WUR from within: straight, sharp, transparent

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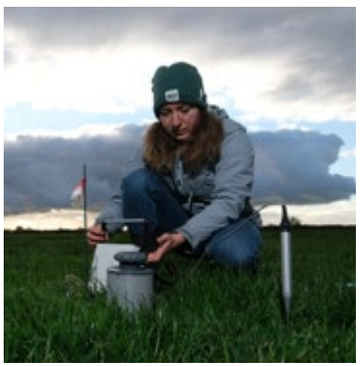

FOREWORD

Disruptive

'Disruptive' is an interesting term. On page 12, food technology expert Martijn Noort uses this word when talking about 3D printing for food. According to Noort, this somewhat futuristic technology will radically change the way in which we produce food. Disruption upsets the old ways and introduces something new in their place.
That sounds promising. The printing press was disruptive, as was the steam engine, electricity and the mobile phone. And yes, Covid is disruptive too. But perhaps it will pave the way for a future in which we are able to cope with any new, initially deadly virus. Disruption means change. Disruption is exciting. I know I'm a little early but I'd like to wish everyone lots of disruption in 2022.

Roelof Kleis
Science editor

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BANANA LINGERIE

The company Musa Intimates has made lingerie from the fibres of banana plants. The fabric is part of a larger project organized by Neder Banaan, a company that specializes in Dutch bananas. Last week, it sold the first 1600 such bananas, which were grown in a greenhouse in Ede. All parts of the banana plant were put to use: the fruits in mini éclairs, small banana cakes and specialty beers, and the skins in a vegan meat substitute product. The man behind Neder Banaan is Gert Kema, professor of Phytopathology at WUR. He grew the first Dutch bananas in a greenhouse on Wageningen campus. Kema studies fungal diseases and new methods for cultivating bananas. AS

Photo Guy Ackermans

More women in citation ranking

There has been a big increase in the number of women among the highly cited WUR scientists.

The new global list of most frequently cited researchers includes 26 scientists from Wageningen, five of whom are women. Their share is growing. Only two years ago, soil scientist Saskia Keesstra became WUR's first female scientist to make the list and now women make up 20 per cent of the WUR total. The total number of highly cited researchers at WUR has increased by one.

Women now make up 20 per cent

In addition to Keesstra, the women in the list are ecologist Liesje Mommer, microbiologist Clara Belzer, soil scientist Violette Geissen and aquatic ecologist Ellen Besseling. Although Besseling actually left academia after obtaining her PhD in 2018. The ranking is based on the number of highly cited articles and the overall citation score for all that person's articles. This year's list has 6600 scientists from around the world.

New

The list of highly cited researchers from Wageningen is quite fluid. Six people from last year no longer appear on the list: Lourens Poorter, Marcel Dicke, Vincenzo Fogliano, Martin Herold, Gerard Heuvelink and David Kleijn. New men on the list are hydrologist Albert van Dijk, entomologist Arnold van Huis, aquatic ecologist Egbert van Nes, plant scientist Jasper van Ruijven and biochemist Dolf Weijers.

The Netherlands is ranked sixth in the list of countries, with 207 scientists. The US heads the ranking with 2622 researchers, 40 per cent of the total. It is followed by China (935), the UK (492), Australia (332) and Germany (331). In the Netherlands, Utrecht University is just ahead of WUR with 29 highly cited researchers. RK

Photo Berber Hania

Ernst van den Ende to Animal Sciences

Ernst van den Ende, director of the Plant Sciences Group, will take charge of WUR's Animal Sciences Group on 1 January.

There is an unwritten rule that WUR directors move on after two terms of four years, but Van den Ende has been in his job for nearly 12 years. 'I was already in injury time,' he laughs, 'but I love working at WUR. Over the past few years I have regularly been approached for jobs elsewhere but I feel most at home in a science institute serving the public interest. That is why I applied for the job at the Animal Sciences Group.'

'I want to help make the transition to sustainable food systems'

He says it is 'really great' to be able to work 'for the science group that is under most pressure from society at large. Animal production is crucial in feeding the world and it plays a key role in the circular economy but it is under immense pressure because of the impact on the environment and climate. I want to help make the transition to sustainable food systems in which we connect plants and animals in the right way.'

Connect

Getting to know everyone is at the top of his to-do list. 'I want to be the ambassador for the group and bring people together, so I need to know what everyone is up to. I also hope to make new connections so that researchers from different groups collaborate more often, both within and beyond ASG.'

It is not yet known who will succeed Van den Ende at the Plant Sciences Group. AS

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Seven families in Wageningen get visits from a WUR student through the BalanceBuddy foundation. The students use play to teach the children about a healthy diet and exercise. Ellen, mother of Lars (8): ‘Someone comes along every week to do fun things with Lars. He has autism and behaves differently to other kids. But he *will* run after the ball with his buddy.’ LZ

Unilever prize for food security

Clark Halpern won the Unilever Research Prize for his thesis on the future impact of climate change on circular food systems in Ethiopia. Halpern combined a static model for circular food systems with a system dynamics version that took account of the effects of climate change (droughts, locust plagues, etc.) over the next two decades. He started with an existing model for circular food systems and applied it to the Amhara region in Ethiopia. ‘That showed me how many cows a farmer can keep if they only use food remains, by-products from the food industry or grass, for example.’
Halpern’s combination of the two models give a better understanding of how circular food systems will respond to future climate change. LZ

Read more on resource-online.nl

Easier to do a course at another university

A new platform, EduXchange, makes it easier for WUR students to do courses at Utrecht University and Eindhoven University of Technology. Other universities plan to join the initiative too.

Photo Shutterstock

EduXchange lets students find out more about courses at other universities and enrol directly. The grades they get are then passed on to their own university.
Students can currently choose from over 60 courses, and the aim is to add more every year. The launch of the platform is ‘the first step in making it easier for students to put together their own curriculum across universities,’ says the announcement on the website of EWUU, the alliance between Eindhoven University, WUR, Utrecht University, and Utrecht University Medical Centre.
‘Of course it was already possible to do a module at another university, but it cost a lot of effort to get the information and make arrangements,’ says Ulrike Wild, the Flexibilization programme director. ‘First you had to go through all the study prospectuses and if you decided to do a module at another university, you had to visit that university’s student service centre with your passport and proof of enrolment. None of that is necessary now with EduXchange. It makes life a lot easier for students who want to take a course somewhere else.’
At present EduXchange is still a pilot within the EWUU alliance but other universities plan to join too. Wild: ‘Leiden, Delft and Rotterdam will be taking part. We are also working on the selection of modules, and there will be far more to choose from in a few months’ time.’ LZ

Photo Roelof Kleis

Ode to regional food

Student Max Elbers and photographer Mirian Hendriks have produced a cookbook entitled *Proef! De Smaken van de Vallei* (Taste! The flavours of the Valley).

At least, they call it a cookbook but the beautifully produced publication is more of a coffee-table book. It is also an ode to the food producers and restaurateurs of Wageningen and its surroundings, and indeed to WUR as well.
It was Elbers who came up with the idea for the book. The Animal Sciences Master's student loves cooking and has an entrepreneurial mindset. He had already set up his own catering company. 'I do a lot of receptions in the Aula for PhD ceremonies and inaugurations.' But that enterprise suffered from the Covid measures.

The author and photographer link each dish to WUR

On a visit to a friend in Brabant, he came across a book about food products from that region. 'That made me curious about what was available in the Wageningen area. So I phoned Mirian and suggested we produce a book together.'

Link with WUR

The search for local products resulted in 18 chapters that showcase what the region has to offer. The setup has three elements. 'We looked for a producer, then a local restaurant that has the product in question on the menu and finally we added an inset showing the link with WUR.'
Both the producers and the restaurants get plenty of attention, with lots of photos. That makes the book more of a visual feast than a practical cookbook. For the next three weeks, Elbers and Hendriks will be promoting the book at the Streekwaar stall on market days. RK

Proef! De smaken van de Vallei can be purchased at www.proefdesmakenvandevallei.nl ◆ 45 euros.

Oasis in a food desert

Around 260 students, divided into 30 teams, have signed up for WUR's Urban Greenhouse Challenge. In this third edition of the design competition, which started in November, the teams have to draw up a plan for providing healthy food in an impoverished district in Washington DC (USA). The teams first need to come up with a redesign of an existing urban farm covering 1.2 hectares. In January they have to present their plan and the best 20 proposals will go through to the next round. The Washington DC suburb, Ward 7, is seen as a food desert. It has an overwhelmingly Black population of 73,000 and suffers from unemployment, violence and obesity. Only one shop in the entire district sells fresh vegetables. The district council wants to develop a food hub offering healthy, locally produced food in a way that uses up little energy and water and that creates jobs in the neighbourhood. AS

Only one shop sells fresh vegetables

Porpoises died from blood poisoning

The dead porpoises that washed up on the shores of the Wadden islands last summer probably died from erysipelas.

This is the conclusion drawn by marine biologist Mardik Leopold of Wageningen Marine Research. The bacterium *Erysipelothrix rhusiopathiae* was found in three quarters of the 22 porpoises that were examined. This bacterium can cause erysipelas (a form of septicaemia, or blood poisoning). It is known as a disease that occurs in pigs and turkeys but it is also found in fish.

The bacterium was found in various organs of the infected porpoises, which had been dead for some time. The bacterium has not previously been found in beached porpoises. There are also no cases reported in the literature of large-scale deaths from this bacterium. 'But I think we have found the culprit,' says Leopold.

Smoking gun

Last summer, some 160 dead porpoises washed up on the shores of the Wadden islands over a period of 10 days. That is a lot. Normally, about 600 porpoises a year wash up along the whole of the Dutch coast. So the ministry of Agriculture asked WUR and Utrecht University to investigate the reason for the striking deaths. One aspect WUR examined was what the porpoises had eaten.

Leopold sees the discovery of the bacterium as a 'smoking gun'. 'We were also able to rule out many other possible causes of the deaths,' he says. The animals may have got the disease after eating infected fish. Leopold hopes to find more clues in a batch of sprat from the same area as the porpoises. 'I'm curious to see whether we can cultivate the bacterium from the fish,' he says. RK

Tower measures forest's breath

Trees absorb CO_2 from the atmosphere. But exactly how much, and what are the effects of things like drought and temperature? A new tower erected by the Meteorology and Air Quality chair group in the Loo Forest near Kootwijk answers that question in detail.

The tower replaces a smaller version erected in 1996. 'That was one of the first in the world at the time, and it was constructed to measure the exchange of CO_2 between the forest and the atmosphere,' Meteorology lecturer Michiel van der Molen explains. At the time, the tower stuck out five metres above the treetops. Not anymore.

The equipment in the tower measures wind velocity and levels of CO_2 in the air 20 times per second. 'With these measurements, you can calculate the net amount of CO_2 absorbed by the forest,' Van der Molen explains. 'That is the difference between absorption (photosynthesis) and emission (breakdown of dead matter) from the forest.'

Pine forest

That net absorption amounts to approximately half a kilo of carbon per square metre per annum. Van der Molen: 'That's quite a lot. Half a hectare of forest compensates for the carbon one average household emits.' But of course, these measurements only tell us something about this 110-year-old pine forest, planted to reduce the impact of drifting sands.

'But we are also looking at how the carbon absorption changes under different conditions,' says Van der

'Half a hectare of forest compensates for the CO_2 emissions of one household'

Molen. 'What happens, for example, during long periods of heat or drought? This information helps us to understand how the CO_2 equilibrium works, and then you can apply it to other types of forest.' Van der Molen is still working on a website that will allow the general public to see the data. RK

The new measuring tower (36 metres in height) is in the foreground. The 1996 tower is on the left. Photo Guy Ackermans

A little wiser

How do fairy circles form?

The woods are full of them at this time of year: rings of toadstools known as fairy circles in English (and witches' circles in Dutch). There's something magical about the sight of them and you can imagine why people connect them with supernatural powers. In times gone by, people thought witches or fairies must be involved. A bit far-fetched, maybe, but how do these circles form, then?

'Fairy circles in the woods are usually found under a tree,' says Wietse de Boer, special professor of Soil Biology. 'They are formed by mycorrhiza fungi, which are fungi that live in symbiosis with trees.' The tree provides the fungi with nutrients while the fungi break down organic matter – such as humus, which is hard for other organisms to use – into mineral nutrients that the tree can absorb. Win-win.

The circle forms because fungal threads underground grow in all directions from a central point. 'The most nutrients are found around the outer edge and that's where the fungus is the most active,' explains De Boer. 'If the weather conditions are right, after a heavy shower, for example, toadstools shoot up all around the edge.'

You do find fairy circles in grassland too. One example is the fairy ring mushroom, which does not coexist with trees and is considered a nuisance on lawns. De Boer: 'Along the edge, where the fungus grows the fastest, the mushrooms take nutrients from the plants, so the grass doesn't grow as well and dies back. But a bit further into the circle, the fungi release nutrients from organic matter into the soil, causing the grass to grow better. So the grass inside the circle is often greener.'

The speed at which a fairy circle grows depends on factors such as the weather and the available nutrients. Some can grow by one metre in diameter per year. One of the oldest fairy circles is in a field in France: it is thought to be 700 years old and measures 600 metres across. Circles that are connected to trees usually stay smaller.

Fun fact: mycorrhiza fungi are known as the Wood Wide Web because trees use the fungal threads to communicate with each other. TL

'The most nutrients are around the outer edge and that's where the fungus is most active'

Wietse de Boer, special professor of Soil Biology

Every day we are bombarded with sometimes contradictory information. So what are the facts of the matter? In this feature, a scientist answers your burning questions.

Asking questions makes you wiser. Do you dare ask yours? Email us at redactie@resource.nl

Illustrator Marly Hendricks

A nose for fatty foods

People can smell whether their food contains any fat, and even how fatty it is. This discovery was made by scientists in the Human Nutrition and Health group.

It is said that you taste with your nose. This is because chewing food releases aromas that enter the nasal cavity through the mouth. This is called retronasal smell. The WUR researchers discovered that this is how people distinguish between whole and skimmed milk. They published their findings in *Food Quality and Preference*.

The new insight could help in the battle against overweight

The researchers hope this new insight will help fight overweight in the future. 'Once we understand which substances in fat smell tempting, the food industry can add these to the fat-free alternatives,' says Matjaz Pirc, lead author of the publication. This would make fat-free products as satisfying as the fatty, high-calorie variety.

Survival

Studies show that test subjects not only smell the difference between whole and skimmed milk but can also distinguish between different fat percentages. Not all the test subjects could do that, however. 'From an evolutionary and biological perspective, this is logical,' Pirc says. 'Fatty, high-calorie products are needed for survival, and their retronasal odour makes these products tastier, ensuring we continue to seek out these products. It is probably more useful to smell the difference between fatty and fat-free foods than that between products containing seven or ten per cent fat.'

The test subjects found it hard to express how they knew which milk contained fat and which did not. Some thought the whole milk smelled creamier, and others described it as 'thicker'. In a follow-up study, nutrition scientists are going to study how the brain responds to the scent of fat. NVTWH

'On certain occasions like a barbecue, people just do expect to eat meat' Photo Shutterstock

Many factors in picking vegetarian options

A different protein source instead of that piece of meat? There are many different motives involved in such a decision, discovered researchers at Human Nutrition and Health.

The flavour of meat substitutes is not the key reason why people choose a vegetarian dish. Equally important are environmental and health knowledge, the price, willingness to try new dishes, the setting and the way the food is prepared. Moreover, women are more likely to select an alternative protein source than men. Wageningen scientists reported these findings in the scientific journal *Nutrients* last month.

'We thought health was a much bigger incentive'

Although these motives were fairly predictable, there were surprises for the researchers. 'We had expected health to be a much bigger incentive,' says Marianne Geleijnse, professor of Nutrition and Cardiovascular Diseases. 'The study shows that there are many factors involved. So transitioning from meat to alternative sources of protein is not that simple.'

Although the flavour and texture of meat substitutes are important to people, the meal as a whole is a more decisive factor in choosing between meat or a vegetarian alternative. 'So it's also about how you cook and serve the food,' says Geleijnse. The context plays a role in the choice too: something scientists call situational appropriateness. 'People just do expect to eat meat on certain occasions,' Geleijnse explains. 'At a barbecue, for instance, or when the family have Sunday lunch together.' In their study, the scientists provide a list of incentives to choose meat substitutes. 'Our research is like a giant puzzle with some pieces missing,' Geleijnse states. There is little information about factors such as religion and animal welfare, while much more research has been done on other factors such as packaging. The Wageningen scientists hope their peers will conduct more targeted research to find the missing pieces of the puzzle. NVTWH

Some farms emit more nitrogen than others

Good farm management can halve nitrogen emissions from dairy farms. What is more, this can increase dairy farmers' profits by one third.

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These findings come from a study by a team of business economists and a soil scientist from WUR. The researchers Melina Lamkowsky and Frederic Ang studied data from 341 intensive dairy farms in the Netherlands between 2006 and 2017, looking at inputs, production levels and the amount of manure coming from the farms. What emerged was that the best farms not only made a 34 per cent higher profit but also produced a 50 per cent smaller nitrogen surplus thanks to better management. The gap between the best farmers and the rest increased in the period that was studied.

'Many dairy farmers could halve their nitrogen emissions without major investments'

The researchers are not sure exactly which measures taken by the farmers cut their nitrogen emissions. 'In our model, the farm is a black box,' says Ang. 'We only know what goes in and what goes out of it.'

Lamkowsky reckons that the successful farmers use some form of precision fertilization, through which more nitrogen ends up in crops and less leaches out into the environment. She also thinks the successful farmers pay more attention to the health of their cows, because they don't replace them as frequently and have fewer young cattle on their farms. This leads to higher incomes and less manure runoff.

Follow-up research should clarify which management approaches the best farmers apply.

The study is interesting in view of nitrogen measures to be imposed by the new cabinet and the wish of certain civil society organizations to make the dairy sector more extensive and less intensive. But the researchers do not comment on this. Ang: 'We compared intensive dairy farmers with each other. We note that many dairy farmers could halve their nitrogen emissions without major investments. We think farmers should be advised on how to adapt their management strategies in order to do this.' AS

In other news science with a wink

HARD WATER

Researchers at Cambridge have developed an indestructible gel. It is made up of 80 per cent water but does not fall apart under pressure. It is held together by polymers and returns to its original shape after being squashed. You can drive your car over it, no problem – as a funny video shows.

HUG FACTOR

We get the most pleasure out of a hug if it lasts at least five seconds, shows a study at the University of London. Researchers got blindfolded women, who didn't know each other, to give each other a hug and then asked them how much they enjoyed it. A brief hug doesn't have much effect. For optimal enjoyment: hold each other tight for five to 10 seconds. Try this at home.

MEMORY SUPPORT

Bees with the bacterium *Lactobacillus apis* in their guts have a greater capacity to learn, shows Chinese research (Jiangnan University). The researchers believe the study proves that gut flora have a far-reaching effect on the rest of the body. And you can adjust those flora: if bees without the bacterium are given it in their feed, they start learning better too.

SEPARATION

The warming of the ocean is causing albatrosses to separate more often, shows a study (by the University of Lisbon) of the population of black-browed albatrosses on the Falkland Islands. The birds are monogamous, but one to eight per cent of the brooding pairs separate. That variation turns out to change in line with the temperature of the water. The impact of climate change is felt everywhere. RK

UV light keeps donated breastmilk usable and healthy

Radiation with UV light is a good method of making donated breastmilk safe for babies without harming health-giving substances it contains. This was discovered by Wageningen scientists and their colleagues at Amsterdam University Medical Centre. They published their results in *Clinical Nutrition*.

Photo Shutterstock

Premature babies have an underdeveloped gastro-intestinal tract and immune system. Substances such as insulin in breastmilk stimulate the development of these systems. Some of the milk comes from donor mothers who express the milk at home, freeze it and deliver it to the breastmilk bank. In the process, pathogens such as bacteria can get into the milk, so the breast bank pasteurizes it. 'A big disadvantage of that is that heating damages all kinds of useful substances, such as antibacterial components, antibodies and hormones,' says Kasper Hettinga, associate professor at Food Quality and Design. The researchers started looking for alternatives to pasteurization.

With UV treatment you lose only six per cent of the insulin, whereas it does kill the bacteria

High pressure and vibration

'Irradiating the breastmilk with UV light of a specific wavelength, namely UV-C, appears to be the best method,' says Hettinga. The radiation damages the DNA of bacteria in the milk, preventing these microbes from dividing, so they die. Hettinga and his colleagues studied how the UV light affects the insulin in the milk. 'When you pasteurize milk, you lose about half the insulin; with the UV treatment you lose only six per cent, whereas it does kill the bacteria.'
UV radiation was not the only method the scientists tested. They also submitted the milk to high pressure, heated it briefly to a high temperature, and sent powerful vibrations through it. Each of these three methods killed the bacteria in its own way, but the brief heating killed insulin as well. And the other two methods were not ideal either. During previous studies, the scientists demonstrated that those methods destroy other healthy milk components such as proteins.

Light in the darkness

'In the end the important thing is the balance between killing pathogens and preserving as many of the healthy substances as possible,' says Hettinga. UV light seems to come out as a clear winner but applying this method on a large scale is challenging. Milk is an opaque liquid and the UV light does not therefore penetrate far into it, so only the outer layer gets sterilized. In the lab, the researchers stir the milk until a UV lamp has killed all the microbes, but that can't be done in the same way with large quantities of breastmilk.
The difficulty lies in the fact that the breastmilk bank keeps the milk of each mother separate to avoid possible cross-contamination. The milk therefore has to be treated bottle by bottle, but in large batches. Nevertheless, Hettinga takes an optimistic view. 'This is not my area of expertise, but I believe my colleagues can solve this problem.'
Before the breastmilk bank can start using the alternative method, the milk sterilized with UV light will first have to undergo clinical testing. That part of the study will be undertaken by the scientists at Amsterdam UMC. NVTWH

A 3D printed burger?

THE FUTURE ON A PLATE

The idea of printing food still sounds futuristic. But it's a future that is rapidly approaching. And WUR is in the vanguard. Whether it's plant-based burgers or personalized diets.

Text Roelof Kleis

To begin with the most exciting story: standing in the experimental zone in Axis is a machine that prints burgers. The size of a small car, it prints a plant-based meat substitute. This machine is still top-secret. But it's there, and it is nearly finished, says food technologist Martijn Noort. He coordinates the 3D-printing activities of the Digital Food Printing Initiative – more on this in a moment. The expectation is that the printer will be presented next year. This will fulfil the wish of an anonymous donor, who gave WUR over a million euros for this development last year. 'The assignment was to speed up the 3D-printing of plant-based meat substitutes, to come up with the formula for producing a meat substitute from plant protein with a 3D printer. A vegetarian burger with better sensory characteristics than the ones that are currently on the supermarket shelves. The bite and the juiciness are the main things. We are 90 per cent done. It's a successful project.'

'3D PRINTING IS A DISRUPTIVE TECHNOLOGY'

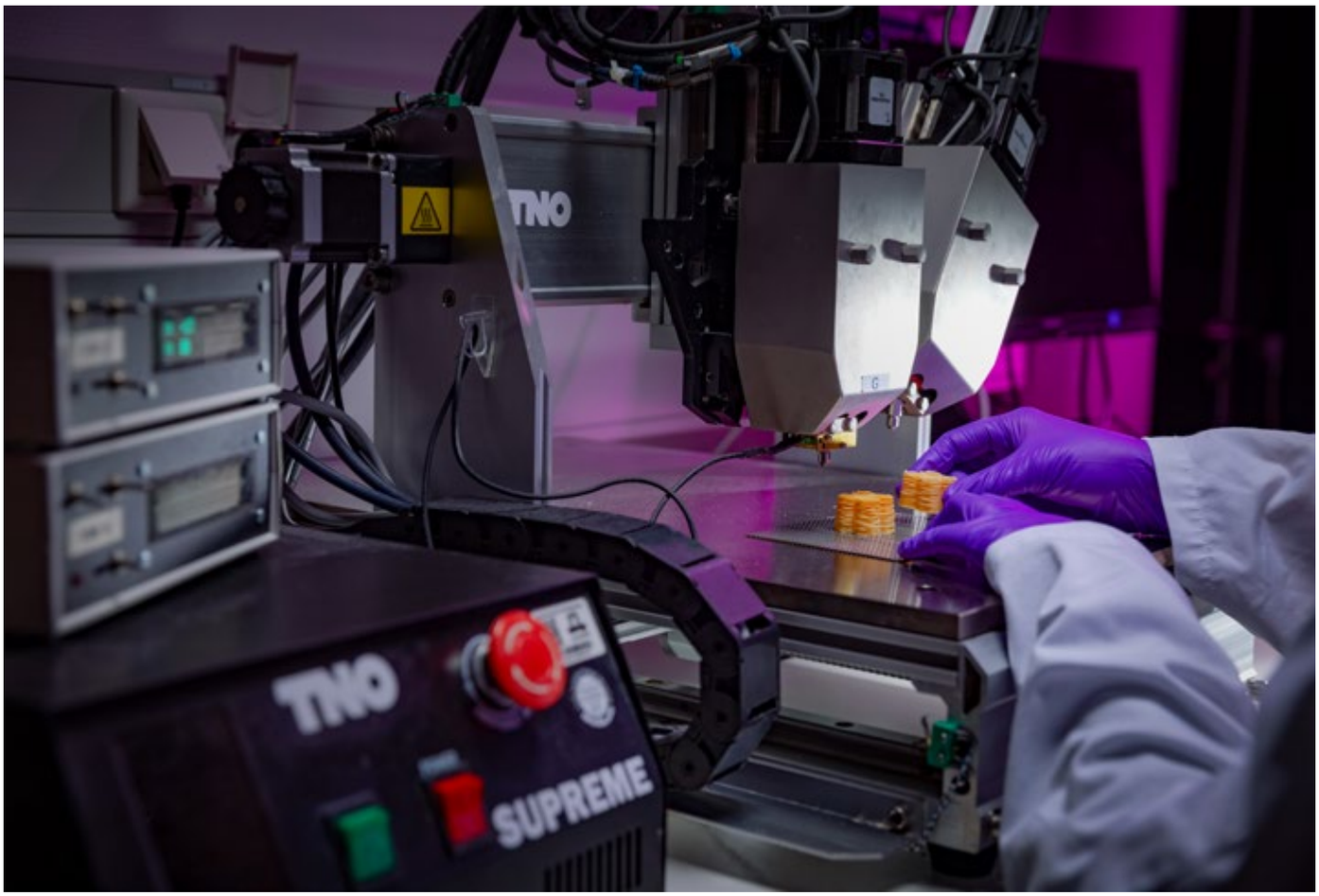
Pleasantly surprised

But WUR is not the first past the post. That was the Israeli company Redefine Meat, which for the past two weeks has been supplying the top Amsterdam chef Ron Blaauw with the first printed cuts of meat. The company is opening a factory in Best, in the Netherlands, and aims to be supplying the new meat to a wider range of customers by the end of this year. Noort honestly admits to being taken by surprise by that development. 'But pleasantly surprised. Ultimately, it's our mission that this sort of thing comes. They are working with the same ingredients as we are: peas, chickpeas and other legumes. But I don't know exactly what technology they use.'

'A lot of innovation in 3D-printing comes from the research field of tissue cultivation: things like printing ears and other organs,' adds Noort. 'If you can print an ear, then in theory you can print a piece of meat as well, even though it isn't edible. We are food technologists who are going to do some 3D printing. You can come at this from different angles. I don't know how scalable their technique is, for example. They are now supplying three top chefs in London, Berlin and Amsterdam. By the kilo. In one of those high-end gastro-bars, a piece of meat can cost maybe 15 euros. But in the supermarket, the same piece of meat needs to cost just a couple of euros. I don't know whether that's feasible yet. But whatever the case, it is really cool. They have put the flag on the moon, and that's good news for us too. The first question companies we talk to ask is always: How feasible is it? Now we can say: look, it's possible already.'

Attention

The burger printer is undoubtedly going to attract a lot of attention. But Noort and his colleagues at Food & Biobased Research have other dishes on their



'The diversity of foods is very great; that is the big challenge' ◆ Photo shutterstock.com

printing menu too. The financing was recently obtained for two big projects in the field of personalized diets. Together with the business world, researchers from WUR, the Netherlands Organization for Applied Scientific Research (TNO) and Eindhoven University of Technology are going to develop a machine that will print tailormade products for the military and for COPD patients. Noort: 'Wageningen Research is responsible for the food technological and social aspects of the project. Which ingredients should go into the product, how will you do it, how do you ensure you cater for consumer preferences, and what are the requirements for the technology so that the consumer can use it correctly?

Besides this applied project (Imagine), the Dutch Research Council NWO is funding a fundamental research trajectory (Print Your Food). In this project, WUR and Eindhoven University are developing what is called a digital twin of the print system. This is a mathematical model that includes all aspects of the 3D printing process. With that

Printing lesson

How do you print food? PhD student Yizhou Ma develops software that teaches printers how to print different types of food material: at what speed the material needs to come out of the printer, what pressure it requires, how hot the material needs to be and how fast the platform needs to move under the printer head to get the desired result. Ma: 'I'm not focussing on any specific printing material but on the control settings on a printer. The aim is that a single printer should be able to print a great many different materials, if you know the right settings. The diversity of food is very great. That is the big challenge compared with printing non-food products such as plastics.' The settings you need depend on the material being used. Ma uses several cameras to track and record the printing process. 'A normal camera for measuring the speed of the flow, and a thermal camera to monitor the cooling of the material.' What he does, in fact, is to calibrate the printer based on the food material and feed the data into software so that the control system can achieve accurate printing jobs across different printers.

‘THE FOOD WORLD IS GOING TO LOOK VERY DIFFERENT IN 10 YEARS' TIME’

‘THE CONSUMER DEMAND FOR MORE CONTROL OVER OUR OWN DIET IS GROWING’

software it is possible to predict whether particular recipes can be printed and will produce an end product with the right structure. A third research area is the processing of waste streams in 3D printers. Noort: ‘The first experiments with that are under way, but it is still in its infancy.’

Joining forces

WUR’s 3D experiments come under the umbrella of the Digital Food Printing Initiative (DFPI). This collaboration between WUR, Eindhoven University and TNO was launched in 2018 with a view to joining forces. Among the successes is a chocolate printer for Cadbury and a pasta printer for Barilla: two machines that came from the DFPI. Noort: ‘If you want to eat printed pasta in a shape you have thought up yourself, you can order that online from Barilla. It is expensive, but it is possible. TNO collaborated on the chocolate printer, which was recently launched commercially in Australia and India.’

Pasta and chocolate printers don’t change the food world. They are nice little gadgets. A niche. But Noort is convinced that the market for printed food is more than that. ‘The consumer demand for more choice and control over our own diet is growing all the time. That’s not a niche market. Just look at all the powders sportspeople use, the products for people who don’t want to eat gelatine, chemical additives, gluten, food colouring – you name it. There is ever more diversification. With smart technology and the progress with digitalization, the rate of product development is going to increase rapidly.’

We can’t see any signs of this yet on the supermarket shelves. And according to Noort, whether that is going to happen at all is anyone guess. ‘I’ve been working on 3D printing of food for 12 years now. First at TNO Food and when that went to WUR in 2018, here in Wageningen. Right from the start, the most interesting and intriguing aspect of 3D printing was that it is a disruptive technology. It disrupts the established system. We always compare it with the rise of Uber and Airbnb. Who thought up Uber? Not the taxi companies. Who thought up Airbnb? Not the Hilton. In the same way, the supermarkets are not behind the development of printed food. Barilla supplies its pasta directly to the consumer, with no involvement of a wholesaler or a supermarket.

Personalized nutrition has no need of the supermarket. The price of processed food as it leaves the factory is currently only a small proportion of the price the consumer pays for it. The bigger part goes to the logistical links in the supply chain. They disappear when the consumer is supplied directly. Precisely in these times of Covid and the new way of life it’s bringing with it, there are many opportunities for 3D-printed food. The food world is going to look very different in 10 years’ time.’ ■

Yoghurt

Food printers make a lot of use of processed plant-based polymers as raw materials. The team led by Costas Nikiforidis (of the Biobased Chemistry and Technology Group) takes a different approach and uses emulsions reinforced with pea protein. This discovery got him onto the (back) cover of the latest edition of the leading journal Advanced Functional Materials. It was not actually his intention to develop printing material, explains Nikiforidis. ‘My team is developing biobased soft materials. The idea of printing with them was really just a bit of scientific fun.’ The researchers first tried to print with a very thick emulsion of oil in water. This kind of emulsion has a fluidity similar to that of mayonnaise, says Nikiforidis. You can print basic shapes with it, but the product soon collapses like a jelly. That changes spectacularly once you add a type of pea protein. In slightly acid conditions, tiny clumps of protein form which act like a glue holding the closely packed oil droplets together. ‘With the added protein clumps, the printed material has the consistency of a thick tooth paste. And you can eat it. It’s a kind of thick plant-based cream which consists of pea protein, water and oil. They are simple materials, and the process is straightforward and low-energy. In theory you can add any ingredients you like in the oil to create products for special diets.’

Recognition and appreciation

Guido Camps

These days, I know a lot of scientists, mainly young ones, who don't feel like climbing further up the career ladder in the present system. A major consideration is the workload and the pressure to publish, combined with the growing challenge of finding funding, especially in this Covid crisis. I'm hearing more and more people saying they just want to leave. The only lifebelt these drowning academics get thrown if they grumble about this is the dossier called Recognition and Appreciation, which WUR has been working on for some time. In November 2019, research organizations VSNU, NFU, KNAW, NWO and ZonMw published a position paper called *Space for everyone's talent: towards a new balance in the recognition and appreciation of scientists*. The idea is that there should be a wider appreciation of the work of scientists, with 'less emphasis on the number of publications, and more emphasis on the other aspects of a scientist's work, such as education and impact. This broader form of recognition and appreciation is a better match with the current core business of scientific and educational institutions, and with what society asks of them.'

'If it's so difficult to think of ways to recognize and appreciate your employees, that says something too'

This report from 2019 (!) led in Wageningen to a committee being formed, which will give a presentation in December 2021, based on a survey done in April 2021. The invitation says that, besides the results of the survey, the presentation will include a proposal on 'how to proceed on the basis of propositions. We are looking forward to discussing the results and the next steps with you, in order to arrive at an improved approach to recognition and appreciation within WU'. The question is: how quickly can this result in real change? This slow pace of action is a dangerous gamble by the university at a time when other universities have already taken steps, the labour market is historically tight, and the workload is only increasing. If you find it so difficult to think of ways to recognize and appreciate your employees, that says something too. Come on WUR, make your reputation as the best university true for your staff as well as your students.

Guido Camps (37) is a vet and a postdoc at Human Nutrition. He enjoys baking, beekeeping and unusual animals.


<2 µm
2 to 50 µm
0.05 to 2 mm
CLAY
SILTY CLAY
SANDY CLAY
CLAY LOAM
SILTY CLAY LOAM
SANDY CLAY LOAM
LOAM
SILT LOAM
SILT
SANDY LOAM
Percent Clay
Percent Silt
Percent Sand

CHUCKING MUD

It looks like a sporting event but in fact this is an 'Introduction to Soil Geography' practical. Soil science in a nutshell: sand consists of grains of sand. It's difficult to turn into a ball that you can throw and it falls apart easily. Not much chance of making an imprint on the paper. Clay is another matter. It consists of minuscule particles that stick together well. If you chuck a ball of clay hard enough, it will stay attached to the paper. So now you know. CJ

See also resourcewur on TikTok

Photo Guy Ackermans

More big catfish on the hook

SIZE MATTERS

The European catfish being caught by anglers in Dutch waters are getting bigger and bigger. What's going on underwater?

Photo Yoeri van Es ◆ Illustration Larissa Mulder

Text Marieke Enter

The European catfish (*Siluris glanis*, also known as the sheatfish) has always been the largest freshwater fish in the Netherlands. But something odd seems to be going on, because ever larger catfish have been caught lately: it is raining record catches. Early last month yet another new record was set, with a catfish that was officially measured at 243 centimetres, making it the biggest catfish ever caught in the Benelux.

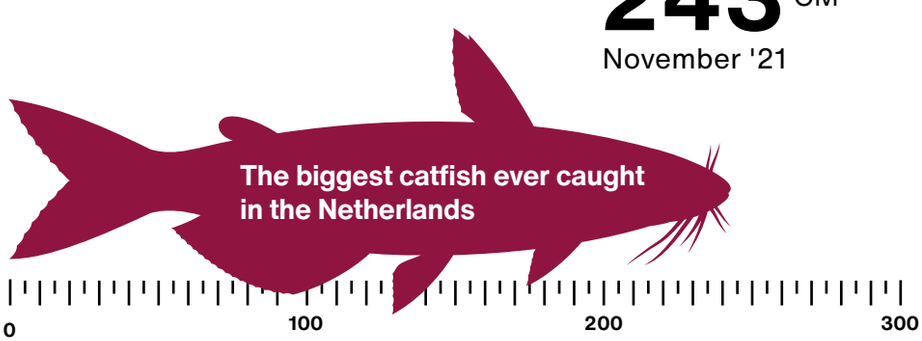
The biggest catfish Sophie Neitzel has caught so far is slightly smaller. But it's still an impressive size, and more than a head taller than her at 193 centimetres – she is a modest 163 centimetres herself. Neitzel is a project manager at Wageningen Marine Research and a passionate angler and diver in her spare time. In the angling world she is known as one of the crack catfish anglers of the Netherlands. In that capacity she already made it to an episode of the fishing channel VisTV and even the NOS news programme got hold of her.

So exciting

Without a doubt, Neitzel has a thing about big catfish. She likes catching them, but what she enjoys even more is to seek them out in their natural habitat, diving into the most beautiful waters in the Netherlands. Not that these fish are easy to find. But after the many thousands of hours that Neitzel has spent sitting with her rod observing them, she has developed a good eye for potential catfish hotspots. She knows exactly what to look for. 'Catching a big catfish is fun, but the process leading up to it is at least as exciting', she says. 'The catfish code is not easy to crack. It takes quite a bit of prior research to locate where a big fish might be. When I then go out on the water with my fishing kayak and fish finder (a device that 'scans' a column of water with sonar-like signals, showing the depth and any fish present, ed.), it's so exciting. Just like a video game, but then for real.'

Warmer water

No specific research is currently being done on the European catfish, as far as Neitzel knows. 'Although we researchers do come across the fish from time to time during fish stock sampling or fish migration projects,' she adds. These are the 'smaller' catfish. Because although the large specimens are seen more often these days, they are still unusual. Neitzel, who is a biologist, does have an explanation for the way this fish species has flourished so much recently that record after record has been broken: the warming of the Dutch waters. This is good for reproduction – catfish only spawn at a temperature above 18°C – and it's good for the food supply



Sophie Neitzel – here with a catfish – is a project manager at Wageningen Marine Research and a passionate angler and diver in her spare time.

as the catfish's food thrives in warmer water too. And because catfish grow fairly quickly, with such an abundance of food it does not take decades for them to grow to a length of over two metres - although Neitzel suspects that the real whoppers are probably already quite old.

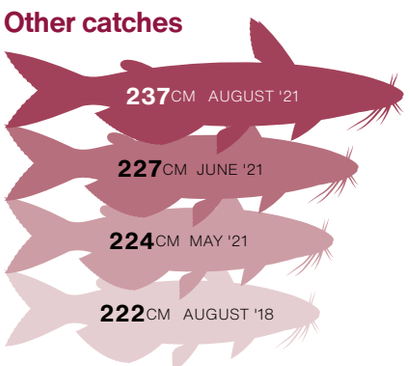
Intimidating

Young catfish eat mostly small aquatic animals: larvae, water fleas, small fish and crustaceans. Their menu grows as they get older and bigger. 'Adult catfish will eat anything they can get hold of, including their own species, birds and small mammals,' in Neitzel's experience. 'As long as it's something they can swallow in one go, because they don't have sharp teeth.' Humans don't meet that criterion, so we should have little to fear from catfish. But if you think they are more afraid of us than we are of them, think again. 'Especially in the spawning season, around May/June, catfish can be seriously intimidating', says Neitzel. She speaks from experience: during a dive it was once made extremely clear to her that she was getting too close. 'Catfish make a kind of nest to lay their eggs on, and then protect them fiercely. If you accidentally get too close, they will try to chase you away by swimming towards you and banging against you. If you don't retreat – which of course most people do, because a massive 100 kilo fish like that makes quite an impression – they won't hesitate to bite you,' she explains. And even though catfish have a kind of coarse sandpaper in their mouths rather than razor-sharp teeth, a bite can still cause a nasty graze. 'If I have to grab a catfish by the mouth when I'm fishing, I always put on gloves first,' says the catfish enthusiast.

Monstrous

Hooking such a large fish in Dutch waters is a special experience that is reserved for a handful of people. Neitzel makes it even more special by secretly returning to these spots later with diving equipment. Of course, she does not share the exact locations – anglers always keep their best spots to themselves. But one person who always goes along is her boyfriend Yoeri, who is a photographer. Thanks to his photos, these impressive and ever bigger inland 'river monsters' can be seen and admired by many people. Onwards to 250 centimetres. ■

Other catches



MEASURING GREENHOUSE GASES IN PEATLANDS

WUR is doing research in peatland areas to identify ways for the Netherlands to reach the climate target of reducing greenhouse gases by 25 per cent. *Resource* went along to see how the measuring is done in the Green Heart area.

Text Albert Sikkema

As Inanthe de Bra walks towards her research apparatus in a meadow near Driebruggen in the Groene Hart (Green Heart) area, in the west of the Netherlands, thousands of geese take to the sky. They are regular campers on the extensive strips of grassland separated by ditches near the A12 motorway and the lakes of the Reeuwijkse Plassen. A Master's student of Climate Studies, De Bra is doing research on ways of reducing greenhouse gas emissions in this peatland area. De Bra is inspecting WUR's measuring instruments in the meadow here. There is a mast with sensors that measure CO_2 and the strong greenhouse gas methane. Another instrument measures the solar radiation, which drives photosynthesis. Meanwhile, a meteorological station registers the temperature, the humidity of the air and the soil, and the soil temperature, while a rain meter catches rain. The equipment automatically sends the data on to the researchers' laptops in Wageningen.

But these are only the measuring instruments that are above the ground. De Bra walks on towards part of the meadow where there are about 30 PVC tubes in the ground. There she measures the soil respiration – in other words, the CO_2 emissions from this patch of peaty soil. This enables De Bra to identify on one hectare of land many variables influencing greenhouse gas emissions.

A HIGHER WATER LEVEL CAN REDUCE CO_2 EMISSIONS, BUT IT CAN ALSO GENERATE MORE METHANE

Land subsidence

The Netherlands pledged in the Climate Agreement to reduce its greenhouse gas emissions by 25 per cent between now and 2030. The country's emissions last year were 165 megatons of CO_2 equivalents, including significant amounts of powerful greenhouse gases such as methane and nitrous oxide. The peatland area, which contributes four megatons, must reduce its emissions by one megaton of CO_2. The peat meadows are the main source of greenhouse gas produced by land use, so something has to happen there.

Researchers have known for a long time that the draining of peatlands for agriculture leads to decomposition of peat (plant remains), through which CO_2 is released. As a result, the land in peat grassland areas has been subsiding for hundreds of years. Overfertilization of the peatland also produces nitrous oxide. The newly retired Wageningen soil physicist Jan van den Akker did extensive research on this in the applied research centre for the peatland area in Zegveld, not far from Driebruggen.

MSc student of Climate Studies Ianthe de Bra inspects WUR's measuring instruments in the meadow. Photo Guy Ackermans

‘THIS IS SENSITIVE RESEARCH FOR FARMERS: THE SURVIVAL OF THEIR FARMS COULD DEPEND ON IT’

Van den Akker not only came up with a diagnosis, but also developed a solution. Together with partners, he invented and tested ‘underwater drainage’. Drainage pipes were installed in the meadows which transported water to the ditches in the winter but raised the water level in the peaty soil in the summer and in dry periods. As a result, smaller quantities of greenhouse gases were formed, and the farmers could work their swampy land in the spring and autumn. It seemed like a win-win situation.

But over the past few years, researchers from Nijmegen and Germany have published critical articles about this underwater drainage. Their research in northern Germany and Friesland showed no visible effects of this technique on the reduction of greenhouse gases. Research elsewhere in the Netherlands did find an effect, however. So the ministry of Agriculture, Nature and Food Quality decided to have further research done in the National Research Programme on Greenhouse Gases in Peatlands (NOVB). In this programme, several universities (WUR, Nijmegen, VU Amsterdam and Utrecht) are now researching the question of which measures can effectively reduce greenhouse gas emissions in peatlands. De Bra’s final thesis research is part of the Wageningen contribution to the NOBV.

Mobile masts

Back in Wageningen, De Bra’s supervisors Bart Kruijt and Ronald Hutjes, who work in the Water Systems and Global Change chair group, describe the current status of the research. Two years into the study, they cannot draw firm conclusions yet, but they do have some interesting observations.

Kruijt and Hutjes do research at Driebruggen and in peatlands in Friesland, near Aldeboarn. In each study, they have a control plot, without measures, which they compare with a plot on which measures are applied such as drainage or raising the level of ditches. And then they measure the emissions of CO_2, methane and nitrous oxide. Colleagues from WUR and Utrecht University are studying all the soil variables, Nijmegen colleagues are looking at the emissions from ditches, and Deltares research institute are measuring the land subsidence.

Wageningen’s specialism is taking measurements above the ground. At present, the researchers are still using masts with equipment on two permanent locations, but soon there will be mobile masts. ‘We’ll be going from location to location,’ says Kruijt, ‘a couple of weeks here, a couple of weeks there. Like that we can collect and compare detailed data from several specific locations.’ The other Wageningen specialism is a small plane that takes greenhouse gas measurements. It flies up and down over the peatlands much as a farmer ploughs the land, says Hutjes. The measurements it takes therefore provide a spatial pattern of the emissions. By carrying out weekly measurements, the researchers also see changes in that spatial pattern under the influence of things like weather conditions.

The initial findings don’t make the puzzle any easier, says Kruijt. In order to reduce CO_2 emissions, the water level in peatland areas needs to be raised. But if the water level goes up, more methane can form. Methane forms when organic matter is converted under anaerobic conditions, meaning underwater. Sometimes that methane is visible, as in ditches in peatland from which bubbles escape. Ditches are the biggest source of methane in peatlands, says Kruijt. To achieve zero methane production from peaty soils, the land should not be waterlogged; instead, the groundwater should be about 20 centimetres below the surface. Then that layer of soil captures the methane that’s produced.

Underwater

Kruijt and Hutjes are testing these observations in another project too, in which they work with nature conservation organization Natuurmonumenten to take measurements in a new wetland in the north of Drenthe province. ‘If you flood an agricultural area and create a wetland, you increase the methane emissions. Nature organizations will also need to look into how they can limit the damage to the climate as they develop nature areas, and that is quite complex.’ The provisional assessment: groundwater levels must be raised to reduce emissions, but it is important to look for the right balance between CO_2 and methane emissions.

‘This is highly sensitive research for farmers,’ says Kruijt, ‘because the survival of their farms could depend upon it. That is why we really want to take measurements for several years in a row. We have been taking measurements in Friesland for three years now, and the effect of underwater drainage is hardly visible there. But there is an NOBV location in North Holland as well, where we do see the effect of drainage. At that location, the groundwater level has been raised considerably, so maybe drainage only works well above a particular threshold. But there are other factors as well. In a dry summer, the effect of drainage on land subsidence and CO_2 emissions is much bigger than in a wet summer. By measuring, we can find out whether we can solve the climate problems in peatlands with technology, or whether we should turn them into nature areas.’ ■

UNIque houses

There are student houses and then there are weird and wonderful student houses. In this feature we visit those UNIque houses

House:
The Coffee Barrack

Residents:
Judith Alkema
Ashlea Byrne
Maxwell Chesal
Ivet Andres Munoz
Karsten Pawellek
Saoirse Shannon

UNIque because:
They sell fair-trade products

Ashlea: 'The Coffee Barack has been around since the 90s. We sell fair-trade coffee, tea, chocolate and wine from the cupboard in the hallway. The concept has always stayed more or less the same. Officially, we're open between 10 am and 10 pm, but if someone knocks on the window - no one ever rings the bell - and we're in the kitchen, we will open the door.'
Ivet: 'We actually have a bell? I wouldn't know what that sounds like.'
Saoirse: 'The house really feels like one big family. We always eat together and are at home quite a lot. I think that's always been the case in this house.'
Ashlea: 'We are even going on a trip to South Africa together. I was planning to go home this winter, because I'm from there, and asked if anyone would like to come with me. Well, that escalated pretty quickly. Before I knew it, the whole house was on board.'
Ivet: 'We are going to sublet the complete house for a month. The people who are going to live here will take care of Nina (the cat, ed.) and the chickens.'
Saoirse: 'Once in a while we organize Droef Cafe. Then we transform the house into a cafe for the neighbours. The last time was around Halloween. We had made pumpkin pie, quiche, and of course lots of coffee and pumpkin spiced latte. A band was playing in the corner of the living room.'
Ivet: 'It was their debut. It was absolutely packed, it was so crowded that people had to stand outside, even though it was really cold.'
Saoirse: 'The money we earn from Droef Cafe always goes to a charity.'
Ashlea: 'There haven't been a lot of parties lately, but we did have a good Pride Party. We are not only known for the coffee, we are also the only house on Droevendaal where everyone's queer.' CJ

If you too want your UNIque house in *Resource*, send an email to resource@wur.nl

From the left: Ashlea, Ivet, Saoirse, Judith ◆ Photo Guy Ackermans

New EU law is next step towards less meat

FEEDING LIVESTOCK ON FLIES

The market for insect protein in livestock feeds could grow considerably now that the EU has given the green light for insects as an ingredient in chicken and pig feeds. WUR researchers Marcel Dicke and Henk Hogeveen shed light on the future of insects as mini-livestock.

Text Stijn Schreven

Circular agriculture is one of the key priorities for Carola Schouten, the outgoing Minister of Agriculture, Nature and Food. It is also high on the EU's agenda. Insects could play a significant role in this now that the EU has approved the use of insect protein in livestock feeds. Professor of Entomology Marcel Dicke and personal professor of Business Economics Henk Hogeveen work together in the InsectFeed project to study the opportunities and challenges in the supply chain from insect farm to poultry farm and consumer. The project focusses on the black soldier fly and the house fly, which are the most promising insects for feed producers because the fly larvae can grow on waste streams from the food industry and no additional land is needed. That is a big advantage, especially for poultry feed, says Hogeveen. 'Poultry need high quality protein in their feed. Currently that comes from soya or fishmeal. Soya farming uses a lot of agricultural land and more soya farming means more deforestation. Fishmeal is not very sustainable and is in limited supply. With insects you can turn low-value waste products into a new high-value protein source. And then you become less dependent on soya or fishmeal.'

Besides increasing circularity, by breeding insects on waste products you can also increase the sustainability of the entire agricultural system, says Dicke. 'It makes waste streams valuable so their quality matters more. They must not contain pesticides, for instance, because those could be disastrous for breeding fly larvae.'

What is more, Dicke expects the supply of substrate for insects to become broader in the wake of the changed legislation. 'It is up to us to find out which waste streams are good for producing insects on.'

Risks

The EU law makes research easier, says Dicke. On diets, for example. 'Within InsectFeed, we have just completed a large trial in which we gave 1700 broilers different diets: live larvae, dead larvae, only the protein from the larvae, or only the fat. All the diets had exactly the same nutritional value. The livestock feed producers had to strictly separate the production of the diets that included insects from the rest, because you were not yet allowed to use processed insect protein at that point. That is allowed now, under strict conditions: producers are not allowed to feed the insects on anything they like, breeding must be hygienic and must meet food safety standards.'

And here lies the biggest challenge, according to the InsectFeed consortium: documenting and managing the risks in the chain. There is a limited number of insect suppliers in the Netherlands. Hogeveen: 'If something goes wrong with the supply of insects, they may end up at 20 poultry farms. Food substrates for insects come from different sources, and there is a risk of pollution with mycotoxins or bacteria, for instance.' Hogeveen thinks the substrate suppliers and insect farmers should take precautions against those risks. 'If they don't do that, they are laying the risk at someone else's door.' And track-and-trace systems can ensure that all parties take responsibility for the risks

‘HOW THE COST PRICE OF INSECT PROTEIN WILL DEVELOP IS ANYONE’S GUESS’

throughout the supply chain, says Dicke. Besides the food safety risks, the consortium will also consider the welfare of insects and the ethics of breeding insects. Hogeveen: ‘It sounds wonderful: insects as part of the food cycle, but are we going to like the idea of millions or billions of insects being killed and going into feeds? Not very long ago, we thought of fish as animals with very little feeling.’

Farmers big and small

The Rabobank expects demand for insect protein to increase from today’s level of 10,000 tons to half a million tons in 2030. That means the insect industry needs to grow a lot, says Dicke. ‘We must scale up massively. There’s a lot more to that than just a multiplication factor.’

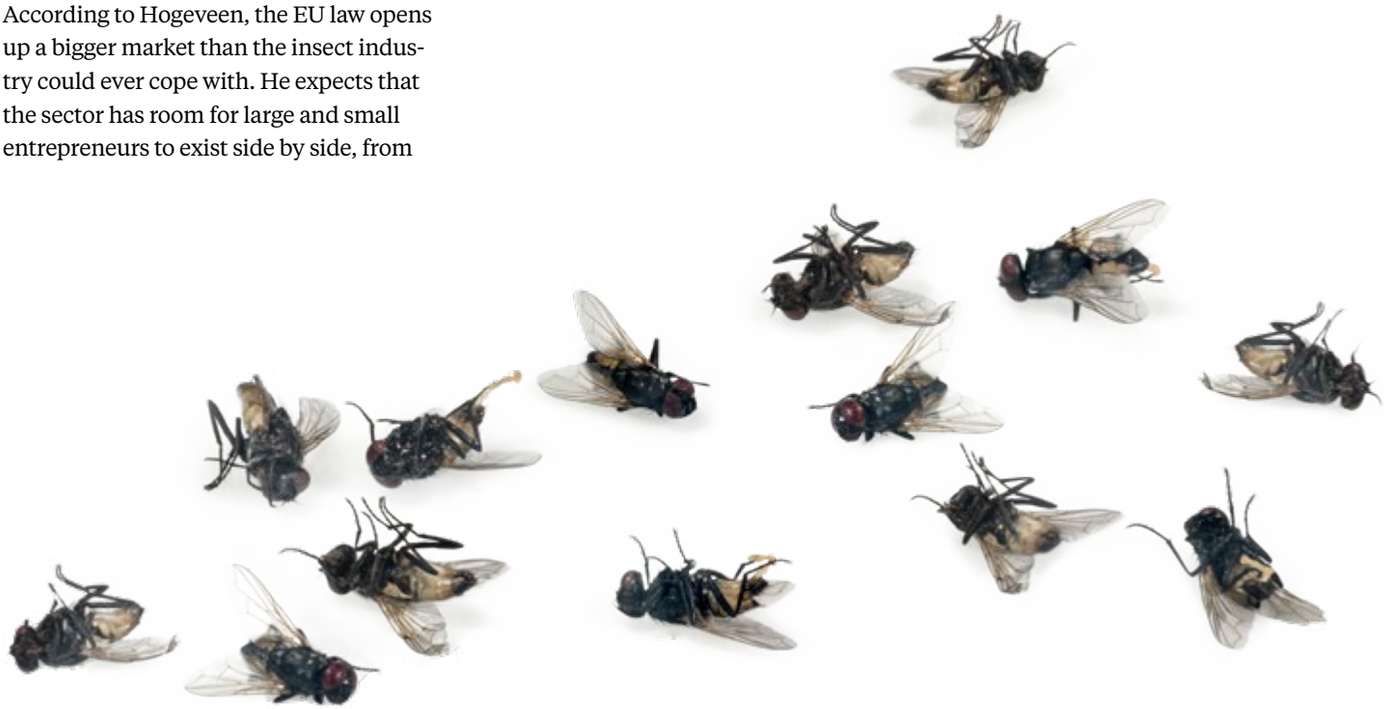
According to Hogeveen, the EU law opens up a bigger market than the insect industry could ever cope with. He expects that the sector has room for large and small entrepreneurs to exist side by side, from the small-scale farmer with a shed full of insects that he feeds to his own chickens to a large insect-breeding company with automatized industrial production. Hogeveen: ‘Both have their merits. A large scale is efficient and has a lower cost price, while a small scale might have a better image and some advantages for circularity.’

The big question, says Hogeveen, is where insect protein can compete with fishmeal or soya protein in terms of price. ‘Soya might get more expensive when deforestation stops in 2030 and the land surface devoted to soya can no longer be expanded. How the cost price of insect protein will develop is anyone’s guess. We have only just started breeding insects on a large scale.’

Insects on our plates

For Dicke, the use of insects as animal feed is not the end goal but a first step. ‘The goal remains to reduce meat consumption,’ he says. ‘We’ll achieve real sustainability when it becomes mainstream to breed insects for human consumption. You replace livestock with mini-livestock that can be bred more sustainably. Once the consumer accepts insects as feed for poultry or pigs, you create an awareness that it’s not crazy to have insects in our food. That makes the next step easier.’

If it’s up to the EU, that step will soon come closer. In November, crickets were approved for human consumption in addition to mealworms. ■



The fly can supply protein for chicken feed ◆ Photo Shutterstock

Going home for Christmas

Covid ⟷ Christmas

Going home for Christmas - who doesn't want that? Last year a lot of internationals were forced to stay here in the drizzly Netherlands. Can they go home this year? Is Covid a factor in their decision? How is their home country getting through the crisis, actually? *Resource* asked five students, PhD researchers and staff members.

Text Coretta Jongeling, Tessa Louwerens, Luuk Zegers and Roelof Kleis ◆ Illustration Shutterstock

Jingwei Zhou
PhD student of Hydrology and Quantitative Water Management, from China

'I will probably not go home in the upcoming Christmas holidays. One of the reasons is that I would have to be quarantined in a hotel for 14 days and self-quarantine at home for another 14 days, which means I would spend most of my holidays in quarantine.
Currently, the number of positive cases is about a thousand in the whole country. The Covid-related regulations in China are very strict. If a new positive case pops up, this person is sent to a special hospital for treatment. The close contacts of this person are traced and quarantined in specific settlements.
In enclosed spaces, people are required to wear a mask and present their Covid code. From my perspective, the situation in my home country is a little bit better than here.' CJ

Suraj Jamge
Employee in Corporate Value Creation, from India

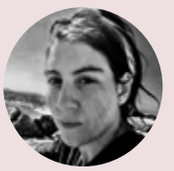
'It's a dilemma. The situation in India is improving, and at the moment I do not need to go into quarantine upon arrival since I'm vaccinated, but that could change. Like everyone, I also want to be home for the holidays and my family is looking forward to it. Last year I did not visit India during the holidays because of the lockdown. Also, I have a lot of compensation holiday time that will expire if I don't take it this year.
But the flight are four times as expensive at the moment, especially around the holidays. So I'm discussing with my supervisor the option of going for a longer time and working from there. I'm a bit worried I would miss the contact with my colleagues, though: I'm now in the office once a week. But at least this is an option for me; for others this might be difficult.' TL

Matteo Grella
MSc student of Food Technology, from Italy

'Last year I didn't go home for Christmas, so this year I will go back to Italy to spend time with family and friends. The plan is to take the plane after the last exam and stay until 2 January, so for about two weeks. Currently the Covid situation back home is better than in the Netherlands. The Netherlands are always "open, close, open, close". I think this causes more stress than a consistently strict policy. Italy has been more consistent and is opening up slowly. There will even be Christmas markets.
As Christmas comes closer, I expect that there will be some more restrictions because a lot of Italians will go back home from the north of Europe. Still, I think it will not be a huge problem. Travelling is pretty straightforward – I can just take the plane thanks to my vaccination.' LZ

Julia van der Westhuyzen
Master's student of Plant Sciences, from South Africa

'The Covid situation looked pretty chill until a few days ago but it changed drastically last weekend.
At the moment there is a travel ban until 4 December. I was planning to go home after that date so it might still be possible to go. If infections now rise it might be better to stay here. It also depends on how difficult it will be to return to the Netherlands. That's easier for people with a British or EU passport than for people with a South African passport. It will probably be a last-minute decision for me. In general, it's difficult to compare the Dutch approach to the South African approach because the circumstances are so different. South Africa has very unequally distributed healthcare and we have many people who are already sick with HIV or TB, so a lot of vulnerable people. Moreover, the vaccination rate is very low because many people rely on traditional medicine, and don't really trust the government.' CJ



Maria Contesse
PhD student in the Knowledge, Technology and Innovation Group, from Chile

'I am a sandwich PhD student. I did my first year in Wageningen, then worked for two years in Chile and was supposed to come back to write my thesis. I couldn't do that because of Covid. I only came back two months ago. Actually, I was planning to spend Christmas and New Year in Chile with my family, but the plane ticket was too expensive. Now I am flying back on 1 January. That's cheapest: no one travels on that day!
While in Chile I was in lockdown for 14 months. Covid was quite serious there and we had a regime of extreme curfews. It's okay now. About 80 per cent of the population is vaccinated. And it's spring now. In July this year I got my second dose of the vaccine. I was extremely relieved and happy. I am young, but I was scared because I smoke. I survived! Many young celebrities in Chile died. And a lot of people lost their jobs. Covid also brought people together, though. People in the poorer neigbourhoods started to organize themselves and make communal meals. It was beautiful and surprising to see this solidarity.' RK

Are you going home for Christmas or staying put? Let us know at

resource-online.nl

Key person: Petra Rozema

They are indispensable on the campus: the cleaners, caretakers, caterers, gardeners, receptionists – the list is long. *Resource* seeks out these key people. This time, meet Petra Rozema (49), secretary at the Centre for Crop Systems Analysis in Radix-Nova.

Text Milou van der Horst ◆ Photo Guy Ackermans

‘Because there is so much I have to know, I’ve put it all on paper so I don’t forget anything: I call it my Secrepedia. My colleague and I are the point of contact for support for staff, guests and students on practical matters, logistics and facilities. We are also the contact persons for PhD services, the Expat Centre, Food Valley, HRM and the finance department. We either answer questions ourselves or refer people to someone who can. We also organize meetings and take the minutes. A lot of work goes into these tasks. That’s why a secretary needs a good overview and to be able to set priorities and switch focus quickly, because a working day is hard to predict. Especially when we still staffed the secretariat, before the pandemic, people were always walking in just when you were working on something. That makes working at home more efficient at times, but I do miss the social side of it, and being able to ask a quick question or just have a chat.

‘I can’t easily keep an eye on the PhD students from home; they are often very isolated’

I can’t easily keep an eye on the PhD students from home because you don’t see or hear what’s going on as much as you do in the office. They are often very isolated, and I like to ask how they are doing. I’ve tried to set up digital coffee breaks, but it didn’t work very well – sometimes nobody turned up. My colleague and I try to stay in contact by sending little gifts, like at Easter and Christmas.

Although my work is very varied, it does become routine at some point. I love learning new things and that’s why I’m involved in various projects. We moved offices during the Covid period, for example, which was challenging to do from home. We had digital timetables and lists in Microsoft Teams, and that helped us learn to use the program. I got a kick out of the fact that we succeeded in that. I’ve been working here for three years now. Before that I worked as a secretary in education. I like the international aspect of working here and working with young people – that keeps me young. I like seeing students and PhD researchers developing and growing up.’

Campus ◆ residents

Fuji Innovation Center

Fuji Oil officially opened its Global Innovation Center Europe on the WUR campus on 1 October. The Japanese company (6000 employees, active in 14 countries) produces plant-based fats and industrial chocolate – such as chocolate coatings and fillings - for the global food industry. It is a business-to-business food ingredient company, says Liz Kamei, head of the Innovation Center.

Fuji Oil also produces plant-based foods based on soya. The company decided to locate its European R&D in Wageningen to focus on plant-based and sustainable technologies in particular.

'We are not building a large research centre but opting for open innovation'

'We will not build a big research centre here, but will work through open innovation,' says Kamei. 'We want to be part of the Food Valley ecosystem, get access to researchers, start-ups and research facilities, and identify collaboration partners.'

As an example, Fuji Oil wants to collaborate in projects relating to new mild processing technologies that are developed in Wageningen. 'Europe, and Wageningen in particular, is leading the way in food processing. That's why we are here.' The company already collaborates with WUR and other partners in PlantPromise, a research consortium aimed at improving plant-based meat substitutes that are made by extrusion – a technique with which a pliable material is pushed through a cast.

Because Fuji Oil focuses on collaboration with partners, the Innovation Center in Plus Ultra II currently consists of just four experts. Kamei expects tthe team to grow to around 10 R&D experts over the coming years. AS

There are about 100 companies on campus. We introduce them to you in *Resource*. This time: Fuji Oil in Plus Ultra II.

All the flavours of the world can be found in the WUR community. Saint Nicholas shares his recipe for the spicy bite-sized cookies called pepernoten.

Flavours of WUR

Pepernoten

Treats

'I've been living in Spain for centuries now but around this time of year I always come to the Netherlands for a couple of weeks to distribute presents and treat everyone to sweet stuff. I can't really remember how this all started, but it's definitely a tradition now. These pepernoten have been firm favourites with both children and adults for generations. Serving tip: Put some pepernoten in your housemates' shoes!'

Ingredients:

- 250g self-raising flour
- 125g caster sugar
- 2 tablespoons speculaas spice
- 125g butter, cold and cut into pieces
- Pinch of salt
- 2 tablespoons milk

1. Mix all the ingredients except the milk thoroughly in a bowl.
2. Add the milk and kneed the mixture into a pliable dough. Too dry? Add a few more drops of milk. Don't kneed it for too long: if the butter gets too soft, it affects the structure of the pepernoten.
3. Once the dough is pliable, make a ball of it. Wrap it in clingfilm and leave it in the fridge for at least half an hour.
4. Meanwhile, heat the oven to 180 °C.
5. Line a baking tray with greaseproof paper. Make little balls with the dough, place them on the tray and flatten them slightly.
6. Put the baking tray in the oven and have a look after 15 minutes. If the pepernoten are still very soft, give them five minutes longer. Let them cool down and enjoy!

Saint Nicholas (ancient)
Parcel deliverer

Which dish reminds you of home? Share it with *Resource* so we can all enjoy it! resource@wur.nl

Irregular Opening Hours

Christmas Holidays 2021

Forum

	2021/2022	Building	Library	Student Service Centre	ServicePoint IT	WURshop	Restaurant	Grand Café	Wageningen in'to Languages
Monday	**20 Dec**	8 am - 8 pm	8 am - 6 pm	12:30 pm - 2:30 pm	8 am - 5:30 pm	closed	closed	10 am - 2 pm	closed
Tuesday	**21 Dec**	8 am - 8 pm	8 am - 6 pm	12:30 pm - 2:30 pm	8 am - 5:30 pm	closed	closed	10 am - 2 pm	closed
Wednesday	**22 Dec**	8 am - 8 pm	8 am - 6 pm	12:30 pm - 2:30 pm	8 am - 5:30 pm	closed	closed	10 am - 2 pm	closed
Thursday	**23 Dec**	8 am - 8 pm	8 am - 6 pm	12:30 pm - 2:30 pm	8 am - 5:30 pm	closed	closed	10 am - 2 pm	closed
Friday	**24 Dec**	8 am - 8 pm	8 am - 4 pm	closed	8 am - 4 pm	closed	closed	closed	closed
Christmas	**25 Dec**	closed	closed	closed	closed	closed	closed	closed	closed
Christmas	**26 Dec**	closed	closed	closed	closed	closed	closed	closed	closed
Monday	**27 Dec**	8 am - 8 pm	8 am - 6 pm	closed	8 am - 5:30 pm	closed	closed	closed	closed
Tuesday	**28 Dec**	8 am - 8 pm	8 am - 6 pm	closed	8 am - 5:30 pm	closed	closed	closed	closed
Wednesday	**29 Dec**	8 am - 8 pm	8 am - 6 pm	closed	8 am - 5:30 pm	closed	closed	closed	closed
Thursday	**30 Dec**	8 am - 8 pm	8 am - 6 pm	closed	8 am - 5:30 pm	closed	closed	closed	closed
Friday	**31 Dec**	8 am - 8 pm	8 am - 4 pm	closed	8 am - 4 pm	closed	closed	closed	closed
New Years Day	**1 Jan**	closed	closed	closed	closed	closed	closed	closed	closed
Sunday	**2 Jan**	10 am - 6 pm	closed	closed	closed	closed	closed	closed	closed

During working hours, the building is open to the public. After working hours, entrance is only possible with a WUR card.

Orion

2021/2022	Building	Bike basement	The Spot	Restaurant
Monday 20 December – Sunday 2 January	closed	closed	closed	closed

Aurora

2021/2022	Building	Bike basement	Your Barista	Blend
Monday 20 December – Sunday 2 January	closed	closed	closed	closed

Leeuwenborch

	2021/2022	Building	Library	Coffee Bar / Restaurant
Monday	**20 December**	7 am - 10 pm	closed	10 am - 2 pm
Tuesday	**21 December**	7 am - 10 pm	closed	10 am - 2 pm
Wednesday	**22 December**	7 am - 10 pm	closed	10 am - 2 pm
Thursday	**23 December**	7 am - 10 pm	closed	10 am - 2 pm
Friday	**24 December**	7 am - 6 pm	closed	closed
Christmas	**25 December**	closed	closed	closed
Christmas	**26 December**	closed	closed	closed
Monday	**27 December**	8 am - 6 pm	closed	closed
Tuesday	**28 December**	8 am - 6 pm	closed	closed
Wednesday	**29 December**	8 am - 6 pm	closed	closed
Thursday	**30 December**	8 am - 6 pm	closed	closed
Friday	**31 December**	8 am - 6 pm	closed	closed
New Years Day	**1 January**	closed	closed	closed
Sunday	**2 January**	closed	closed	closed

Entrance is only possible after registration at the reception desk.

WAGENINGEN
UNIVERSITY & RESEARCH

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

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[no]WURries

Covid quarrels

‘Discussions about QR codes in education and a “2G” system are more heated than ever now we are heading for another lockdown winter. Not all of my friends have been vaccinated and opinions are sharply divided. The arguments are getting so irate that I’m afraid our group of friends will break up. How can I stop the situation getting out of hand?’

M., student
(name known to the editors)

Reliable information

‘It is understandable that it’s hard to have such heated arguments with your friends. Currently, there is a lot of misinformation going around about the vaccine and COVID. Ask your friends about the reasons why they are hesitant about the vaccine and guide them to information from the government or WHO, if they are open to it. If not, make clear to your friends how you feel about the arguments in the group and suggest that you avoid the topic altogether.’
Jitske Spee, MSc student of Plant Sciences

Be open-minded but critical

‘Today, good friends are more important than ever. Separate the issues from your friends as people. Listen and be open-minded. Who, throughout human history, has committed the most atrocities? Those who “know” and those who identify too strongly with their beliefs. Admitting that we do not know everything, and that those we disagree with may know something we do not, requires confidence. That confidence comes from deep knowledge and thought. Be critical of each other, but also of authorities, data and most of all yourself. Isn’t that the point of a university education?’
Alexander van Tuyll, a researcher at Greenhouse Horticulture

Different aspects

‘Emotions, culture, norms, values and religion all play a role in this complex situation. Not all those aspects are equally important to everybody. But everyone has one thing in common: wanting to feel safe and to be seen and heard. Bear that in mind and listen to each other’s views with mutual interest. Put yourself in someone else’s shoes: no perspective is right for everyone, but it can be for an individual. Show some understanding of each other’s views without trying to convince each other that you are right. That way, everyone in your friendship group can be themselves.’
Femma Roschar, coach in Communication Skills and Personal Leadership

Good discussion

‘Among groups of friends you always get differences of opinion and discussions, which can be refreshing. But this topic is complicated. Often everyone is convinced they are right. One option is to have a single good discussion about it, with respect for each other’s point of view. Let everyone explain their position without interruption or discussion. Agree that you will respect those positions. Friendship is too valuable to let this issue destroy it.’
Karen Zweers, secretary at Consumption and Healthy Lifestyle

Avoid the topic

‘If friends that matter to you are against particular Covid regulations and vaccinations, it is worth keeping an open mind and making a point of listening carefully to each other’s standpoints. To avoid rows, it helps to realize that there are no right or wrong opinions. If the constant confrontations within your friendship group get too much, admit that honestly. Maybe others think the same way. So agree to avoid certain subjects when you meet.’
Yasmin Dijksterhuis, BSc student of Plant Sciences

NEXT WURRY

New Year’s resolutions
‘I always make New Year’s resolutions but I never manage to keep them. But I’m not giving up and I hope this year will be different! Who has tips to make them a success?’

Hannah, Master’s student
(full name known to the editors)

Do you have advice or tips for this WURrier? Or could you use some good advice yourself? ***Email your tips or your question (100 words max) by 7 December to resource@wur.nl*** *subject noWURries.*