

Resource

SEPTEMBER 2022 VOLUME 17

The journalism platform for all at Wageningen University & Research

Two students
to a room

Low-emission barns
Technology not a
failure

Cow's milk trains
immune system

No more recording
of stats lectures

Staghouwer resigns
What now?

Amazon expedition
Looking for CO₂ | p.20

**Sjoukje
Heimovaara**
Changing
course
p.18



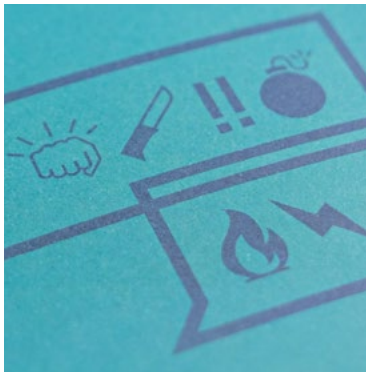
Contents

NO 2 VOLUME 17



12

Plant as photo model
Next-level plant science



15

Nitrogen dialogue
intense internally too



22

Ombudsperson
'People are done with misconduct'

7 Students make rapid sepsis test

26 Greenhouses depend on gas

8 You win some, you lose some: gaining from a setback

28 The side job: student Jan tests drugs

10 The proposition: support scientists in communication

Read the latest news and background stories at resource-online.nl



FOREWORD

Heavy tanker

The guard inspected my bag and decided it was OK: I was allowed inside for the opening of the academic year. The first time in brand-new Omnia, the first opening with new Board President Sjoukje Heimovaara giving the speech. The theme (planetary boundaries) and the line-up looked promising. Sjoukje sounded approachable too. She warned that we were pushing our planet's boundaries, with the pond next to Omnia that has dried out due to the persistent heat as a poignant local example. Hannah van Zanten stressed that our linear food system needs to alter and become more circular, and Jessica Duncan impressed with her talk on change through unusual collaborations. Marten Scheffer (co-author of the *Nature* article that introduced the term 'planetary boundaries') also emphasized that the time has come for 'genuine change'. That applies to WUR as well. 'This tanker needs to change course slightly,' says Sjoukje Heimovaara on page 18. Hopefully the message will get across on campus. Because at present there is still a report on the intranet about travel agent ATPi with a photo of a KLM plane. And we have the food waste free week on campus, which is a good thing — but only one week? Why not all year round? It is a heavy tanker, that's for sure.

Willem Andréé
editor-in-chief





FRESCO'S BIKE

A wheel, a bicycle seat, a chain. Useless unless they are connected together and support one another. Louise Fresco's bike, donated 'to a student without a decent bicycle' on her departure, had been dismantled and was put on display outside the Forum last Monday. According to activists from *The Jester* among others, this symbolizes Wageningen research. 'WUR reduces global problems such as the climate crisis into separate elements, whereas we should be looking at how all those elements fit together.' The action was short-lived as the security staff didn't want this 'garbage' in front of the door. ^{CJ}

Photo Resource

Experiment: two students to a room

Many international exchange students had still not found a room as the academic year was about to start. So student accommodation provider Idealis has begun an experiment with two students sharing a room.

‘Most students have already found somewhere to stay,’ says Idealis director Bart van As. ‘But of course more may come next year and Wageningen may then not be able to cope. So we have started an experiment with two students sharing a room.’ Twenty international exchange students are taking part in the experiment, in the Dijkgraaf student flats. At the request of the fire service, they are spread over different

corridors within the block of flats.

Half the rent

All the students taking part in the trial volunteered for this, says Van As. ‘Many foreign students like the idea of sharing with a roommate they have chosen themselves. In other countries it is quite normal for two students to share a room. In China, you even get up to six students in one room. So they are used to it.’ The director sees another advantage for the students taking part in the experiment: ‘They only pay half the rent, which is a nice bonus.’ Once the experiment has ended, Idealis will evaluate whether room sharing is a good emergency scenario



Photo Unsplash / Marcus Loke

for housing students from abroad. ‘The comments I’ve heard so far have been positive. The participants like sharing a room.’ If it turns out later that room sharing is not the right solution, an alternative will have to be found.

‘Then we may need to make use of a moored cruise ship or rent rooms in the WICC hotel.’

This is a revised version of an article that appeared in the Gelderlander/Arnold Winkel

Student challenges on personal safety

How do you make your boundaries clear? What are microaggressions and how can you protect yourself against them? And how can bystanders help others stay safe?

As part of the ‘Feel safe at WUR’ campaign, the Student Service Centre has developed a series of challenges about these and other aspects of personal safety. These SafeTEA challenges, as they are termed, can be viewed online as of last week. In addition, three live SafeTEA evenings are being organized in the Forum to work on these topics in person.

The first was Tuesday evening and the next one will be on 27 September.

Earning points

To encourage people to take part, points can be earned by doing the online challenges and attending the SafeTEA evenings. They can be exchanged up to the end of

the period for rewards such as vouchers for a cup of tea. Alternatively you can save them up to buy a WUR sweater, for example, after completing all the challenges.

So far about 300 students have registered for the challenges, which were promoted during the AID week with the SafeTEA Escape Room. It is still not too late to get involved: anyone with a WUR email address can register for the challenges at safety.wur.nl/tea. Finally, why the name SafeTEA? ‘Studying and living together has a lot of similarities with drinking tea,’ according to a leaflet. ‘It is warm and nice but you need to be careful: you should take differences in taste into account and make sure no one gets burned, including you yourself.’ ME

10

Good news for students with a job on the side: the minimum wage will go up by 10 per cent in the new year. This measure is in the leaked plans for the new National Budget. The healthcare allowance will also increase by 35 euros. Both measures are aimed at compensating for the rising cost of living. ^{HOP}

100 million needed for climate research

An annual investment of 100 million euros is needed to make more effective use of science in the transition to a climate-neutral society by 2050, a committee has advised the Dutch Research Council and Royal Netherlands Academy of Arts and Sciences. The directors of these two institutes welcome the recommendations. This could lead to a shift in funding for research. There is still time to prevent the worst irreversible effects of climate change, says the committee chair Heleen de Coninck (Eindhoven University). 'But that is only possible if scientists and relevant social actors collaborate intensively on system transitions! This is necessary for example in agriculture, urban planning, transport and the food industry.'

Systemic change

The report advocates a 'Dutch Climate Research Initiative' to manage the 100 million euros. About half that budget should be spent on systemic change. Some 30 million euros should go on international research, for example in collaboration with developing countries. The idea is not that researchers compete with one another for funding, says the report. 'Such competition between scientists may have a positive effect on the quality of the research but it can also slow progress down because so many badly needed projects miss out on funding.' ^{HOP}

Agriculture minister Staghouwer resigns – now what?

Henk Staghouwer's resignation did not come as a surprise to Public Administration & Policy expert Jeroen Candel. Now politicians in The Hague face an enormous task. 'The coalition will need to brainstorm to put together a comprehensive package of measures.'

What next? Candel: 'Now we need someone who has a long-term vision for the food system, someone who is prepared to take difficult decisions. Farmers are demanding a future. The government says farmers need to transition to less intensive forms of agriculture. They are being asked to deliver more environmental services but nothing is said about how they are supposed to earn income from this. Available instruments for tackling the nitrogen problem, such as European agricultural policy, have not been used.'



Photo ANP

The ChristenUnie political party will have to come up with a replacement for Staghouwer. But it is a small party with few administrators with seniority and experience in this area, says Candel. 'You want someone who can jump right in, but I don't see any obvious candidates. Anyway, paradoxically the agricultural crisis can't be resolved by agricultural policy alone. The coalition government

as a whole will have to consider the matter. Staghouwer inherited an agricultural policy from previous governments that continually postponed tackling tricky topics such as nitrogen, the climate and biodiversity. Farmers are justifiably frustrated that such huge demands are being made of them but not of other parties in the supply chain, including consumers. A comprehensive food policy is required, but that virtually means breaking open the coalition agreement.' We really need a new Green Deal for the Netherlands, says Candel, to fit in with the EU's Green Deal. 'A plan in which you figure out how to make the food system and economy as a whole future-proof with due regard for sustainability and fairness. But that is an immense task: the coalition will need to brainstorm and jointly come up with a vision for the future.' ^{WA}



‘Most exchange students have a room’

A few weeks ago, a call was posted on the intranet asking people to take in exchange students as about 100 of them had still not found a room. Most have now found somewhere to stay, and a few have cancelled their exchange plans.

The intranet call produced two rooms, and two more rooms were found through the social network of WUR’s Exchange Team, says the team coordinator Eric de Munck. ‘Ingrid Hijman of the Student Service Centre also urged Idealis to reserve some emergency rooms.’ It provided 21 regular rooms plus 11 rooms to be shared by two students. ‘So that was enough for 43 exchange students in

‘It’s hard to find a room here if you live in Italy’

total.’ Other students were able to find somewhere to stay themselves, via Facebook for example. This means

most exchange students have now got rooms. ‘There are also a few students lodging with relatives. We are still trying to help them find somewhere. And some have cancelled the exchange.’ It will be clear at the end of September how many have done that.

Poor position

De Munck thinks something needs to be done to improve the position of exchange students in the housing market. ‘No rooms are reserved for them, and Idealis doesn’t give them priority unless they are from outside Europe. Two thirds are from within Europe so they have to try and arrange something while in their home country or come here without a pre-arranged room. It’s hard to find a room here if you live in Italy.’

De Munck doesn’t have all the answers, but he does think WUR should look into this. ‘VU University Amsterdam reserves rooms for exchange students, for example. I’m not saying we should go that far, but the poor position they are in at the moment is not acceptable.’ LZ

No more recording of statistics lectures

Lecturers who teach the first-year courses Statistics 1 and 2 want to get students back ‘into the habit of coming to campus’. They will therefore stop recording lectures

Fewer students turned up for statistics lectures after the coronavirus lockdowns ended than before the pandemic, says lecturer Carolien de Kovel. ‘In period 4 last year, we had days when we live-streamed two lectures because there were so many Covid cases. But some of the students then turned up 10 minutes late for the practicals that followed the lecture. It turned out they had watched the lecture online and only came to campus for the practical. We found such behaviour strange and not what you want in the academic world. You want students to be present, asking questions and chatting to one another and the

lecturer during the break. That is important for the students’ personal, social and intellectual development.’ What is more, it is precisely the students who stay at home who could do with the extra attention, says De Kovel. ‘Statistics is a subject a lot of students have difficulty with. About 70 per cent pass first time but the rest often take three, four or five goes. Our impression is that this is the group that prefers to stay at home whereas they would benefit most from coming in. Then the teacher can take a look over their shoulder and ask whether they have any problems.’ LZ



Sports grants for Esma Staal and Sofie Dokter

Handball player Esma Staal (left) and heptathlete Sofie Dokter were awarded 1500 euros each from the Niels Smith Fund for WUR students who are top athletes. There are currently 29 top athletes studying at WUR. Staal (20) plays for VZV in North Holland in the highest league. Her team also competes in European competitions and she is a member of the Dutch national under-20 team. Dokter (19), from Groningen, won gold at the Dutch heptathlon championships. She competed in the European Championships in the summer, coming a very respectable 13th. The Niels Smith sports fund was set up in 2010 to honour the son of WUR alumnus Marianne Remmers, who died at the age of 15. RK



Silver for rapid test

WUR students won silver in the SensUs Challenge with a rapid test for detecting sepsis (blood poisoning).

The SensUs Challenge is an annual international competition for students organized by Eindhoven University of Technology and aimed at boosting innovation in biosensors for healthcare. Biotechnology students Inge Braak and Iris Janssen jointly headed the nine-person team SenseWURk for the past year. Braak: 'The task was to develop a biosensor to detect Interleukin-6, also known as IL-6, a substance your body makes when you have an infection.' Janssen: 'Sometimes, the body overreacts to an infection, making itself dangerously ill in the process. If that happens, the body has a high concentration of IL-6.'

Saving lives

The team developed a rapid test — familiar from Covid — for detecting IL-6. Janssen:

'Our rapid test tells you within 30 minutes how much IL-6 there is in the blood plasma'

'We use blood plasma instead of a cotton swab with saliva. If there is IL-6 in the blood plasma, the test emits a fluorescent signal. The higher

the concentration of IL-6, the greater the fluorescence.' The fluorescence is measured by a reader linked to a computer. 'That tells you fairly precisely how much IL-6 the blood plasma contains.'

Sepsis is the leading cause of death in intensive care, explain the SenseWURk team leaders. At present, it still takes hours or even days before a suspected case of sepsis can be confirmed. Braak: 'Our rapid test tells you within 30 minutes how much IL-6 there is in the blood plasma.' Janssen: 'The sooner you diagnose sepsis, the sooner you can start giving antibiotics.' Every hour of delay increases the risk of death by eight per cent.

Team SenseWURk is now looking at the options for further developing the test. LZ

Cow's milk trains immunity



Immunoglobulin G from cow's milk sets off a response in innate immune cells and can thereby boost immunity against infections.

Breast milk is the recommended source of nutrition for babies but not all new-born babies can get breast milk. Formula milk based on cow's milk is a good alternative as the composition is quite similar to human milk. Furthermore, strict regulations make sure that it contains the right amounts of nutrients. Milk also contains proteins that boost the immune response of new-born babies. These proteins include the Y-shaped immunoglobulins (Ig). Mojtaba Porbahaie, a researcher at Cell Biology and Immunology, investigated whether IgG, the immunoglobulin in cow's milk, interacts with human immune cells to elicit a stronger immune response.

Immune training

Immunoglobulins and antigens form spherical immune complexes that bind to the receptors of immune cells and set off a stronger immune response than the antigens do on their own. Porbahaie discovered that the immune complexes made up of antigens and IgG from cow's milk bind well to the receptors in

human immune cells *in vitro*. IgG could therefore trigger an immune response.

However, an experiment with healthy people with whey protein added to their diet did not change the immune response to a test infection with a

'It is not surprising we did not find a clear effect'

high dose of *Escherichia coli*. 'The immune system of healthy people usually doesn't need any extra support so it's

not surprising we did not find a clear effect.' Tests on high-risk groups (young children, the elderly and people with immune disorders) are not allowed for ethical reasons.

Heat-treated

Epidemiological studies of new-born babies on farms who drank raw cow's milk showed that they were less likely to develop asthma and allergies, and this effect persisted into later life. While the farm environment could be a contributory factor, this points to the possible benefits of raw milk. Milk sold in supermarkets is heat-treated to kill pathogens, but as a result supermarket milk may also lose the benefits of compounds such as IgG. ss

[You win some, you lose some]

A failed experiment, an error in your model, a rejected article: in academia such things tend to be labelled failures. As for talking about failure? Not done! But that's just what WUR co-workers do in this regular feature, 'You win some, you lose some'. Because failure can be useful. In this instalment, we hear from Vincenzo Fogliano, professor of Food Quality and Design. Text & illustration Stijn Schreven

'In the first two years of my lab work, I did nothing but make mistakes. For example, I tried to purify a protein from maize cells using chromatography, in order to identify it. Time after time I couldn't find the protein afterwards: I had collected only 0.1 per cent, while the other 99.9 per cent went down the drain. I was utterly baffled. All my work could be binned and I had collected next to nothing.

'Two years later, I discovered that I'd been using the wrong filter column: the pores of the filter were too small and the protein was being washed away with the buffer solution. That was a turning point. While I was still deep in the shit, I could only see the huge amount of time wasted and I was frustrated that the results were not as I expected. But then I suddenly saw all I had learned and how much I now understood about things I wouldn't have delved into so deeply if I hadn't had the failure. And I managed to finish my thesis quickly after that.

'I have another example. The first time I applied for a job abroad, I was one of the last two candidates. When the other one got the job, I found it hard to accept. I had already started dreaming about what it would be like, and

'While still in the shit, I could only see the time wasted'

I had told my family. Suddenly that dream was shattered. As a scientist, you

develop your own research and CV. Your career is all about you. So that rejection felt personal: I was not good enough. 'In the months that followed, I doubted myself and my decision to go into science, and I blamed the system. But when I got the chance to apply for a place in Wageningen, I saw things more positively and I understood what I could do better. I needed to explain my strong points better. The selection committee won't automatically grasp the value of your research. Thanks to that earlier setback, I was better prepared this time.'



Harvesting branches can exhaust the soil

Forest managers should not be too quick to harvest branches in areas with poor soils, says Anjo de Jong, a researcher at Wageningen Environmental Research. Together with colleagues, he calculated the loss of nutrients in Dutch forests due to harvesting stem and branch wood.

In addition to nitrogen, trees need nutrients such as phosphorus and potassium to grow. The soil in higher lying sandy areas of the Netherlands is often poor and lacking in such nutrients. There is enough nitrogen due to deposition, which is good for growth, but it also leads to leaching of other nutrients. This causes an imbalance that reduces the vitality and rate of growth of the forest.

Forest ecologists see this imbalance in the soil reflected in the trees. De Jong: 'Dutch trees have much higher nitrogen content than trees in other countries. At the same time, they have lower concentrations of potassium and phosphorus.' That is mainly the case in the tree trunk. In branches, the difference is smaller for nitrogen but still big for the other nutrients.

Conifers

These days, forest managers sometimes harvest branch wood and top wood as an energy source in addition to stem wood. But the branches have relatively more nutrients than the trunks, so you then remove a lot of nutrients. This is particularly the case for conifers, where the needles stay on the branches. Deciduous trees such as the beech, oak and birch that grow in poor soils tend to have more nutrients in the trunk. That is why De Jong urges foresters to hold back on harvesting the stem wood of these trees.

The forestry agency Staatsbosbeheer was involved in the study and has now drawn up its own guidelines for harvesting. Other forestry managers are also interested in the researchers' recommendations. ss

Council of State rejects assumptions for low-emission barn

‘Low-emission barns rejected’, ran the media headlines after the Council of State ruled last week that low-emission barn floors did not constitute sufficient grounds for granting nature permits for three Utrecht dairy farmers. But those newspaper headlines oversimplify the matter, says Karin Groenestein, a senior researcher in the Environment and Livestock at Wageningen Livestock Research

Even the Council of State itself stressed that the ruling does not apply to all low-emission barn systems. It applies specifically to two types of barn floor used in dairy farming, namely the A1.13 and the A1.28. Groenestein estimates that about 5 per cent of Dutch dairy cows use such floors, whereas in total 20 per cent of dairy cows are kept in low-emission barn systems.

‘There is no reason to declare the technology a failure’, she emphasizes. ‘The Council of State does not do that either. It does not question the effectiveness of the floor systems in general. It simply concludes that there is not enough evidence for the assumption about the size of the actual reduction in nitrogen emissions. And the law says certainty about the size of the effect is required in order to qualify for a nature permit.’

Spreading or removing

Groenestein says it is no surprise to hear there is a gap between the promised nitrogen reduction and actual reductions. Statistics Netherlands published a report showing this back in 2015. ‘Some barn systems are more sensitive to variations in the practical application than others’, she explains.

Most low-emission barn floors work on the principle that the urine — and therefore the ammonia-containing substance — is removed quickly. Urine flows away fastest



Photo Shutterstock

if the floor is regularly cleared of cowpats. That is not a problem when you have a new floor and wipers. If the low-emission barn floor is cleared as frequently as recommended, usually once every hour or two, it does what it is supposed to do: namely prevent ammonia from forming.

‘An MOT for barn systems sounds like a good idea’

But if the floor is cleared less frequently, or if the wipers are worn and therefore simply spread the manure around rather than removing it, then nitrogen emissions become a problem. Groenestein: ‘Ammonia starts forming within two hours of faeces and urine coming into contact with one another.’

‘The essence of the problem lies in how the system has been set up’, she argues. ‘Once farmers get their permit, there are no more checks. As a result, farmers do not have an incentive to make optimum use of their low-emission barn systems. Dairy farmers have always been given a lot of leeway, but now the sector is paying

the price for this.’

According to Groenestein, all the parties involved — the farmers, the policymakers and the barn system manufacturers — should be asking themselves ‘Is this really what we intended?’

To gain

‘In principle we know enough about what does and doesn’t work. As researchers, we have been studying this topic for a long time. One of my colleagues has suggested we should introduce an MOT for barn systems. That sounds like a good idea to me, although I realize barn technology alone will not resolve the problem. There is also lots of room for improvement in the implementation.’ ME

Improved stoves empower Ethiopian women

Ethiopian women use the time they save by using improved cooking stoves to do paid work. The extra income means a healthier diet for their families. That's not the only benefit of an improved stove.

These are the findings of Kaleb Jada (Development Economics), who did research on the stoves. The traditional open cooking fires in rural Ethiopian households are inefficient and harmful. They consume a lot of wood and biomass as fuel and cause indoor pollution, leading to health problems such as lower respiratory tract infections. Since they were recommended, many Ethiopians have started using improved stoves. Kaleb Jada (Development Economics) researched whether such stoves can also contribute to food and nutritional security, which is key to reducing malnutrition.



The improved cooking stove.
Photo GIZ Energy Coordination Office

The improved cooking stoves reduce indoor pollution and require less fuel, lowering greenhouse gas emissions and deforestation. At the same time, they also improve nutrition and food security – primarily by saving rural women a lot of time, Jada discovered from data from 4338 households, collected in 2014 and 2018. ‘The new stove shortens cooking

time and is more energy efficient, so women don't have to gather as much firewood. Traditionally, women do the cooking in Ethiopia, so the improved stoves make the biggest difference to their lives.’

Time-saving

‘Women now have some time to spare, and this makes them more inclined to seek paid work and generate income,’ explains Jada, although he adds that his study only covered a small sample. ‘Women spend more of their income on the household than men do, which leads to better nutrition and food security.’ Households with these stoves were found to have a more varied diet and to eat more products containing vitamin A. That improved diet reduces malnutrition and can prevent non-communicable diseases such as diabetes, heart disease, strokes and cancer. ss

THE PROPOSITION

For PhD candidates, their thesis propositions are an opportunity to highlight their professional and personal convictions about science and society. In this feature they explain their most thought-provoking proposition. This time, a proposition from Antoine Karengera (Marine Animal Ecology), who defended his thesis on 7 September.



‘The best way to make the general public understand and trust scientific achievements is to support scientists in their communication efforts rather than leaving this task to communication specialists.’

‘Advancements in science are often met with more opposition than enthusiasm. Take vaccines, for example, or genetically modified food, or gene therapy. The debate takes place on TV or social media between politicians or communication experts, but scientists are side-lined. Communication specialists only focus on the positive side of science. I always talk about both sides of my research, not just the positive aspects or what my audience wants to hear. If scientists were supported in their communication, their discoveries and achievements would get a better reception from the general public. ‘I explained my research to people attending an open day at Wetsus, the water research institute in Leeuwarden where I did my PhD. I told them how I was using a

little worm, a nematode, to measure water quality. Everyone understood that, and yet later someone asked me if tap water contained these worms. I realized I hadn't communicated clearly enough. ‘If we encouraged researchers to publish each step of their research in a daily newspaper rather than in a scientific journal, I think there would be more public support for the eventual breakthrough. Otherwise the end result of the study comes as a shock. For example, RNA-based vaccines had been studied for years. When the pandemic came, they were quickly developed and used. A lot of people were worried because it seemed impossible that a reliable vaccine could be developed in such a short time. Apparently, people were not aware of the previous research.’ ss

Nitrogen

There have been a lot of changes in the past few weeks. Students have had a 'normal' start with introduction days, lectures and plenty of people on campus. We have a new President of the Executive Board. The opening of the academic year, in a new building, was about our planet's boundaries. It's great that the year has started

'The normally calm, sleepy Dutch summer was punctuated by fierce protests'

and third-years for what will hopefully be a normal academic year.

Another change was that the normally calm, sleepy Dutch summer was now punctuated by fierce protests. Nitrogen was the magic word this summer and of course Wageningen had to be involved in the debate.

I read tweets by Wageningen scientists who saw dying oaks everywhere as they cycled through the Veluwe nature reserve; Wageningen scientists who complained

again, and here's a warm welcome to all the new first-years. And indeed welcome back to our second-years

that their more positive nitrogen outlook had got buried in political games; Wageningen scientists who presented solutions that did not require the sacrifice of a single farm animal; letters in the newspaper signed by Wageningen scientists and stating now was the time for action (not more research).

This is a wise lesson for all our students: there are limits to what we can achieve with science. If you have come to university to learn how things really are, you should realize that the person telling you 'how things really are' is mainly telling you 'how things really are according to them'. Even scientists in Wageningen who have specialized in a topic can differ a lot from one another in their interpretations. But while you won't find ready-made answers at university, hopefully you will find opportunities to formulate your own answers to the big questions.

And if you happen to have found a good answer to the nitrogen crisis, let me know because at the moment this particular Wageningen scientist has no idea.



Guido Camps

Guido Camps (38) is a vet and a researcher at Human Nutrition and OnePlanet. He also enjoys baking, beekeeping and unusual animals.

Next-level photosynthesis

THE PLANT AS PHOTO MODEL

With the completion of NPEC at the end of this month, plant research enters a new era. The era of automation and a lot of data.

NPEC stands for Netherlands Plant Eco-phenotyping Centre. The focus here is not the plant's genetic baggage – its genotype – but its outward appearance, or phenotype. The research entails measuring aspects of the plant's appearance and the influence of the environment. And what NPEC offers in terms of technology is downright phenomenal, says professor of Genetics Mark Aarts, chair of the Board of NPEC. 'Genetics is no longer a limitation for research these days. Nowadays we can determine genotypes very quickly and cheaply. What we need now is to understand what those DNA sequences do. Why is lettuce with this genotype different from lettuce with that genotype? How do the envi-

ronment and climate influence that? NPEC offers the facilities to measure all that. I am a geneticist and for me the possibilities this opens up are fantastic. Really super.'

Of course, scientists have always measured how crops react to a certain treatment, disease or stress, says Rick van de Zedde, the project leader for the development and construction of NPEC in Wageningen. 'But until now these sorts of experiment required a lot of manual work. The scale of testing was limited by the number of plants a person could analyse in a day. PhD students therefore spent weeks on intensive manual work, whereas they have better things to do with their valuable time. NPEC gives researchers equipment with which they can conduct standardized analyses of

'Here you can measure characteristics that the human eye doesn't see'



Text Roelof Kleis

plants on a large scale, and build data-sets. All with the help of robots, sensors, automation and camera systems; in the greenhouse and climate cells as well as in the field. This is a global trend.'

Photo model

NPEC is a collaboration between WUR and Utrecht University (see inset: Ecotron). The facilities are spread across both campuses. There is not much activity yet in the NPEC greenhouse behind Radix, where Van de Zedde proudly shows off the equipment. There are two sections to the greenhouse. In one section, the plants are moved on conveyor belts towards cabinets full of measuring systems. In the other section, the plants stand still and the measuring systems move. In both cases, the measuring is fully automated. 'Here we measure the architecture of the plant,' says Van de



In the first section of the NPEC greenhouse on the Wageningen campus, the plants are moved on conveyor belts towards cabinets full of measuring systems.
 • Photo Guy Ackermans

‘We can simulate a sunny day in Southern Europe or a night frost in the Netherlands’

Zedde, pointing to a large white box. In the cabinet, the plants are captured from all sides by 15 cameras as if they were photo models. ‘A 3D image of the plant is then constructed from these images. We developed the software for doing that ourselves. This is a Wageningen invention, which you won’t find anywhere else in the world.’

Each of the camera systems in the ‘photo lane’ has its own focus. Van de Zedde: ‘That one was developed together with One Planet, and makes hyperspectral images, capturing not just visible light but also ultraviolet and infrared. This lets you detect early symptoms of disease or drought stress. Here you can measure characteristics that the human eye cannot see’. The third and final room in the lane focuses on photosynthesis. ‘So that can meet the need for data at the planned photosynthesis institute that is coming to the campus. Photosynthesis is one of the spearhead topics at NPEC.’ A trial is underway in the ‘stationary’ part of the greenhouse. Various grass varieties are being exposed to drought. ‘We are look-

ing to see which variety will survive the longest,’ Van de Zedde explains. ‘We are doing a very controlled analysis of what happens to the plants’ weight when they slowly go into a kind of drought stress. The plants are each placed on a scale that is so accurate that the plants mustn’t move. By this method, you can measure evaporation very precisely. This kind of research is very important to NPEC. Everyone can see that climate change is causing problems. When it is bone dry and extremely hot, our standard crops have a hard time in the fields. It would be great if we could find more



robust plants at NPEC. Not just grasses, but also crops like tomatoes, cucumbers or quinoa.’

Non-stop measurements

There is the same focus on photosynthesis in the greenhouse in the climate chambers in another NPEC building just down the road, opposite Unifarm. The chambers are greenhouses in themselves, just on a small scale. The difference is that not a single ray of sunlight penetrates into them. The light in the chambers is artificial and fully controlled. Van de Zedde: ‘That means that we control the climate here. We can simulate a sunny day in Southern Europe, or a night frost in the Netherlands.’ The climate chambers are specifically equipped to measure photosynthesis, says Professor Aarts. ‘Much better than anything we’ve had before, we are delighted with them. One of the chambers has a light



There is complete control over the light falling on the plants in the climate chambers. That allows various aspects of photosynthesis to be studied, as is being done in this photo with the model plant *Arabidopsis* (thale cress) • Photo Guy Ackermans

NPEC marks the start of Plant Sciences 2.0

ceiling with various cameras and other sensors that enable us to continuously measure various characteristics of photosynthesis in all the plants simultaneously, on a time scale of milliseconds. We are particularly curious about the response of plants to rapid variations in light intensity.’

NPEC marks the start of Plant Sciences 2.0, Aarts is quite sure. ‘No doubt about it. Automating so many aspects opens

up new possibilities. You can measure at any time of day or night, and in a consistent way. People can’t do that, it’s not sustainable. NPEC offers the possibility to measure what happens from seed germination to flowering and to continue measuring plants beyond that.’ ■

Ecotron

One of NPEC’s eye-catchers on the Utrecht campus is the Ecotron. There are no fewer than 32 of them set up in different halls in the new black premises next-door to the Kruyt building. They are beautifully designed capsules of more than a man’s height. A team is hard at work getting them all installed and tested.

You could describe Ecotrons somewhat irreverently as fancy covered flower pots. ‘They offer the researcher an option in between the field experiment and the standard pot experiment in the lab,’ explains professor of Ecology and Biodiversity George Kowalchuk. ‘The field gives you the real interactions of the plant with the environment, but you don’t control the conditions. It is too cold, too dry

or there might be a pest. To avoid all that, you can do pot tests in a climate chamber, for example. That is useful, but it’s not a realistic simulation of the real world. Ecotrons fill the gap between the two. The plants grow in a closed system on real soil with sufficient mass and depth and under realistic and controlled conditions. Even the suction effect of the soil can be simulated.’

As the plants grow, various measurements and samples can be taken. Kowalchuk: ‘One of the research questions, for example, is how much carbon plants fix and where that carbon goes. About 40 per cent of it is excreted through the roots, thereby feeding the soil life in the rhizosphere, the environment that interacts with the roots. That soil life, with its pattern

of micro-organisms, varies per species and even per cultivar. Because an Ecotron is a closed system, you can use isotope analysis to determine when and in which organism carbon is deposited. In this way we can map the interaction between the plant and the soil.’

Besides the Ecotrons, NPEC in Utrecht also houses a battery of advanced climate chambers in which very diverse conditions can be created, and a module dedicated to the interaction between plants and micro-organisms. ‘There you can very precisely analyse the interaction of plants with micro-organisms both above and below ground. For example, you can see how the phenotype of a plant changes after interaction with micro-organisms.’

Nitrogen

Internal dialogue was intense too

Frustration, grief and deep-rooted concerns. Less than a week after farmers and members of the public had a 'good conversation', Impulse once again formed the backdrop for a dialogue about nitrogen. This time for WUR employees, so that pressing issues that can divide us are discussed amongst ourselves as well. It was an intense discussion.

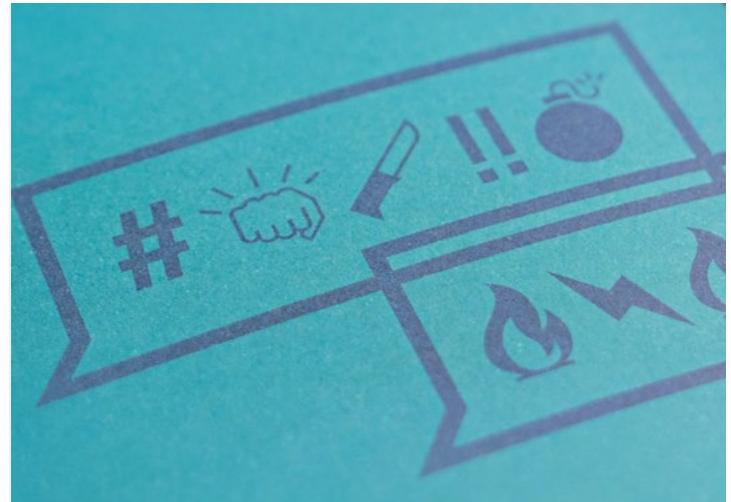
'One of the issues that came up was the qualms people have about WUR's position in the political and public debate on nitrogen. Several scientists said they feel very committed to the nitrogen issue and proud to be able to contribute to finding the much-needed answers. But isn't WUR being too hesitant about offering its expertise and insights? 'We have been doing so much research for so long. We know more or less what the solutions are. Why aren't we much more assertive in communicating that knowledge across?' a researcher wondered.

Not everyone thought WUR was too quiet. 'Broadcasting is only useful if people are willing to listen. As scientists, we contribute knowledge. It is up to politicians and the market to decide what the consequences should be.' And another consideration: 'I am deliberately cautious about what I share. I try to keep emotions and judgements out of it so that we don't get tractors thundering across the campus or turning up at scientists' homes.'

'The situation is dramatic. But for a scientist, it's still worth getting up for in the mornings'

Suspicion

Of course, there was also some discussion about the common allegation that WUR is not impartial. Depending on who you talk to, WUR is seen as too pro-government, pro-farmers, or pro-nature. This often affects individual researchers. 'I consider myself and my work as pretty pro-farmers. And yet, being a Wageningen researcher, I get called out for not flying an upside-down Dutch flag in solidarity at home,' said a Livestock



Names are withheld due to the explosive nature of the subject
♦ Photo Unsplash / Mika Baumeister

researcher. Conversely, those working in the ecological and organic domain find themselves being treated with suspicion due to the alleged close ties between WUR and the agro-industry.

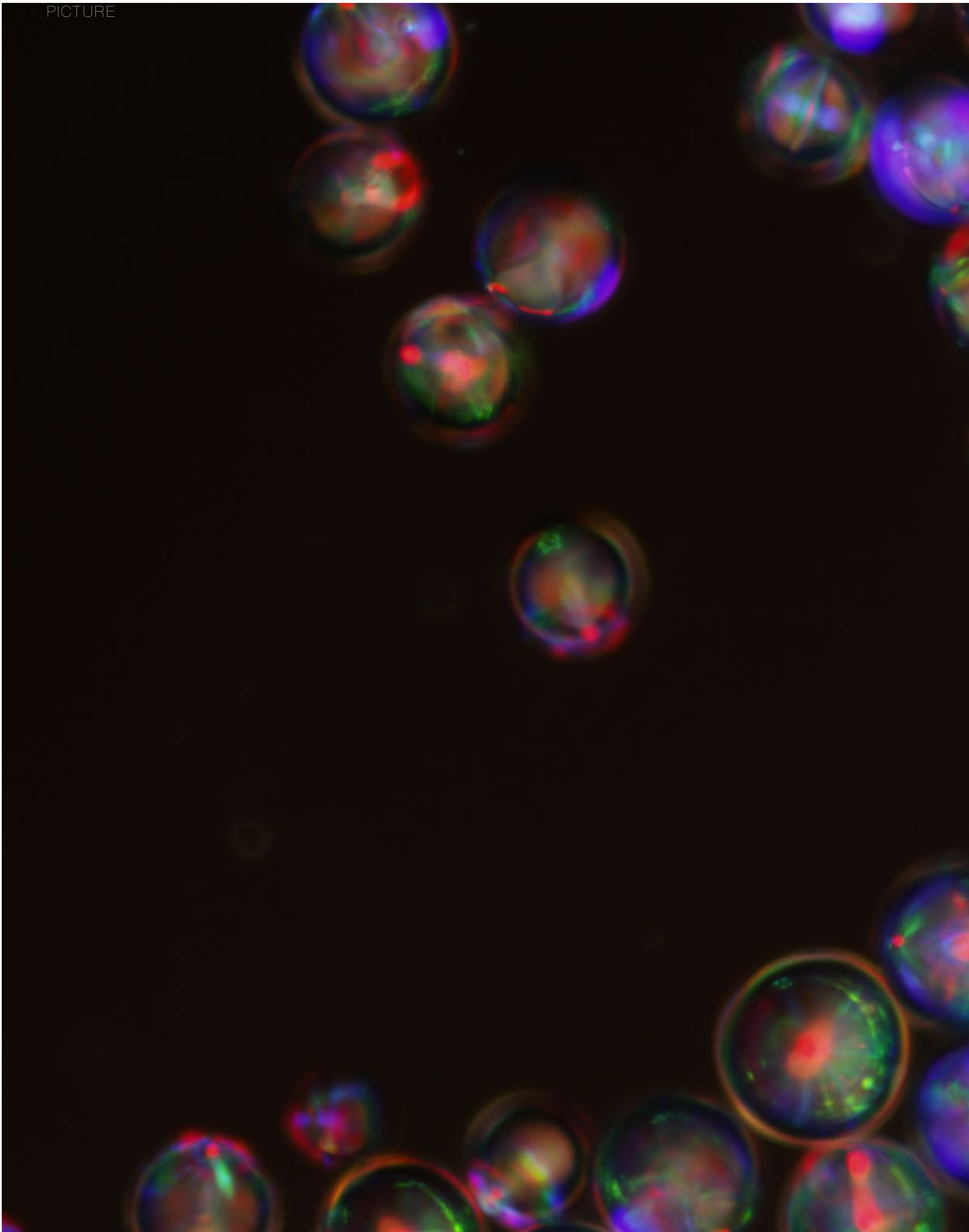
And that hurts, particularly when it concerns nitrogen. 'It distracts us from what's important, while the Netherlands is hurtling towards a future we really do not want,' said one researcher emphatically. 'As far as nature is concerned, we are past the eleventh hour,' agreed a colleague vehemently. And someone else chipped in: 'The destruction of nature really saddens me. But I also understand the desperation of the farmers.'

Polemic

So can we escape the deadlock? The Impulse group was doubtful. 'I'm afraid the polemic will first get even more intense, until the situation is so hopeless that there is no alternative but to come closer together. To quote Einstein: problems cannot be solved with the same mindset that caused them.'

The dialogue will be continued on 27 September and 26 October, with a more in-depth discussion of the possibilities for action. Because these must exist, despite the worried tone that dominated this session. As one participant said: 'The situation is dramatic. But, as a scientist, I still consider it worth getting out of bed for every morning.' ME

PICTURE





MARVELLOUS MARBLES

These aren't marbles or parallel universes: they are liquid crystal droplets. The liquid crystal inside each droplet orients in a helix whose pitch is similar to the wavelengths of visible light. This causes the droplet to reflect colours, much like butterfly wings. When outside molecules such as fatty acids and soaps interfere with the liquid crystal, the colour pattern changes dramatically. Larry Honaker and Siddharth Deshpande (Physical Chemistry and Soft Matter) are using this property to develop a biosensor. ^{ss}

Photo Larry Honaker

Sjoukje Heimovaara: new contours are becoming visible

‘This tanker needs to change course slightly’

A new leader, a new direction. WUR President Sjoukje Heimovaara is starting to reveal her ideas, and share them within the organization.

It was immediately apparent that this year’s opening of the academic year at the beginning of September was different from usual: no external speaker and a sensitive subject: planetary boundaries, about the limits of what the earth can take. This was the formal kick-off for Heimovaara’s presidency. At the moment, she is still meeting WUR staff to help her settle into her new position, but the course she aims to navigate is becoming clear.

From the start of the interview, Heimovaara lets her thoughts and ideas flow. ‘I was just having a discussion about online meetings. A meeting in New York? Do it online. We mustn’t fly to Bogota or Beijing for just a two-day meeting. There is no need for that.’

How far have you got with forming your ideas?

‘I am still mainly listening carefully. To scientists, teachers, my colleagues on the Executive Board, and the Supervisory Board. It is my conviction that our staffing policy and our work culture must keep up with the

‘Our independence is the most important thing we have’



Text Willem Andréé

times. A report has been published by the Royal Netherlands Academy of Arts and Sciences (KNAW) about personal safety in the workplace. We are not doing worse than others, but people here do work in relationships of dependency — students with lecturers, PhD students with supervisors, tenure trackers with professors. Not everyone can handle that. That’s not Wageningen’s fault, but we must make sure it’s thanks to Wageningen that it doesn’t go wrong.’

How?

‘We must create a culture in which we talk to each other, about personal safety for instance, and in which it is clear what to do if you don’t feel safe. I am generalizing, but there are places where people are afraid to do that. On campus in November a play addressing these issues will premiere. It is anecdotal, but as you watch, you recognize the abuses. For instance, someone who wonders at the end of his career: “Why did I let this happen? I think tomorrow I will tell that colleague that he shouldn’t shout like that.”

‘We should also pay attention to unconscious dependence. Everyone is dependent – on grants, bringing in projects, bringing in funding. It is difficult to say “no” to a client or superior who asks you to change the



Photo Duncan de Fey

‘This is how we quietly incapacitate our staff’

way you’ve expressed something. And researchers are sometimes asked to do that. Or a report is ready, but we are asked to put it aside for another three weeks. That happens.’

A report shelved for three weeks?

‘It happens that the results of a research are not convenient for a client at that moment and that they want to shelve the report. KNAW did a study of the influence of clients: one quarter of researchers in the Netherlands experience pressure. In at least half of the cases, it comes from government bodies, but it also comes from other clients. And Wageningen has its share of cases, and of course we are opposed to this. At the same time, one

condition for project approval is that the researcher seeks a company that supports research. It is nice if that works out, but there is pressure on the researcher to answer certain research questions and not others. That is a grey area. I want us to feel and state more clearly that we do not want this at WUR. Our independence together with our creativity and intellect is our biggest asset.’

We must move with the times, you say. How?

‘An example: I was talking to professors and we were discussing the number of publications you have to have to your name to obtain a PhD. I find that rather rigid. Because a PhD is a test of competence, not a test of the ability to publish. If a researcher does all the right things, but the results don’t get published, it should still be possible to obtain a doctorate, in my opinion. And that clashes with the idea of a mandatory minimum number of publications.’

That is a fundamental change.

‘That is how we were raised, to focus on science and how you make headway. But there is more. Some young researchers – again, generalizing – want other things in life. They say: that professorship is all very well but it’s going to cost me too much time, and I want to see my children grow up. At some point, we’ve got to accept that we are driving each other crazy with the rat race. If we keep on running, the rest will have to keep up. How do we arrive at a situation in which we pay more attention to balance?’

Do you know how?

‘No one is forcing us to keep on running. There is a certain pressure in education, and timetables and tests aren’t really negotiable. We are currently taking on support staff to ensure a healthier work environment, and there is money for that. But then we have to actually use that money to hire people who provide teaching support and not say: that’s a good opportunity to hire more tenure trackers, because then we can publish more’.

What happens if we stop ‘running’?

‘Then you get some peace. At present, for example, every new tenure tracker has to come up with a new course. Is that because students are asking for it? No, you must do it because it is part of how you prove that you are capable of it. We are doing very well in education, but like this we quietly incapacitate our staff and that is contrary to our aim of sustainable employability. This tanker will have to change course slightly so that we have another generation of happy and motivated employees working at WUR’. ■

Is the rainforest a sink or a source of CO₂?

HIGH - LEVEL TALKS

Clouds talk to leaves and the leaves talk back. Scientists from Wageningen and Utrecht listened in to that conversation in the Amazon for three weeks.

Text Roelof Kleis

The image of a dialogue comes from professor of Meteorology and Air Quality Jordi Vilà. He uses it in one of the blogs written during the expedition to the Brazilian rainforest. Trees don't talk, of course, but the image gets the point across. Speech is communication; in this case the interaction of leaves and passing clouds through the play of light.

The project Vilà and his team have been working on for some time is called CloudRoots. 'Through CloudRoots, we want to make the connection between clouds, precipitation and photosynthesis in the rainforest under light that is constantly changing,' he explains. So it's about the interaction between the atmosphere and the vegetation. There are indications that due to climate change, the Amazon is no longer absorbing CO₂ like a carbon sink, but is emitting it instead, thus becoming a source. This question is usually approached from the carbon cycle perspective. We say: in this perspective, include the water and energy exchange and the role of clouds in that

through their interplay with radiation.' 'Many scientists who research the CO₂ cycle leave the dynamics of clouds out of the picture,' adds Vilà's colleague Oscar Hartogensis. 'They assume a kind of daily average amount of shade and do not study what actually happens at the leaf level. But we are doing just that. These are fast processes. We look at the very fast interaction between the leaf and the cloud.' That interaction goes as follows. As soon as a plant is in the shade, photosynthesis stops immediately, because its fuel supply (the sun) has been interrupted. This stops both the absorption of CO₂ and the production of water vapour by the leaf. 'And that evaporation is in effect fuel for the next cloud.'

Vilà and his team took their measurements in the Amazon at the German/Brazilian research station ATTO, seven hours' journey from Manaus. Hartogensis: 'To get there, you have to go quite a distance by boat on the river. A car then drives you along the only road in the area, to the camp. The camp itself is

actually quite luxurious: there is electricity and even a cook. There are technicians and containers with complete labs in them.' But the most important thing on the site is the tower; a 321-metre-high steel construction from which measurements are taken. Vilà: 'Meteorological measurements, as well as measurements of greenhouse gases, clouds and the chemistry of the atmosphere. It is an active area in terms of cloud formation. We were there in the driest month, but still, a shower can suddenly fall out of nowhere. And in the rainy season, it rains an awful lot. The views from the tower are spectacular: it's like looking out over an endless green ocean.' But you have to earn that view. 'It took me 27 minutes to get up the stairs,' says Hartogensis. 'Martin Janssens, a PhD student from our group, set a record of less than 15 minutes.'

Evaporation of water through the stomata of the leaf is really a necessary evil. 'The plant doesn't want to lose water,' says Hartogensis. 'The plant wants to

absorb CO₂ for photosynthesis. As soon as it is in the shade, photosynthesis will decrease. If the shade goes on a long time, the stomata close too, but that is a much slower process. Stomata constantly open and close a little in response to the absence or presence of shade. We are investigating how this dynamic process affects the overall exchange of heat, moisture and gas.' The answer to that question is of great importance for the question whether the rainforest is a

sink or a source of CO₂. Vilà: 'First you have to understand the process and the interactions involved in it. Then you can incorporate that in the climate models for CO₂.'

That the details are important here is beyond doubt for Hartogensis. 'It is clear that these are non-linear processes. So, to see the effect of shade on CO₂ exchange and evaporation, you can't just take the average amount of shade. That will get you a very different result. That is where we will end up,

but we still need to calculate the size of that dynamic effect. The challenge is to determine how relevant these fast and local processes are to local weather models.'

But the research may also be relevant to climate models. Vilà: 'We know how leaves react to an increase in CO₂ in the atmosphere. Stomata do not have to open as wide and there is less evaporation and exchange of heat, which in turn has a big effect on cloud formation. We are now adding how leaves respond to different light conditions and temperature. If this effect is significant, our next step is to design a way of including it in the next generation of climate models.' ■

'MANY SCIENTISTS RESEARCHING THE CO₂ CYCLE LEAVE OUT THE DYNAMICS OF CLOUDS'



Technician David Bonell Fontas (Utrecht University) sorts out the equipment in the measurement mast. This set-up can measure the transport of CO₂, H₂O and their isotope composition. • Photo Oscar Hartogensis

Personal safety

‘People are done with misconduct’

Abuse of power, intimidation, bullying: as an ombudsperson Jacqueline Schoone is familiar with WUR’s ugliest side. She analyses where the fault lies with the system and what can be done about it. She will publish a new report soon. What are the trends, what has she noticed?

Text Marieke Enter • Photo Guy Ackermans

‘People still find it difficult to call each other to account for unacceptable behaviour, at WUR like anywhere else. And transgressive behaviour is still often dismissed under the guise of affection: “oh well, he’s just an oddball”, or “she didn’t mean it like that”. But unacceptable behaviour that is condoned can continue and get worse. Fortunately, I do see a change. Misconduct is being tolerated less and less. People are done with it, they want it to stop.’

‘A lot of the complaints come from the work floor. That fits in with a broader social trend. The talent show *Voice of Holland* scandal has had an enormous impact. Everyone now realizes how destructive and appalling an unsafe environment is. The norm has shifted. You don’t have to put up with transgressive behaviour anymore. And you are allowed to expect your colleagues or fellow students to stand up for you. An unsafe environment has gone from being an individual’s problem to being a collective task. I’ve even heard people who have “made it” and haven’t needed to worry about repercussions for a long time say that they can no longer justify not doing anything about it. Looking the other way is just not on anymore. That is a fantastic development.’

More reports

‘I expect the number of reports to increase significantly. There is less and less reluctance to report an incident. People can stand up for themselves better, supported by society’s changing views on what is and is not

okay - not to mention the labour market. Not so long ago, if you wanted a good career, you had to accept an unsafe environment because it was supposedly “all in the game”. That has been completely overturned. The excellent KNAW (Royal Netherlands Academy of Arts and Sciences) report on this states that personal safety is a precondition for scientific quality. I’d like to go a step further: personal safety will become an employer’s asset. Universities will soon be judged by their employees on what they do about safety and job satisfaction. Not enough? Then people will go elsewhere. There is a growing awareness that you don’t have to work in an unsafe environment. People feel they deserve better than that. Managers will also be called to account more emphatically and held responsible for doing something about it. One of my recommendations is to equip them better for this.’

Students

‘Relatively few reports are received from students, although fortunately they do find their way to the confidential counsellors. The number of reports has increased somewhat since the introduction of the guideline on who you can contact for what, but in my

‘Personal safety becomes an employer’s asset’



'The norm has shifted. You don't have to put up with transgressive behaviour anymore. And you can expect your colleagues or fellow students to stand up for you.'

opinion, there's still room for improvement. This is a familiar pattern, also at other universities. Students mainly report incidents out of a sense of responsibility, to prevent other students from getting hurt. When it comes to themselves, their own interests, they often opt for a way out that isn't available to staff members and PhD students: sitting out the problem behaviour until the course is finished, because after that you never have to see that person again. No, that doesn't solve anything, but students can't always face the hassle of reporting a problem. Having said that, I do notice that the new generation of students is a lot more alert and assertive. They won't be pushed around - and rightly so.'

Extra helpdesk

'This autumn WUR will have an extra reporting point. It is an additional 'reception desk' and the reports are simply passed on to the regular channels. But it means the victims don't have to find out first where exactly they should go. People can also report to the new helpdesk anonymously, if necessary. By making it as easy as possible to report incidents, we hope to bring as many as possible to light.'

I have sometimes described submitting a formal complaint to WUR as "an almost impossible step", because the procedure is formidable in some respects. It is not easy to make a formal complaint: you have to provide evidence, and you risk a discussion about whether your complaint is well-founded or not. And then there is the requirement in the complaints regulations that a complainant must have exhausted "all informal avenues" before a complaint can be dealt with. That could be made easier and safer, I think. I do see the strong points, though. For example, while a complaint is being handled, the defendant and the complainant do not have to meet face to face. For many complainants, that is a great relief. But on the whole, there is too much of an underlying assumption in the complaints procedure that "we should be able to work things out together as reasonable people". That is generally true, but excesses call for a firmer approach. Someone who repeatedly displays a pattern of intimidatory or sexually transgressive behaviour may well deserve to have a formal complaint lodged against them. Transgressive behaviour should have consequences.' ■

District heating: why it *does* work in Wageningen

The Benedenbuurt neighbourhood in Wageningen is a rare success story in the long list of sustainable district heating initiatives in the Netherlands. Master's student of Environmental Policy Tim den Hoedt did an internship with the project. What can the Netherlands learn from the Benedenbuurt?



Text Marieke Enter

Not many students can say, as Den Hoedt can, that the Netherlands Organization for Applied Science Research (TNO), the Ministry of Home Affairs and several other energy hotshots read their internship report with interest. The heat transition is 'hot' but insights into the factors determining success are still fairly thin on the ground. And yet they are urgently needed because the Netherlands has to end its dependence on natural gas. According to the Climate Agreement, greenhouse gas emissions – and hence the use of natural gas – will be a thing of the past by 2050 at the latest. This will have a significant impact on the approximately seven million houses that are currently still largely dependent on natural gas for heating, hot water and cooking. Moreover, the Climate Agreement states that the first 1.5 million homes must be gas-free by 2030. This context explains why local initiatives for sustainable district heating – 'heat networks' – have been mushrooming for some time now. But many of these plans don't make it: they are too expensive, too

complicated, and there is not enough enthusiasm. The Benedenbuurt neighbourhood in Wageningen has stood out as a positive exception to date. Last summer, 'their' local heat network initiative – the idea came from the residents themselves – reached the required registration threshold: at least 75 per cent of households had to be willing to participate. It was precisely during that crucial recruitment phase that Den Hoedt did his internship in the project.

Here, the environmental policy graduate reconstructs for *Resource* the factors that played a role in Wageningen.

Take it to the front door

'National and local energy policy is extremely abstract for most people. Even when people understand that the Netherlands must get off natural gas, that doesn't mean they will take action. Many people also simply have no idea how to go about making the transition to being 'natural gas-free'. So you need to take this subject to the front door, literally, and make it easy for people. Then they will get moving.'

Maximize support

'The deal we offered was aimed at making the switch to the heat network as easy and affordable as possible. The project arranges everything for the residents in terms of heating and hot water; all they have to do themselves – with the help of the residents' cooperative – is to get themselves an induction hob and arrange any extra electric wiring in the kitchen that requires. Not because the project didn't want to do the work, but because the cost varies greatly from one address to the next. It wouldn't be fair to divide those costs among all the households.'

Just enough time pressure

'We saw that even early adopters need some time to get used to the idea of a district heating connection in their home. Allow people that time; too much time pressure is counterproductive. At the same time, keep up some pressure, because a proposal that is too non-committal ends up at the bottom of the pile. And another tip regarding time: realize that the slowest people involved set the pace.'



Tim den Hoedt: 'At one point, we even saw flags appearing in nearby neighbourhoods. Homemade ones that said, "I want to get off the gas too." A nice side effect.'
 ♦ Photo Wanka Lelieveld

The personal touch

'Personal contact is time-consuming, but crucial for support. We visited every home personally to explain what we were offering and answer initial questions. A crucial factor was that this initiative came from the local energy cooperative: people trust each other and know each other. Partly because of this, the project team understood that it would be unwise

to approach all the residents the same way. So we ran walk-in coffee mornings for senior citizens at which we could take the time to answer their questions. There's no point suggesting something like that to people with busy jobs.'

Visible support

'Halfway through the registration period, we went round all the houses again to

take stock of who would participate and who was still hesitating. If people signed the contract, they got a little flag in their garden. More and more people signed up eventually the neighbourhood was full of flags. That was a way for the frontrunners to help convince the middle group. At one point, we even saw flags appearing in nearby neighbourhoods. Homemade ones that said, "i want to get off the gas too." A nice side effect.'

Russia

'It wasn't the decisive factor, but the geopolitical situation did boost enthusiasm for the project. The price difference between natural gas and the heat network evaporated. Last year, gas cost 80 cents per cubic metre; this summer it had already gone up to 2.30 euros. And the security of the supply weighs heavily now too. What if Putin turns off the gas to a degree that causes major shortages? Then you are better off with your own local heat network.' ■

The Benedenbuurt Heat Network

The Benedenbuurt neighbourhood dates from the 1940s and 1950s and is a mix of owner-occupied houses, housing association houses and flats, both rented and owned. The heat network is based on an air/water heat pump that keeps the temperature in the entire network around 70°C. There are low-temperature heat networks (around 40°C) as well, but they are only suitable for very well insulated homes.

The plan is to combine the installation of the heat network with the replacement of the sewers in 2024, so that the streets only have to be dug up once. This will reduce both the inconvenience and the costs, making the heat network financially feasible. At least, that is the case if more than 75 per cent of households participate. And that target has been reached: 82 per cent of the homeowners have signed a contract, and 82 per cent of the tenants have said they are positive about the plan. You can read more about the project in Den Hoedt's LinkedIn blog: <https://bit.ly/wagawarmte>.

Greenhouse horticulturalists campaign for better government policy

INNOVATION IN GREENHOUSES STALLED BY ENERGY CRISIS

The energy crisis is putting the squeeze on greenhouse horticulture companies. Greenhouses consume nine per cent of the natural gas used in the Netherlands, and alternatives are not readily available. But the sector points out that greenhouses produce more than vegetables and flowers: they also supply about 10 per cent of the electricity in the Netherlands. Text Arno van 't Hoog • Photo Shutterstock

Growers of tomatoes, cut flowers and pot plants use a lot of gas and electricity in winter in particular, just like the average household. Energy prices have increased tenfold in the past year. In 2022, 75 per cent of the greenhouse horticulture companies had fixed-price long-term contracts for at least some of their energy. Nevertheless, 38 per cent of greenhouse horticulturalists expect to have difficulty paying their bills by the end of 2022. The Ministry of Economic Affairs and Climate Policy is now working on a disconnection plan for next winter, should real shortages occur. Greenhouse horticulture companies that voluntarily reduce their energy consumption can then count on compensation. That makes whether to pause or continue growing crops a business decision. 'At the current gas price of 1.20 euros per cubic metre, greenhouse cultivation is often no longer economically viable,' says Frank Kempkes, researcher Energy

and Greenhouse Climate in Bleiswijk. He is the project leader of a number of demonstration greenhouses showcasing how greenhouse horticulture can be more energy efficient. There have already been rose growers who put their greenhouses on cold storage last winter, says Kempkes. 'Roses can withstand such a period, but other types of cut flowers cannot. Potted plants can be kept a bit cooler for a few months, but you can't turn off the heating completely. And once you have tomato plants, and you have invested in substrate, fertilization and care for months, you can't just turn off the heating when the price of gas goes up. Then you suffer huge losses.'

Less energy

Greenhouse horticulture has already made considerable savings in recent years. More is being produced per square metre with less energy, and with innovation even more is possible, says Kempkes. 'When you add it all up,

the heating requirements of a typical horticultural firm can be halved with insulation, heat recovery and smarter cultivation.'

Over the past few years, the demonstration greenhouses in Bleiswijk have shown what is possible, in the cultivation of strawberries, gerbera, freesia and pot anthurium, for example. Experience has been gained with better insulation, heat pumps, economical LED lighting and precision climate control. The demonstration greenhouses do not use gas: their heating and lighting are electric.

Pioneers

A few pioneers have already switched from gas to heat storage in the soil. Orchid grower Van der Hoorn in Ter Aar had a large gas-free greenhouse built in 2006 with lighting on green power. Kempkes: 'In the Netherlands, the sun provides the equivalent of 100 cubic metres of natural gas per square metre. Growers consume an average of 30 cubic



metres per square metre annually, so the sun supplies much more than the horticultural sector needs. We are still quite a long way off making seasonal storage of heat standard practice, because it requires large investments in equipment and construction. The storage takes place in underground aquifers and that is not possible everywhere.'

These kinds of costly investments are currently confronting business owners with difficult choices, says Pepijn Smit, a researcher at Wageningen Economic Research and author and project leader of the annual Energy Monitor for Dutch Greenhouse Horticulture. 'On the one hand, the sector wants to stop being dependent on natural gas as soon as possible. On the other hand, that first has to be feasible, not least financially. There are dark clouds hanging over the sector's future. Growers don't know what will happen this winter, let alone in the next two years. Some companies still have reserves for coping with setbacks, but they are not inexhaustible either.'

Affordable

The Energy Monitor for Dutch Greenhouse Horticulture shows that the proportion of sustainable energy being used has increased from 2 to 10 per cent since 2010.

'ONCE THE PLANTS ARE ESTABLISHED, YOU CAN'T JUST TURN OFF THE HEAT'

'If you want that proportion to grow even further, you need alternatives that are available and affordable. Affordable sustainable electricity should be one of them.' According to Smit, the role of electricity is sometimes forgotten in discussions about greenhouses and gas consumption. Growers use combined heat and power (CHP) for this purpose: a mini power station with an efficient gas turbine that produces electricity, hot water and carbon dioxide for the growth of the plants. In addition, a significant amount of the electricity produced by CHP is sold. Smit: 'The greenhouse horticulture sector sells more electricity than it uses itself, particularly at times of peak demand in the network, for example on

winter mornings or when there is less wind or solar power available. CHP systems can respond very fast to changes in electricity consumption, much faster than a coal-fired plant.'

That is food for thought, says Smit: if you get the greenhouse horticulture sector off the gas, growers will have to source their electricity, heat and carbon dioxide for growth elsewhere. 'Cogeneration (CHP) in greenhouse horticulture is remarkably efficient. If electricity from a power station is expensive, it may be more attractive to buy expensive natural gas and convert it into heat and electricity via combined heat and power plants.'

The sector recently launched a publicity campaign. 'There is a good chance that your house is heated by our greenhouses, or will be soon.' The key message is that greenhouses supply around 10 per cent of the electricity in the Netherlands and that percentage should increase. Which makes investing in the energy transition a must. The campaign will run until November. ■



THE SIDE JOB

You've got to make ends meet somehow. We can all borrow from Uncle Duo, but there are also students who earn money in special ways. In this series, we discover some unusual side jobs. This time we meet Jan Heida (27), a certified drug tester at a testing service * in Arnhem.

Text Steven Snijders • Photo Jan Heida

'Drugs are illegal, of course, but at the test site there is a local "opium exemption". We are allowed to have drugs there, under strict conditions. There are clear agreements with the authorities and the testers have undergone training and must be qualified. If we do not recognize tablets, we send them to a lab.

'If we do not recognize tablets, we send them to a lab'

We test thousands of samples a year, with major peaks on New Year's Eve, Kings Day and Amsterdam Dance Event.

'If users come in for testing, we talk to them. Is the user aware of the risks? When I ask that question, the answer is often, "yeah". But then I ask them to name three risks? Sometimes there is no response to that, and then we provide information about the product. That is how we try to minimize the risks. If we get the impression that we're dealing with a vulnerable person, possibly with an addiction, we also provide information about addiction care. That care is in the same building. We try to make the threshold as low as possible for them.



Jan tests drugs

Who: Jan Heida

What: Drug testing and counselling

Why? Jan is keen to help minimize the risks of drug use

Hourly wage: 13-16 euros, varying per institution and location

We have another task as well: we monitor the drugs market. All the testing centres in the Netherlands collaborate to get a good picture of the trends: which drugs are on the rise and whether there are dangerously contaminated products in circulation.

'I ended up at Unity via the testing service. Unity is a national network of young people that provides open-minded education and information about alcohol and drugs. We are often at parties and festivals and we get a lot of positive responses. I think that if you limit the risks, you can make them more acceptable. The line between what is illegal and what is not can be hard to explain. They are all just molecules that have some effect or other.'

**This testing centre is part of the Drug Information and Monitoring System (DIMS) network. Users can hand in drugs here and have them tested for composition and dosage.*

Do you have an unusual side job or know someone else who does? Send an email to steven.snijders@wur.nl

Flower hunting

In this series, Master's student and student editor Julia van der Westhuyzen (photos and text) and Professor Joop Schaminée (stories) go in search of the loveliest campus flora.



Ragwort

Common name: ragwort

Scientific name: *Senecio jacobaea*

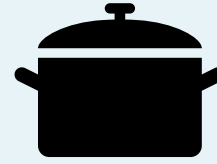
Flowering time: June to November

Where to find it on campus: next to Atlas

This bright yellow, sweet-scented flower is frequently found in Northern Europe. The common English name 'ragwort' describes its shabby, ragged leaves. The scientific name comes from the Latin word *senex*, which means old man. Joop Schaminée: 'This is because the flowers of species in the genus *Senecio* will all turn into a fluffy white *pappus*, similar to that of a dandelion. This bundle of fluffy white-crowned seeds resembles the face of a bearded old man, so the genus of plants producing this kind of pappus was named *Senecio*.'

The origin of its name '*kruiskruid*' in Dutch is the subject of debate... It either comes from the word for grey (*grijs* in Dutch) and therefore also describes the greyish white fluff, or from the word *kruis*, which means cross and describes the cross-like shape of the leaves. Saint Jacob's day is on 25 July, which is when these flowers are in full bloom – hence the name *jacobaea*.

The WUR community is home to all the flavours of the world. Dania Lyew, an MSc student of Food Safety from Panama, shares a recipe for kimchi.



Flavours of WUR

kimchi

'I spent six years in South Korea, where I studied Food Science and learned how to make kimchi. After moving to the Netherlands, kimchi was the dish I missed the most. So I decided to prepare it myself to accompany other dishes. Every time it rains, I enjoy fermenting vegetables as an indoor activity. And it works better because the humidity is higher.'

press the mixture down. Cover the kimchi with a layer of paste. Close the jars.

- 6 Leave the jars at room temperature for one or two days. Then open them and press the vegetables down firmly. Close the jars and store them in the fridge. The kimchi tastes best after two to three weeks.

- 1 Cut the cabbages into quarters and remove the hard core. Then cut the wedges into bite-sized pieces. Wash the cabbage in cold water and drain. Sprinkle the leaves with salt and massage them in. Add water until the leaves are covered and let them stand for 2 hours, stirring every half hour.
- 2 Rinse the cabbage and check that the leaves taste slightly salty. If the leaves are too salty, rinse well again and then drain the cabbage and start on the kimchi paste.
- 3 Mix the rice flour with the water and bring to the boil while stirring. Let it cool, stirring occasionally.
- 4 Blend the onion, garlic, ginger, apple and fermented soybean paste (or fish sauce) into a paste in the food processor. Add the rice flour porridge and stir in the pepper flakes. Add carrot, spring onion, daikon and leek.
- 5 Stir the kimchi paste in with the cabbage and rub it into the leaves. Fill the canning jars to two centimetres below the rim and

Scan the QR code for the list of ingredients

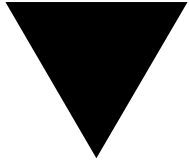


Dania Lyew

Dania Lyew, an MSc student of Food Safety from Panama.

10-euro lunch voucher

Share your recipe with *Resource* and get an **Aurora voucher worth 10 euros**.
resource@wur.nl



The cycling vloggers: 7000 kilometres of regenerative agriculture

Aisha Hassan and Lukas Paltanavičius – who graduated early this year – are cycling from Wageningen to Tanzania. Along the way they are visiting farms that practise regenerative agriculture – sustainable farming that improves the soil rather than depleting it. They make a mini-documentary for YouTube about every farm they visit. We spoke to Hassan while they were taking a short break in Jordan. Text Coretta Jongeling

How is the trip going so far?

'Well! It's surreal to come from Greece and suddenly find ourselves in Amman. We didn't want to cycle through Syria so we had to find another way to get to Jordan. Unfortunately, only cargo ships go there, so we had to fly. That means taking the bikes apart completely, boxing them up and then putting them back together here.'

What does the next lap look like?

'We are visiting three farms in Jordan and then we'll cross the border into Egypt. I am very curious to see how they are dealing with the massive drought here.'

Which farms will you visit?

'It is not always easy to select them. Not every farm engaged in regenerative agriculture calls it that. The term is rather new, but the methods the farmers use are not: they have been around for centuries. We started networking back in the Netherlands to find the farms, and the tips we got from Melle Leenstra, the agricultural attaché for Jordan and Egypt, were very helpful!'

Are you still enjoying cycling?

'We certainly are! We have met so many nice, hospitable people. There have been times when it was tough and we wondered why we were doing it. And it will be hard here too, it's terribly hot. Luckily, we are not in a hurry. If the journey takes a few months longer, it's not a disaster.'

The videos can be seen on:

 www.cycletofarms.com

 [@cycletofarms](https://www.instagram.com/cycletofarms)



Visiting Sky News Arabia for an item on the cycling trip.

LIKES, SHARES AND COMMENTS?

Follow us on Facebook, Instagram, LinkedIn, Twitter and TikTok for the latest news, photos, videos and more.

 @wur.resource	 @ResourceWUR
 resource_wur	 resourcewur
 resource-wur	



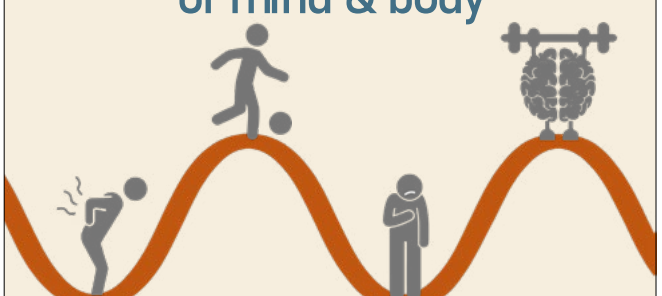
Resource

WUR from within: straight, sharp, transparent

Science Cafe
Wageningen




Resilience

of mind & body



Recovering from setbacks
in sports and mental health

<p>Wednesday, 21st September Café Loburg 19h45 Live music (Downtown Grooves) 20h15 Science</p>	<p>Speakers Prof. Claudi Bockting (AMC-UvA) Dr. Ruud den Hartigh (RUG)</p>
---	---

Colophon

Resource is the independent medium for students and staff at Wageningen University & Research. *Resource* reports and interprets the news and gives the context. New articles are posted daily on resource-online.nl. The magazine is published every fortnight on Thursday.

Contact Questions and comments for the editors: resource@wur.nl | www.resource-online.nl

Editorial staff Willem Andrée (editor-in-chief), Helene Seevinck (managing editor), Roelof Kleis (editor), Tessa Louwerens (editor), Luuk Zegers (editor), Marieke Enter (editor), Stijn Schreven (editor), Coretta Jongeling (online coordinator), Thea Kuijpers (secretariat).

Translations Clare McGregor, Meira van der Spa, Clare Wilkinson

Design Alfred Heikamp, Larissa Mulder

Overall design Marinka Reuten

Printing Tuijtel, Hardinxveld-Giessendam

Subscription A subscription to the magazine for one academic year costs 59 euros (135 euros if abroad). Cancellations before 1 August.

ISSN 1389-7756

Publisher Corporate Communications & Marketing, Wageningen University & Research





WUR COMMITS TO VEGAN

WUR wants to become the world's first fully vegan university by 2030, the Executive Board has decided.

This is no surprise for Board President Houkje Sjeimovaara. 'After all, I did my best for it too! For years we have been the most sustainable university in the Netherlands. What am I saying? In the world! And noblesse oblige. I think we should set a good example. If the farmers have to make sacrifices, then we should all do our bit.'

The call to go completely vegan has been sounded on campus for some time. Imke de Boer, professor of Livestock and Nutrition, recently wrote the book *Past het dier nog op ons bord?* (Do animal products still belong on our plates?) The professor, who is on her way to becoming a vegan herself, but still finds it a bit hard because she can't find a tasty vegan yoghurt, is stunned by the Executive Board's drastic step: 'Goodness gracious!'

The student branch of Farmers for Defence is 'not amused'. Spokesperson Pim Wortelboer: 'What kind of woke nonsense is this? Don't the people in Atlas know that we farmers put the food on their plates too? We are not having this. I've already tweeted around a bit and

people are ready to take action.'

Sjeimovaara is delighted to hear the farmers' plans. 'Yes, very much so. We are very much in favour of dialogue. We have even built a whole new centre for it. And it's always nice to get together with the farmers. Let them come, I say. We have an event terrain which definitely has space for a couple of hundred tractors. Great fun! But we will stick to our guns, of course.'

The head of Recruitment and Selection Renske van Dijk is happy with the new direction. 'But I deny that it came from us. Or hadn't you asked that yet?' When asked, Van Dijk says it is not a recruitment trick. 'We did, of course, do the sums on how many students this could bring in. We think it would boost recruitment by about 40 per cent. Never underestimate the attraction of veganism.' When asked if going vegan will breathe new life into Wageningen's traditional woolly-socks-and-sandals image, Van Dijk is furious: 'That is a typically negative journalist's question. I think that is such a pity. And the answer is: no, of course not. Wool isn't vegan. You should know that. Good afternoon!'