm, 14 percent for the national or local government, and 13 percent at a university or research institute. 11 percent are working in industry or trade, 6 percent in IT and 5 percent in the leisure, nature management, sport or culture sectors.
Many graduates are in leadership roles (16 percent) or work as advisors (15 percent), researchers (11 percent) or policymakers (9 percent). Another 6 percent are entrepreneurs or freelancers.
Source: KLV Wageningen Alumni Network

This career move meant a lot of additional studying for Pikavet. 'I became a property valuer and I trained as an estate agent, and did lots of advanced courses. That was all on top of the job. It wasn't much fun at times, like when my holiday reading was yet another construction engineering book.' Pikavet has always benefitted a lot, he says, from the analytical way of thinking he learned at Wageningen.

ARTISTIC SIDE

Just like Pikavet, Ruben Smit focused mainly on ecology during his studies. He was keen to go on in academia. 'Even as a child I was incredibly inquisitive. I always wanted to know why things were the way they were.' Smit got his PhD in 2000 for a study of the effects on vegetation of grazing by deer. After that he taught at Wageningen for about six years. 'I noticed that I was gradually losing the fascination with nature with which it all started. Researchers dig deeper and deeper but they lose sight of the bigger picture. Whereas that holistic perspective is exactly what I cherish. And besides, I had no outlet for my artistic side.'
Smit has been taking photographs since he was 14. 'I saw a couple of falcons feeding their young dragonflies. If only I had a camera now, I thought.' He sold his model railway, got a paper round and bought his first single-lens reflex camera for 300 guilders. Later he used his photos in his lectures and published photos and columns in magazines such as the Dutch *Grasduinen* and *National Geographic*. In 2005 he came first in the annual BBC Wildlife Photography competition with a picture of mating toads. Smit became a full-time nature photographer and after a couple of years began to film as well, including for TV Gelderland's programme BuitenGewoon and Vara's Vroege Vogels.

NEGOTIATING

Meanwhile, Ferry Pikavet's work had shifted from old-style estate management to new-style estate management, after he started working for Van Lanschot Nannenga Naus Rentmeesters in 2004. Now he supported government bodies, water boards and nature organizations in land matters and provided advice on the purchase of farmland for space for roads, housing estates, business parks and new nature areas. Pikavet was involved, for example, in the purchase of 1200 hectares of farmland for the Oostvaarderswold. 'The idea was that the area would be a wildlife corridor in Flevoland between the Oostvaardersplassen and the Veluwe. Because of the crisis in 2009 and the cuts to the nature management budget that followed it, that plan was shelved.'
Pikavet is fascinated by the combination of legal and social aspects surrounding land confiscation. 'Land and real estate are emotion. But the sale is also a matter of goodwill. Negotiating is a game and I just love that.' Very occasionally a farmer pounds the table with his fist, but Pikavet rarely takes difficult discussions home with him. 'In the rural areas there are many conflicts of interest between farmers' organizations, government bodies and nature organizations. If you show genuine interest and respect, people come to understand each other's considerations. With only suspicion you don't get anywhere.'
In 2014 he became branch manager of the office in Driebruggen. Since then he has been focussing more on the strategy. One of the challenges is the exodus from some rural areas. 'A lot of houses and farmhouses are being vacated because people are migrating to the city. What are you going to do about that?' There is work to be done at the nature organizations too, as they have to be self-supporting. Pikavet helps them exploit their real estate. His office has also set up an online 'marketplace' for the sale and lease of agricultural property. 'The website is a big success. Water boards use it to sell sections of dike, for instance. The agricultural sector was hesitant about it because there were such large amounts involved. We are real pioneers in this.
Smit too did pioneering work, by collaborating on the first big Dutch nature film. *De Nieuwe Wildernis* attracted 600,000 filmgoers, and the educational project that went with it reached more than 300,000 primary school pupils. 'The biggest achievement of the film is that people learned to appreciate nature again in a time in which nature has been put out with the garbage,' says Smit. The filming itself was quite taxing. 'The Netherlands has no tradition in this field and expectations were sky-high. Two years before the film came out we were already talking about it on the TV talk show Pauw & Witteman. There were big commercial interests at stake as well.'

BEAUTIFUL FILMS

Meanwhile, Smit now has his own production company. 'I want to make beautiful films that have substance to them, and not just to make money out of them.' At the end of this year a TV series will come out, *De Levende Rivier* [The Living River], and he is also working on a film about the Wadden Sea. His role is shifting from that of filmmaker to that of director and producer. 'It is nice to think up several productions and to be responsible for the content.' In imitation of the BBC, where scientists and filmmakers work together on nature documentaries, Smit has set up the Natural History Unit. He wants to locate the unit in Wageningen and, together with the university, to create a podium for nature films and a workspace where students can learn about visual communication. Smit: 'Aesthetics are part of what drives researchers. There is a strange divide between art and science, but if you are not fascinated by the beauty of nature, you can't immerse yourself in the science.' ■

NEW FUND DOCUMENTS USEFUL PLANTS

Spreading plant knowledge in Africa

'Most African countries do not know their own wealth when it comes to plants,' says Jan Siemonsma. He set up the Plant Resources of the World Fund, which distributes books and CD-ROMs about edible, medicinal and otherwise useful plants.

TEXT ALEXANDRA BRANDERHORST **PHOTOGRAPHY** CLAUDE THOUVENIN/LINEAIR

Women in Benin learned to extract natural colorants from sorghum. In Nigeria a forgotten leafy vegetable, the spider plant, made a comeback. And researchers from universities in countries including Kenya, Ghana and Uganda documented the effect of traditional medicinal plants. All these projects made use of information from Plant Resources of Tropical Africa (PROTA), a foundation which documented useful plant species between 2000 and 2013.

'Many plants can be used as food, as medicine, or as a source of wood or fibre. But most African countries do not know their own wealth when it comes to plants,' explains Jan Siemonsma, who was project leader of PROTA for many years. Siemonsma is now on the board of the new Plant Resources of the World Fund (PROW Fund) which manages the foundation's legacy in collaboration with Wageningen University Fund.

'There are eight to nine thousand plants in tropical Africa of which we know that they are used. We have studied about four thousand of them,' says Siemonsma. 'By putting the useful plants in the spotlight, we contribute to the preservation of knowledge about the plants, and of the plants themselves.' The plants can potentially provide the local population with additional income as well as increase their food supply.'

The descriptions of the plants can be found in books, on CD-ROMs and in the PROTA4U database. For every plant, a description is given of its characteristics, growth, cultivation, chemical composition and uses. The description is accompanied by a botanical drawing and a small map of the plant's distribution across Africa. The database, which was created with funding from the Bill & Melinda Gates Foundation, is consulted more than half a million times a year. 'The database is mainly consulted by researchers and universities and institutes all over the world for their teaching and research,' says Siemonsma.

BOOKS ARE POPULAR

In many African countries, where the internet is not always available, the books and CD-ROMs are popular too. 'With the help of the CTA in Wageningen, which distributes agricultural information in developing countries, 22,000 books and 9000 CD-ROMs have already been sold in Africa,' Siemonsma says. The books are available in both French and English.

Books and CD-ROMs have come out on cereals & pulses, vegetables, tropical hardwood, vegetable oils,

'A lot of people in Africa could benefit from this knowledge'

Medicinal herbs at a local market.

fibre crops and dye plants. The first two of five books on medicinal plants have been published too. In African countries the books about vegetables and medicines are the most popular. 'Millions of Africans are dependent on traditional medicinal plants. There is a great need for reliable information about how they work,' explains Siemonsma.

The documentation and the editing of it is labour-intensive. 'The job is to collect, verify and summarize existing knowledge which often comes from far away, for instance from the libraries of African universities,' says Siemonsma. So PROTA worked with local authors and had several offices and an extensive network in Africa.

In 2013, the project fizzled out when the Dutch government cut back on development cooperation. Publications on fruit, ornamental plants, forages, root crops and auxiliary crops such as ground cover plants were still in the pipeline. The search for another source of systematic financing did not bear fruit, however.

REPRINTING

Siemonsma even took early retirement to continue with this work without pay. The rights for the books and the database fell to Wageningen University. The university wants the database to go to Naturalis. 'We saw that the university had no interest in keeping the book series and the CD-ROMs on the market. We felt that was a shame, as there is still plenty of demand for them. Even in 2014, we sent 1400 books and 800 CD-ROMs to Africa.' So in June 2014, Siemonsma and two ex-colleagues set up the PROW fund, to be managed by the Wageningen University Fund.

'Every year the book sales make about four to five thousand euros. Together with money from donors this enables us to keep on reprinting and distributing the books. If more money comes in, we would first like to finish the reviews of medicinal plants.' With that aim in mind, the PROW Fund is still working on fund-raising. 'Of course we would love to complete the whole series. A lot of people in Africa could benefit from this knowledge.' ■

www.wageningenur.nl/prowfund

SUPPORTING THE PROW FUND

The Wageningen University Fund (WUF) manages several named funds. The Plant Resources of the World Fund (PROW) makes knowledge about useful plants available to developing countries. You can support the PROW Fund with a one-off donation, a regular contribution or a legacy. *Info: wuf@wur.nl*

NETWORKS

Alumni groups established in China and Indonesia

'An alumni group is a good way of making and consolidating contacts, both now and in the future,' said Louise Fresco at the first meeting of the alumni group for Wageningen graduates in Beijing.

'To feed the world in a sustainable manner, Wageningen UR needs to focus on interdisciplinary research and collaboration between different knowledge domains, even more so that we do now.' This was the message the chair of the Wageningen UR Executive Board, Louise Fresco, gave to the 60 or so alumni in Beijing on 2 December 2014. The meeting marked the start of the new alumni group in Beijing. Fresco emphasized the importance of dialogue with alumni in China and elsewhere.
The new alumni group will be organizing activities that revolve around topics associated with Wageningen and the professional development of alumni, says the chair of the alumni group committee, Han Bei-Zhong, who is professor of Food Sciences at the China Agricultural University. Alumni can also play a role in contacts with current and future students. 'Alumni are important role models for today's students. Through the alumni, they can come into contact with the business sector and have a prospect of interesting jobs.'
An alumni group was also set up in Jakarta at the end of November. More than 40 people attended a scientific mini-symposium about food security in Indonesia.

Both alumni group have a supervisory board and an executive committee that receives support from the alumni office in Wageningen.
Info: www.wageningenur.nl/alumni
www.wageningenur.nl/alumni/china
www.wageningenur.nl/alumni/indonesia

From left: André Driessen, Louise Fresco, Han Bei-Zhong, Delia de Vreeze

AWARDS

Communications prof Noëlle Aarts wins teaching award

PHOTO SVEN MENSCHEL

Wageningen University's Teacher of the Year Award 2015 has gone to Noëlle Aarts, professor holding a personal chair in Strategic Communications. 'Students who attend the lectures given by Noëlle Aarts are treated as partners on an equal footing in discussions and are encouraged to ask questions or come along to her office,' says the student jury. Aarts is open to ideas from students and challenges them to think creatively. According to the jury's report, her lectures are dynamic and topical.
On 15 January, Aarts and the four other nominees received 2500 euros to spend on teaching. The Wageningen University Fund provides the Teacher of the Year Award in order to encourage high teaching standards at the university.

EDUCATION

'Interesting to see how someone else teaches'

The meeting for Wageningen graduates working in education that was held on Wageningen Campus on 13 January was all about, inspiration, making education more appealing and new knowledge in the classroom.

You can make education more appealing by referring to topical issues. That was professor of Cell Biology and Immunology Huub Savelkoul's message for the 30 plus alumni, all teachers in secondary, vocational or higher education. In a mini-lecture, Savelkoul showed how he incorporated the Ebola crisis in his lectures as well as recent diet hypes such as the idea that gluten or bread might be unhealthy. 'You can use topical examples to explain difficult concepts. These days it's all about one-liners but students have to learn to understand the fundamental issues,' says Savelkoul.
The meeting was organized by the Alumni Office, the Education and Competence Studies Group and Bètasteunpunt Wageningen. After the mini-lecture, the teachers could attend workshops on such subjects as discipline-related didactics, sustainability, the *World Food Challenge* digital game and incorporating your own knowledge. 'I mainly came in order to network,' says Bart van Kats. 'Huub Savelkoul's talk was great. It's interesting to see how someone else teaches.'
Van Kats studied Tropical Plant Breeding, graduating in 1991. He teaches chemistry at the Luzac College in Goes and at a secondary school in Rotterdam.'Coming to Wageningen was really like being back home.'

FUNDS

Impressed by students' motivation

The Anne van den Ban fund supports Master's students from developing countries who want to study at Wageningen University. Some of these students talked at the annual donors' day about their plans when they return home.

'I was really impressed by the students' energy and enthusiasm,' says Aart Karssen, who received his degree in Land Development in 1976. At the end of November, he and 18 other donors met three second-year Master's students. These Anne van den Ban students from Vietnam, Kenya and Uganda talked about their ambition to work on food technology, nutrition and health, and the prevention of erosion when they return to their own countries. Then seven first-year Van den Ban bursary students joined them during the reception.

Karssen admires these students' decision to contribute to improving conditions in their own country rather than building up a scientific career in the West. 'Every day in Wageningen they learn things they can pass on when they return. That was the recurring theme through all their talks,' says Karssen.

Info: www.annevandenbanfonds.nl

IN MEMORIAM

Founding father of animal breeding has passed away

Professor Rommert Politiek was the founding father of education and research in Animal Breeding and Genetics at Wageningen University. He passed away on 22 December 2014 at the age of 87.

Rommert Douwe Politiek was a farmer's son and came to Wageningen in 1950 to study Livestock Farming. He was a lecturer in Livestock Farming Science from 1960 to 1968 and subsequently professor of Animal Breeding at the then Agricultural College from 1968 to 1988. His department was a centre for teaching and research. Politiek focused on improving scientific knowledge of genetics and breeding methods. He also had a wide international network. He encouraged many young researchers and remained actively involved until after his retirement.

REUNIONS

50 years of Environmental Technology

The Environmental Technology section is celebrating its 50th anniversary with an alumni day for all the department's graduates and former employees on Friday, 1 May 2015. To register, go to the department's website: www.wageningenur.nl/en/ete-alumniday

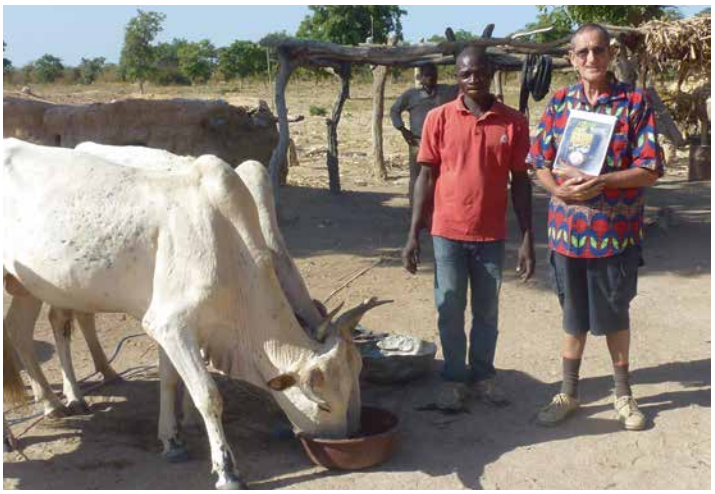
Classes of 1965 and 1990

The reunion for the alumni who started their degree in Wageningen in 1965, 50 years ago, is on Friday, 16 October. The reunion for graduates who started 25 years ago, in 1990, is on Saturday, 31 October.

WAGENINGEN IN THE WORLD

Greetings from Cassou!

The man holding Wageningen World is Paul Kleene, in Cassou, Burkina Faso. Kleene, who graduated in 1969 in Tropical Rural Economics, has lived there since his retirement in 2008. Before that, Kleene worked for major NGOs in Senegal, Mali and Burkina Faso and he developed an agricultural extension method for family-run farms: *Conseil à l'Exploitation Familiale*. Now he is an independent consultant helping to develop sustainable agriculture. The man standing next to him is Djibril Diasso, a young farmer who Kleene is working with. Livestock farming is a crucial element in the development of sustainable agricultural systems in savannah regions in the long term, says Kleene. He writes that he had to wait until he was retired before he could start work on that. 'When I was working for others, development work always had to be "quick".' He may never live to see the day when Diasso's farm really takes off. 'But Djibril, his neighbours, his children and my children will be there. Isn't that what sustainable development is all about?'



Lilian van den Aarsen PhD, WU Biology 1986, has been appointed director of Knowledge, Innovation and Strategy at the Ministry of Infrastructure and the Environment. 1 January 2015.

Prof. Jacqueline Bloemhof-Ruwaard, WU PhD 1996, has been appointed professor holding a personal chair in Sustainable Logistics Management at Wageningen University. 8 January 2015.

Stan Brouns PhD, WU Molecular Sciences 2001, assistant professor at the Laboratory of Microbiology at Wageningen University, has been awarded a European Research Council (ERC) Starting Grant of 1.5 million euros, for five years of research. 4 December 2014.

Sytze de Bruin PhD, WU Soil Science 1989, assistant professor at the Laboratory of Geo-Information Science and Remote Sensing at Wageningen University, has received the Public-Private-Partnership Award 2014 for sustainable solutions in the sugar sector in Rwanda, along with his partners, for the project 'Sugar: make it work'. 19 November 2014.

Eduardo Cittadini PhD, WU Crop Science 2002, has been appointed coordinator of the National Programme for Development and Sustainability of the Territories at INTA (Instituto Nacional de Tecnología Agropecuaria) in Argentina. 3 November 2014.

Sebastiaan van 't Erve MSc, WU Biology 2003, has been appointed mayor of the municipality of Lochem. 9 January 2014.

Prof. Louise Fresco, WU Rural Sociology of the Non-Western Regions 1976, chair of the Executive Board of Wageningen UR, has been appointed the chair of the expert group that will be evaluating the European Union's Seventh Framework Programme (FP7). 7 November 2014.
Fresco was also ranked 17th in the list of the top 200 most influential Dutch people published on 13 December in the Dutch newspaper De Volkskrant. 13 December 2014.

PHOTO HARMEN DE JONG

Prof. Louise Fresco

Prof. Arnold van Huis, WU Phytopathology 1974, professor holding a personal chair at the Laboratory of Entomology, co-author of the first insect cookery book, has given his farewell lecture. 20 November 2014.

Marleen Kamperman PhD, University of Groningen Chemistry 2003, assistant professor at the Laboratory of Physical Chemistry and Colloid Science at Wageningen University, has been appointed a member of the Young Academy of the Royal Netherlands Academy of Arts and Sciences (KNAW). 28 November 2014.

Wiebke Klemm MSc, TU Dresden Landscape Architecture 2003, PhD candidate in Climate-Proof Cities, Landscape Architecture at Wageningen University, won the Outstanding PhD Student Award 2015 given by the European Council of Landscape Architecture Schools (ECLAS). 21 September 2014.

Rutger Las MSc, WU Plant Sciences 2014, received the East-West Seed 2014 Graduation Award for Plant Sciences for his Master's thesis 'Fright, flight or fight. Exploring defence dilemmas in annual and perennial brassicaceous plants'. 28 November 2014.

Wouter Peters PhD, Utrecht University Atmospheric Sciences and Meteorology 1998, associate professor (personal chair) in the Meteorology and Air Quality group at Wageningen University, has received an ERC grant of 2.3 million euros for research into the carbon cycle in the Amazon rainforest. 28 January 2015.

Widi Tri Satya Mastuti, WU Animal Sciences 2004 and a PhD candidate in the Animal Production Systems group at Wageningen University, has won an award for the best presentation at the Asian-Australasian Association of Animal Production Societies Congress in Yogyakarta, Indonesia. 10 November 2014.

Berend van der Meer MSc, WU Molecular Life Sciences 2014, won the Unilever Research Prize 2014 for his Master's thesis on colloidal crystals at the Laboratory for Physical Chemistry and Colloid Science at Wageningen University. 27 November 2014.

Lara Minaard, BSc student, WU Animal Sciences, and founder of Wageningen Debating, has been awarded the first Cicero annual prize by the Dutch Debating Club in Amsterdam. 15 January 2015.

Gera van Os PhD, WU Phytopathology 1989, researcher in Plant and Soil Protection at Wageningen UR, has been appointed a lecturer in Sustainable Soil Management at CAH Vilentum in Dronten. 1 January 2015.

Arjo Rothuis PhD, WU Zootechnics 1984, has been appointed the Asia account manager at Wageningen UR. 1 January 2015.

PHOTO GUY ACKERMANS

Arjo Rothuis PhD

PERSONALIA

Ellen van Selm MSc, WU Rural Sociology 1988, has been appointed mayor of the municipality of Opsterland. 1 December 2014.

Martin Sikma, MSc student WU Soil, Water and Atmosphere, won the Student Research Award 2014 for the best Bachelor's study in the Netherlands and Flanders. He investigated the transportation of mass in clouds. 26 November 2014.

Saravanan Subramanian PhD, WU PhD 2013, has won the Dr V.G. Jhingran Best Post-Graduate Overseas Thesis Award 2014 for his thesis 'Feed intake and oxygen consumption in fish'. 31 October 2014.

Wen Wu, MSc student, WU Biotechnology, came second with her team in iGem, an international competition for synthetic biology in Boston, USA. They designed a bacterium that can save bananas from a destructive disease. 4 November 2014.

Jasper van der Woude MSc, WU International Land and Water Management 2014, KLV committee member, won the Delta Water Award 2015 with the Fresh Force team (Infram, Desicio and KplusV). 29 January 2015.

IN MEMORIAM

H. van Baren-Schirring MSc, WU Management, Economics and Consumer Studies 2010, passed away at the age of 29. 28 October 2014.
Prof. M.M.G.R. Bol, WU Tropical Land Development 1956, passed away at the age of 89. 16 November 2014.
J. Bon MSc, WU Food Technology 1963, has passed away.
E. Bouma MSc, WU Tropical Plant Breeding 1956, passed away at the age of 84. 16 November 2014.
W. van Boxsem MSc, WU Forestry 1972, passed away at the age of 70. 1 November 2014.
H. Dost MSc, WU Tropical Forestry 1953, has passed away.
T. Eernstman MSc, WU Tropical Forestry 1952, passed away at the age of 92. 10 January 2015.
A.J. Hellings MSc, WU Landscape Architecture 1948, has passed away.
J.A.H. Hendriks MSc, WU Tropical Plant Breeding 1950, passed away at the age of 89. 6 January 2015.
F.J.H. van Hiele MSc, WU Agricultural Plant Breeding 1950, passed away at the age of 90. 8 June 2014.
N.C. Hofman MSc, WU Tropical Plant Breeding/Horticulture 1958, passed away at the age of 83. 2 December 2014.
Prof. G. Lycklama à Nijeholt, former professor holding an endowed chair in Emancipation Studies and Women's Studies, passed away at the age of 76. 18 November 2014.
T. de Meester PhD, WU Forestry 1956, passed away at the age of 87. 8 January 2015.
Prof. R.D. Politiek, WU Zootechnics 1955, passed away at the age of 87. 22 December 2014.
J. Schulting MSc, WU Agricultural Plant Breeding 1954, passed away at the age of 89. 25 December 2014.
A.A.S. Smissaert-Houwing MSc, WU Biology 1978, has passed away.
D. Snieder MSc, WU Phytopathology 1970, passed away at the age of 68. 19 December 2013.
D.W. Stolp PhD, LLM, WU Agricultural Plant Breeding 1947, passed away at the age of 94. 23 November 2014.
M.J. Viskoper-Slijper MSc, WU Forestry 1966, has passed away.
B. Westenberg MSc, WU Tropical Livestock Farming 1952, passed away at the age of 91. 11 November 2014.

AWARDS

United Wardrobe

United Wardrobe, the company founded by current and former Wageningen University students Sjuul Berden, Thijs Verheul and Joep Dohmen, won the prize awarded by the general public at the Accenture Innovation Awards. United Wardrobe is a website where people can buy and sell clothes and fashion accessories, and where buyers get a guarantee that they will receive the goods ordered and sellers that they will receive their money. 17 January 2015.

'Snack well, work better'

Student entrepreneurs Thomas van den Boezem, WU Health and Society, and Mark Schönhage BSc, Communication Sciences 2014, have won the municipality of Wageningen's incentive award with their business BoxBites. Since May 2014, the company has been delivering boxes full of healthy snacks from the Netherlands and abroad on a subscription basis to people at home or in their office. Their slogan is: 'Snack well, work better'. 5 January 2015.

PHOTO SVEN MENSCHEL

Talking together about manure and society

'Inspiration Dinner' of NZV: public dialogue in action

Initiating and encouraging public debate is one of KLV's objectives. Examples are the well-known 'Wereldlezingen' and the regional alumni meetings, which KLV jointly organises. The study circles, networks of committed professionals from science and practice, are an ideal base for nourishing the debate. That was apparent from the Inspiration Dinner about manure processing that was recently organised by the Dutch Zootechnical Association (NZV). "Such an evening does not yield off-the-shelf solutions", say co-organiser and former NZV board member Gerrianne Jansen, "but it does provide inspiration and perhaps even more important still: nuance in perspectives and a fresh look from people outside of the sector." In a nutshell: a fine example of public debate in action.

Urgency

"Whereas a few years ago public and political discussion was mainly about animal welfare now it more frequently concerns megafarms, manure processing and the relationship with the soil", says organiser Gert Hemke, former chair of the NZV. "In pig farming manure processing has been an issue for some time. However, in dairy farming part of the manure will also need to be processed as dairy farms will want to expand following the axing of the milk quota and they will not be able to get rid of all the extra manure on their own land. The market for manure, especially in Germany, is already becoming saturated. Consequently there is a growing urgency to get rid of the manure in another way."

Animal rights or manure processing?

The direct reason for the debate on 10 January was an article in the *Agrarisch Dagblad* by Eric Smaling, former professor at Wageningen University and currently a member of the Dutch parliament for the SP (socialist party). In this, and in contrast to the position of LTO, he calls for a system of animal rights. He proposes that the large-scale deployment of manure processing is open to fraud and misses its purpose. Hemke: "I knew Eric from his period at Wageningen University and I invited him to hold this discussion in Wageningen as well with professionals from science and industry. In addition we invited two more speakers: Wiebren van Stralen from LTO-Noord and Peter Schepers from Exlan who both have an expert knowledge of the technical pos-

sibilities of manure processing systems." In between the dinner courses they all held a brief introduction that they closed with propositions in order to stimulate the discussions at the dinner tables.

Technical solutions

One of the propositions was that it is striking that arable farmers still apply phosphate from artificial fertilisers on a wide scale even though in principle their need for phosphate could be met with animal manure. This would, however, require the manure to be separated into a thin and thick fraction (in other words urine and faeces) so that nitrate could be removed from the liquid part. Although the technologies for this are highly promising they need to be developed further. That is only one part of the problem, however, as close consultations would also have to be held with arable farmers so that their fertilisation requirements could be optimally met. Special housing systems would also need to be developed and livestock farmers would have to make a substantial investment in their housing systems.

Support

Technical solutions are only one side of the story, a side that the agrarian sector can all too easily get stuck in. Because, says Gerrianne Jansen, "being right is one thing but what benefit does that give you as a sector – or as an individual livestock farmer – if a political discussion arises and there is no public support?" The political and public debate is not so much about technical solutions but about the future of livestock farming in the Netherlands, about the relationship with the soil, and about people and the environment. Eric Smaling formulated this as follows at the start of the evening: "It is good that we continue to be proud of Dutch agriculture and export but not at the expense of the soil. We must not just consider the technical solutions but also demonstrate that we take the soil seriously." And that is why debates like this are so important.

Driving force behind the dialogue

"When we asked at the end of the evening who was going home inspired more than half of the participants put their hand up", says Gert Hemke in closing. "Students in particular said: 'This is something we hardly ever hear about in our study.' But livestock farmers also gained ideas about future possibilities. And when I see how many influential people from different parts of the sector and the country made the effort to come to such an evening in Wageningen then I think we can be proud of our role as a driving force behind the discussion about embedding livestock farming in society."

KLV has also been inspired. NZV is one of the 18 study circles and networks under KLV's umbrella. These networks are, in principle, independent and KLV supports them as needed. Debates like these give KLV even more reason to maintain the links with study circles so that it can act as a broker in bringing interdisciplinary and cross-disciplinary subjects into the debate.

About NZV

The Dutch Zootechnical Association (NZV) is one of the most active subnetworks of KLV with 550 members. The network is made up of Wageningen alumni with roots in Animal Sciences (previously zootechnology), students, and professionals from outside of Wageningen with an affinity for livestock. NZV organises activities around the relationship animal, people and environment with the aim of strengthening its members' networks. www.nzvnet.nl

INVITATION

If you check our KLV Facebook page on a regularly base, you will be informed what KLV has been up to and what we are working on. This way you will keep in touch with the alumni association of your Wageningen University. Of course you are welcome to post your own interesting status updates too.

Join KLVNetwork!

www.facebook.com/klvnetwork

ACTIVITIES

Info: klv.nl/en (unless indicated otherwise)

16 March
Young KLV - CV Writing

19 March
Wageningen Business Cafe

26 March
Science Café - Astronomy, Dark Matter

16 April
Wageningen Business Cafe

30 April
Science Café - Music Cognition

21 May
Wageningen Business Cafe

Young KLV - BCF Career event - Free entrance

15 June
Young KLV - CV Writing

15-17 June
European Grassland Federation - International Symposium - Grassland and forages in high output dairy farming systems
More info: www.egf2015.nl and www.europeangrassland.org

16 June
SKOV seminar - Agricultural development in Sub-Saharan Africa

PHOTO JOOP HARMSEN

Purification of waste water can save Egyptian monastery

In the Egyptian countryside, waste water often flows untreated back into the environment. To change this, Joop Harmsen of Alterra Wageningen UR and an Egyptian expert designed a cheap purification system for the village of Deir Gebel El-Tair. Using septic tanks, a stone filter and a filtering reed swamp, waste water is turned into nutrients and irrigation water. There is still no funding for implementation as yet, but there is more at stake here, Harmsen stresses, than the health of the 8000 villagers and the reclamation of minerals. In the village is the Deir El-Adra monastery, built above a cave where Jesus, Mary and Joseph are believed to have slept on their flight to Egypt. Every year one and a half million Coptic Christians and Muslims make a pilgrimage here. But this sacred site is in danger. 'The monastery is situated on the edge of a chalk plateau. Infiltration of the waste water into the ground is making the cracks in the subsoil bigger and bigger. It is quite possible that the monastery will collapse. I expect that threat will persuade ministries in Egypt or western financiers to do something about the waste water.' *Info: joop.harmsen@wur.nl* ■