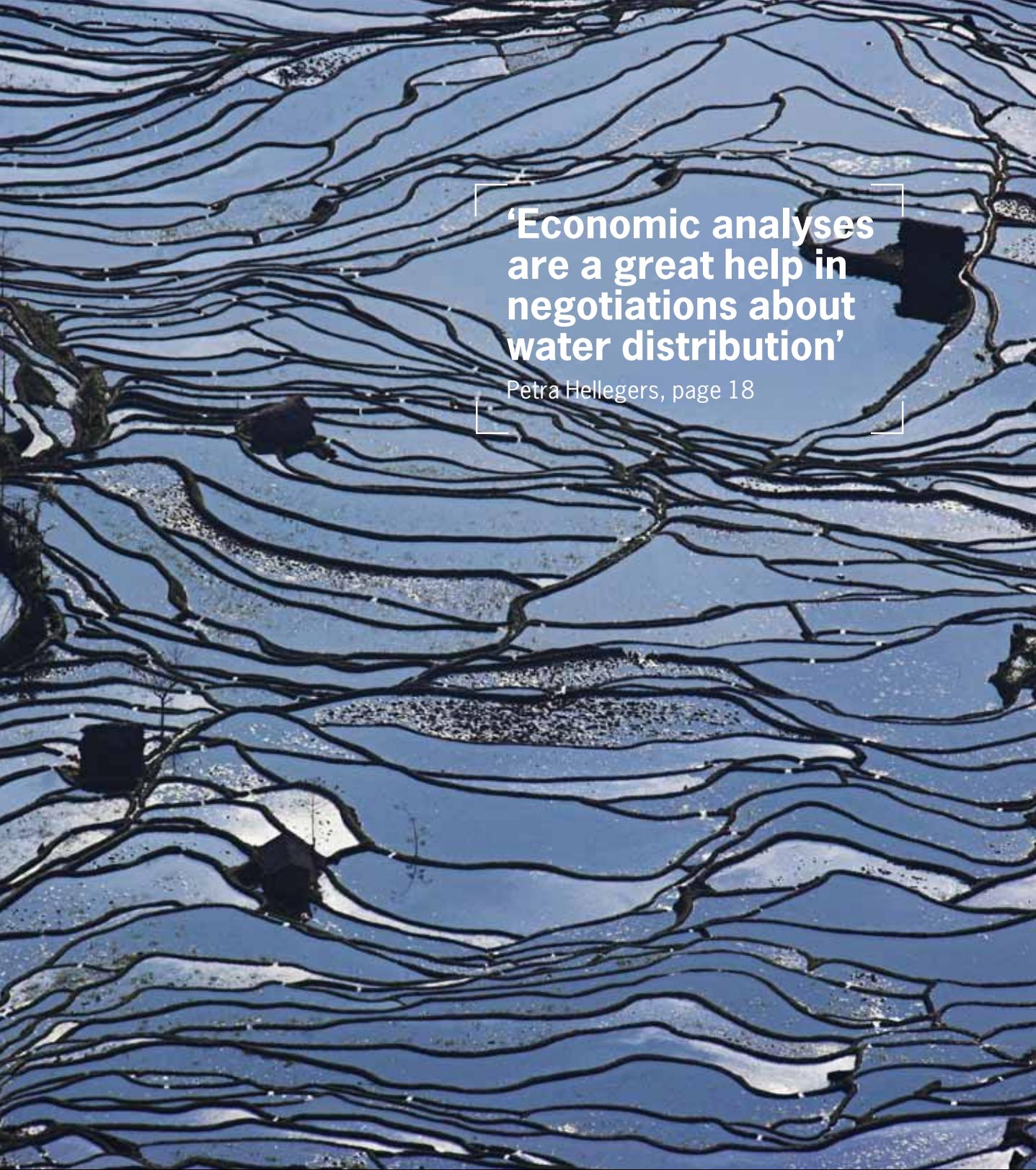


WAGENINGEN WORLD

MAGAZINE OF WAGENINGEN UR ABOUT CONTRIBUTING TO THE QUALITY OF LIFE

nr.4 2011



'Economic analyses
are a great help in
negotiations about
water distribution'

Petra Hellegers, page 18

Farming without **antibiotics** | **Science** means business | **Generous donors** for research | New: **green power** from plants | Can **nature** survive without government support? | More **mushroom** in the jar



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To stem the rise of resistant bacteria such as MRSA, the 'hospital virus', antibiotic use in the livestock sector must be slashed. No easy task for farmers, and consumers are going to feel it in their purses.

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COMPETING CLAIMS ON WATER

The growing demand for water will not readily lead to major conflicts, according to the new professor of water economics Petra Hellegers. 'With objective information, well-thought-out decisions can be made.'



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FOOTING THE BILL FOR NATURE

With the government cuts, other parties might have to start funding Dutch nature. But can nature manage without government support? Answers from Dolf de Groot, Fred Tonneijck, Willem Ferweda, Tia Hermans and Fank Berendse.



COLOPHON Wageningen World is the quarterly magazine for associates and alumni of Wageningen UR (University and Research centre) and members of KLV, the Wageningen Alumni Network. A PDF version of the magazine can be found at www.wur.nl/UK/publications/Periodicals **Publisher** Wageningen UR, Viola Peulen, **Editorial Board** Paul den Besten, Hans Bothe, Ben Geerlings, Wilbert Houweling, Bert Jansen, Lotte Kerkhoven, Jeanette Leenders, Jac Niessen, Judith Pierik, Helene Stafleu, Erik Toussaint, Brenda van der Zee **Editors-in-chief** Gaby van Caulil (Editor-in-chief Resource), Pauline Greuell (Corporate Communications Wageningen UR) **Magazine editor** Miranda Bettonville **Copy editor** Rik Nijland **Alumni news** Alexandra Branderhorst **Translation** Clare Mc Gregor, Clare Wilkinson **Language editor** Clare Mc Gregor **Art direction and design** Jenny van Driel (Wageningen UR, Communication Services) **Cover picture** Corbis **Overall design** Hemels Publishers **Printer** Mediacenter Rotterdam **ISSN** 2210-7908 **Address** Wageningen Campus, Akkermaalsbos 12, 6708 WB Wageningen, PO Box 409, 6700 AK Wageningen, telephone +31 317 48 40 20, wageningen.world@wur.nl **Change of address alumni** www.wageningenalumniportal.nl **Change of address associates** (mention code on address label) wageningen.world@wur.nl **Change of career details** alumni@wur.nl

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



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PHOTO GUY ACKERMANS

Seven billion plus

'The birth of the billionth world citizen is a good moment to give some thought to the growth of the world population. For about fifteen years now, the growth curve has been slowly levelling out because differences in birth and death rates are getting smaller. The United Nations Population Fund estimates the average global population growth for 2010-2011 to be 1.1 percent.

'After the global death rate first went down as a result of increasing prosperity, better nutrition, vaccination programmes and antibiotics, the birth rates went down too in many countries. In countries where this has not happened yet, such as in West and East Africa, the population is growing by more than 2 percent per year. A crucial factor in falling fertility rates is education for girls. Research has proven that the better educated girls are, the later they marry and the smaller their families.

'Globally you can see a dichotomy. On the one hand there are countries with a young population in the early stages of the transition process, where birth rates are still high. On the other hand there are many countries with an aging population, such as those in Europe and many parts of Asia and Latin America.

'In poorer countries such as Indonesia, population aging is going to pose problems. Fewer and fewer adults will have to take care of more and more elderly dependents in a context in which state provision for social security is lacking.

'It remains a challenge to feed the growing world population. The problem increases as growing prosperity raises people's aspirations and levels of consumption. Sustainable production and consumption will therefore be increasingly important. Wageningen UR should certainly play a role here. And that includes tackling problems of waste disposal and water supply in the cities – already home to half the world population. Natural scientists, technologists and social scientists should work on solutions together. We must cherish this multidisciplinary approach in Wageningen.'

Anke Niehof, professor of the Sociology of Consumers and Households, Wageningen University

ENTOMOLOGY

Silicones kill malaria mosquito

A thin film of silicones on the water makes paddy fields unsuitable as a breeding ground for malaria mosquitoes, conclude scientists at Wageningen University, part of Wageningen UR, and Kenyan colleagues. They conducted tests in Kenya with the compound polydimethylsiloxane, also known as Aquatrain, and found in products such as contact lens liquid. The film kills the mosquito larvae but does not have a negative effect on the water quality, other forms of aquatic life or rice growth. Info: sander.koenraad@wur.nl



SUSTAINABLE PRODUCTION



PHOTO BART DE GOUW

Sustainability Consortium launched

Wageningen UR will be coordinating the European activities of The Sustainability Consortium (TSC). Princess Maxima officially opened TSC in The Hague at the beginning of November.

The Sustainability Consortium originated in America. It is an association of producers and suppliers of consumer products plus a number of non-governmental organizations. Around eighty companies and NGOs have now joined, including a large number of multinationals and the Worldwide Fund for Nature. TSC aims to create global, scientifically

based standards for measuring the sustainability of products. The basis for this is life-cycle analysis in which variables such as the ecological footprint are calculated for all stages of a product's life. Aalt Dijkhuizen, chairman of the executive board of Wageningen UR, became a member of TSC's Board of Directors last summer. Info: koen.boone@wur.nl

HORTICULTURE

Tropical vegetables from a plastic greenhouse

Market gardeners in Indonesia and other low-lying tropical countries could produce far more vegetables by using a relatively simple greenhouse with a plastic roof and lots of natural ventilation, concludes Impron from his doctoral research at Wageningen University, part of Wageningen UR. The greenhouse he tested was developed by Wageningen UR Greenhouse Horticulture. At present, vegetable yields are often disappointing because of heavy rain, diseases and pests. Info: gerard.bot@wur.nl

ATMOSPHERE

New measurement network for climate research

Alterra and Wageningen University, both part of Wageningen UR, will be collaborating with six other Dutch scientific institutes in the field of climate research under the name ICOS-nl. With funding from the Netherlands Organization for Scientific Research, they hope to contribute to the European ICOS (Integrated Carbon Observing System) project. This involves setting up a measurement network for research on greenhouse gases in Europe. Info: maarten.krol@wur.nl

SOIL

White worm keeps undergrowth poor

Acidification affects soil life in forests. The environmental stress makes bacteria and rain worms less active while fungi, nematodes and white worms actually become more active. This releases extra nitrogen into the soil, which hinders the development of greater biodiversity in the undergrowth. These are the conclusions of Dolf Kemmers at Alterra, part of Wageningen UR. He looked at why recovery measures aimed at reversing the effects of acidification, such as adding lime or cutting sods, often have so little effect on the undergrowth. Info: rolf.kemmers@wur.nl

NUTRITION AND HEALTH

Chicory and pears cut risk of stroke

People who eat plenty of chicory, cauliflower, apples or pears reduce their risk of a stroke by half compared to those who eat few white fruits or vegetables. This finding came out of an initial study of the effect of the colour of fruit and vegetables.

Doctoral researcher Linda Oude Griep did the research together with colleagues from Wageningen University, part of Wageningen UR, and the RIVM. She based her findings on a ten-year study by the RIVM of more than 20,000 Dutch men and women between the ages of 20 and 65 for whom there was data on their eating habits and the incidence of stroke.

Last year, Oude Griep demonstrated on the basis of these data that eating raw fruit and vegetables significantly reduces the risk of stroke. In a follow-up study she analysed the effect of the colour of the fruit and veg, which goes together with a number of nutrients. She distinguished four colour groups: green for leafy vegetables such as spinach and lettuce; yellow/ orange, including citrus fruits and carrots; red/ purple, including tomatoes, strawberries and black grapes; and white, including apples and

pears as well as bananas and cauliflower. People who eat plentiful amounts of white fruit and vegetables appear to have a 55 percent lower risk of suffering a stroke than people who eat little from this colour category. Oude Griep did not find such a correlation for any other colour. 'But only if the effect is confirmed in other populations can health advice be based on it', warns the researcher. The researchers do not advise cutting consumption of non-white fruit and vegetables, because these contain other important nutrients that may provide protection against other diseases. Quite what the link is between the white colour and the prevention of strokes is not clear. The Dutch Product Board for Horticulture funded this research, but was in no way involved in the analysis, interpretation or description of the results.

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BREEDING AND GENETICS

Fewer joint problems in horses

Within a few years it will be possible to select show-jumping and dressage horses for their resistance to osteochondrosis, a joint disorder that can make even young animals unsuitable for these sports. It will require more DNA data on stallions and information about their offspring. Besides hereditary disposition, environmental factors such as the feed or the stable floor can contribute to the complaint. Hereditary disposition to the disease stands at 23 percent, according to calculations by PhD researcher Ilse van Grevenhof of Wageningen University, part of Wageningen UR. 'That is quite high', says Van Grevenhof. 'Horses' hereditary predisposition for dressage is 15 percent and that is enough for them to be bred for that.'

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NATURE

Biodiversity good for humans

A large natural variety of plant species ensures that nature remains useful for human beings. Especially under changeable conditions, this diversity helps safeguard all kinds of useful services such as pollination, clean drinking water and pure air. If a plant species disappears, a useful service often disappears with it. This conclusion was published by an international research team including Jasper van Ruijven of Wageningen University, part of Wageningen UR, in the scientific journal *Nature* in August.

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Silage grass earlier

To obtain milk with more unsaturated fatty acids, farmers should harvest grass earlier for silaging and dry it for a shorter period. If farmers want to silage maize, they would be well advised to use varieties that stay green longer. These conclusions are outlined by Nazir Khan in his thesis for Wageningen University, part of Wageningen UR, for which he received a PhD mid-September. Info: wouter.hendriks@wur.nl



PHOTO HOLLANDE HOOGTE

Happy event on the fish farm

Even farmed sole that has grown up in captivity can reproduce naturally, Wageningen UR researchers noticed last summer on the experimental farm of the Zeeland Sole Foundation. They found much smaller fish in the open-air ponds than they had released there.

To date, Dutch sole farmers have relied on sole caught at sea. These fish breed in covered ponds but their offspring fail to do so. 'We do not seem to have imitated natural conditions well enough in the covered ponds', says research leader Henk van de Mheen of IMARES, part of Wageningen UR. Breeding has got going again in the open-air ponds. Sole farmers need to be able to breed fish in captivity so they can select fast-growing fish and make the business viable.

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Research on impact of pesticide on bee populations

Research is being done on the effect of the controversial pesticide imidacloprid on forty bee populations on Droevendaal Organic Experimental and Educational Farm, part of Wageningen UR.

The key concept for this research is vitality. How vital is a bee population after long-term exposure to imidacloprid? The bees are exposed to a range of different simulated conditions – from the worst imaginable to the optimal. For example, some populations are given sugar water full of imidacloprid and their pollen supply is rationed; others get to keep all their pollen and are not poisoned.

This is the first time this kind of research has been done at population level. 'Research on an individual bee cannot simply be transferred to a whole population. You should see a population as a super-organism which can respond very differently

to an individual bee', says researcher Sjef van der Steen of Plant Research International, part of Wageningen UR.

The use of imidacloprid in agriculture and horticulture is under fire. Some researchers think this pesticide plays a key role in bee deaths. Van de Steen, however, puts the deaths down to a lot of different factors. 'As far as we know at present, the main one is the Varroa mite. But environmental factors play a role too, such as the availability of pollen or the presence of pesticides. However poisonous a pesticide is, it is the degree of exposure that determines how dangerous it is for a bee population.'

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PHOTO HOLLANDE HOOGTE

MARINE ECOLOGY



PHOTO HANS VERDAAT

CELL BIOLOGY

1.5 million for a clump of stem cells

Dolf Weijers, associate professor at the Laboratory of Biochemistry at Wageningen University, part of Wageningen UR, has received a 1.5 million euro grant from the European Research Council. The money is for research on the generation of stem cells in plants.

Unlike humans and animals, plants remain able to form organs such as leaves, flowers and stalks throughout their lives. This is because of a clump of stem cells that develops at a very early stage, during germination. Weijers will be working with two postdocs and two PhD students, studying thale cress to see how these cells are created and develop. Info: dolf.weijers@wur.nl



TECHNOLOGY

Reading DNA fast and accurately

The purchase of two high-speed DNA sequencers will enable biotech company Keygene and Plant Research International, part of Wageningen UR, to map genetic information on plants, bacteria, humans and animals in no time at all. One of the two mighty machines can decipher a human genome up to sixteen times a day. The Centre for Advanced Technology in the Agro and Food sector (CAT-AgroFood), an initiative of the Ministry of Economic Affairs, Agriculture and Innovation, the province of Gelderland and Wageningen UR, helped pay for the equipment and will be operating it. Info: petra.caessens@wur.nl

Offshore wind farm a haven for fauna

A wind turbine farm off the busy Dutch coast provides many animal species with a bit of peace and quiet. New seabed creatures settle on or around the turbine poles and cod, porpoises and cormorants like to visit.

Only a few species of birds appear to avoid the wind farm. These findings came out of a two-year study of the wind farm at Egmond-on-sea (OWEZ) by IMARES, part of Wageningen UR, together with Bureau Waardenburg and the Royal Dutch Institute for Marine Research.

Because shipping is banned in and around the farm, an increase in biodiversity there is to be expected, says Han Lindeboom, board

member at IMARES and extraordinary professor of Marine Ecology at Wageningen University, part of Wageningen UR. That this increase is not natural does not worry him at all: '19th century maps show this area as a peat bog. In those days there were trees here with all sorts of things growing on them. Now we are creating something like that ourselves. It may be artificial but it is enriching.' Info: han.lindeboom@wur.nl

CLIMATE

Alarm system for Amazon forest

Alterra, part of Wageningen UR, is developing an early warning system for threatened ecosystems in the Amazon region, in collaboration with a number of international partners. The alarm system is at the heart of Amazalert, a new international research

programme on the effects of forest death, climate change and deforestation in the Amazon region. Alterra leads the project, which involves scientists from 14 institutes and universities from Europe and South America. Info: bart.kruijt@wur.nl



PHOTO ANP

How far does a midge fly?

Researchers from Alterra, part of Wageningen UR, are charting the flight behaviour of the mosquito most commonly found in the Netherlands. The knowledge will be useful for planners and nature managers.

Mosquitoes are capable of multiplying prolifically – around water reservoirs for example. And that can be a nuisance for local residents. So researchers want to know how far new wa-

ter features should be located from housing estates so as to minimize the mosquito bites and sleepless nights endured by the residents. They are also interested in whether copses and shrubs between the water and the housing estate reduce the problem. The research was done at the behest of the Dutch Government Service for Land and Water Management (DLG) of Drenthe province. Mosquito larvae were collected for the study around the Wageningen campus. With much

media fanfare, the researchers released the first mosquito research subjects in August, on a test plot between Wageningen and Rhenen. Traps were suspended at a range of different distances in order to find out how far afield the insects will range in an open landscape. Initial results suggest that they cover at least 160 metres. Research is also being done on how far mosquitoes fly if they encounter shrubs, copses or other obstacles on their route. Info: piet.verdonschot@wur.nl



PHOTO BART DE GOIJW

You eat better if you feel good

It is not easy to demonstrate the effect of diet on people's mood. However, there is plenty of evidence that people who feel good eat better, said Human Nutrition professor Frans Kok at the official opening of the Food4you Science Festival.

Laura Bouwman, assistant professor of Public Health and Society at Wageningen University, part of Wageningen UR, also talked about how diet can influence your mood. Bouwman argued that we should look for what causes good health rather than for solutions to health problems. 'We should follow the example of

people who are fit and well.'

This year was the fifth edition of Food4you and there were more than ten thousand visitors in Wageningen for the science festival's general public day on 8 October. They were able to enjoy dozens of demonstrations and activities focusing on the joys of healthy, tasty food under the slogan 'Good food, better mood'. Festival activities related to eating and flavour were also organized over the first two weeks of October in the other Food Valley municipalities of Ede, Barneveld and Veenendaal. Info: www.food4you.nl

LEISURE

The Dutch favour a patchwork landscape

Dutch people prefer a landscape that has a bit of everything: forest, water, sand, grassland and farmland. This is the conclusion drawn from five years' worth of data on landscape preferences collected from visitors to the website daarmoetikzijn.nl.

The website, created by Alterra, part of Wageningen UR, helps its visitors find their ideal part of the Netherlands – whether it be for a day's walking, a weekend cycling tour or a holiday. Website visitors fill in how much value they place on particular features, such as farmland, forest, peace and quiet, and then the website calculates where they should go in the country. Places you should avoid are coloured in red on your personalized map, and the places that would suit you are shown in green.

Visitors' preferences are used for research on leisure and tourism, and this was the reason for creating the website. It proved to be cheaper and simpler than conducting surveys. And it gives website visitors some travel advice in exchange for their collaboration. What emerges from the data collected is that the Dutch are not looking for something to-

tally unlike their local landscape. 'Someone who comes from an open agricultural landscape wants more forest, but then again not as much as the average Dutch person. And conversely, someone from a forested area wants a bit less forest when they are on holiday, but still more than the average', says Alterra researcher Martin Goossen. The areas around 't Loo in the province of Gelderland and Nijverdal in the province of Overijssel seem to fit the bill for the typical Dutch leisure-seeker.

Policymakers can learn from his findings, says Goossen: 'For example, the preference for forest is twice as strong as that for small-scale agricultural landscapes.' Equally, leisure facility providers can benefit from the research, by for example checking how website visitors rate the landscape around their premises. Info: martin.goossen@wur.nl



Polder Waterland in Noord-Holland

ENVIRONMENT



Bees are flying metal detectors

Honeybees make excellent environmental monitors, shows bee researcher Sven van de Steen of Plant Research International, part of Wageningen UR.

Van der Steen obtained information about the incidence of ten common metals in three places in the Netherlands: Maastricht, Buggenum and Hoek van Holland. The fine dust that sticks to the bees as they search for pollen and nectar contains metal particles. If the bee is dissolved in an acid bath, these metals are released and can be analysed. The beauty of the system, according to Van der Steen, is its simplicity. 'Complicated measuring equipment is not available in many parts of the world, but there are bees everywhere.' Bees have been used as bio-monitors before, but only to detect a smaller number of heavy metals such as cadmium, lead and cobalt, says Van der Steen. Info: sjefvandersteen@wur.nl

NUTRITION AND TRADE

Innovative capacity for Chile

Six Chilean scientific institutes and eight companies have joined forces with Wageningen UR to set up the ICEFood institute. Its aim is to increase the innovative capacity of Chilean food companies.

Chile wants to be an even bigger exporter of fruit, salmon and wine. It also wants to make its food industry more innovative and lucrative. The Chilean government is contributing 17 million dollars to the centre and Chilean scientific partners and companies 10 million. Info: peter.zuurbier@wur.nl

PHOTO FOTO NATURA



Farming without antibiotics



The use of antibiotics in livestock farming must be slashed if the spread of drug-resistant bacteria in the healthcare system is to be halted. No easy task for farmers, as is clear from a working visit to the Peel region of the Netherlands. And consumers will feel it in their wallets.

TEXT ALBERT SIKKEMA **PHOTOGRAPHY** THEO TANGELDER **ILLUSTRATION** WAGENINGEN UR

‘There are pig farmers who cannot manage a ten percent cut in antibiotics’

Increasing numbers of hospital patients become infected with resistant bacteria that doctors are unable to treat with antibiotics. This is leading to the deaths of an estimated 100 people a year in the Netherlands and around 25,000 people in Europe as a whole. Some of these bacteria, such as MRSA and ESBL, are also found on livestock farms. The years of intensive antibiotics use in the livestock farming sector have made these bacteria resistant to veterinary drugs as well as to most of the antibiotics used in hospitals. They will not kill healthy people but they do pose a serious risk to patients with severely weakened immune systems, such as cancer patients, says Dr Jan Kluytmans of the Amphia Hospital in Breda.

MRSA (Methicillin-resistant *Staphylococcus aureus*) mainly develops on pig farms. Research by Els Broens (for which she received a doctorate from Wageningen University, part of Wageningen UR, at the end of October) shows that in recent years the drug-resistant bacteria have spread rapidly from the farms to the abattoirs via the transport of piglets and pigs for slaughter. Around forty percent of pig farmers carry the MRSA bacteria. If they are admitted to hospital they have to be nursed separately to prevent the bacteria spreading.

ESBL (Extended Spectrum Beta-Lactamase) develops mainly on poultry farms and is now spreading through the food chain. This year, Dr Kluytmans showed that ninety percent of chicken in supermarkets is infected. The bacteria are now to be found in one in ten Dutch people, compared with none at all only a few years ago. ESBL is difficult to treat as there are only a few antibiotics left that are still effective against these bacteria. There is a fear that the pathogen will also develop a resistance to these remaining drugs so that it will no longer be possible to treat urinary tract infections, for instance, that are caused by ESBL.

The use of antibiotics in livestock farming needs to be halved by 2013 if the spread of drug-resistant bacteria is to be halted, says the Dutch cabinet. But Kluytmans and other experts feel usage levels need to be reduced far more drastically in order to stem the spread of the drug-resistant bacteria. Can the livestock farming sector make that change?

80 PERCENT REDUCTION

We are off to Boekel, in the heart of the Peel peat-bog region and home to Geert-Jan van Veen. He studied Biology at Wageningen between 1983 and 1989; now he has his own pig farm with four hundred sows and ten thousand piglets. Van Veen has a letter from his vet on his kitchen table showing his antibiotics consumption over the past three years. And it turns out he has reduced his use of antibiotics by more than 80 percent. How did he manage it?

Van Veen uses antibiotics mainly during weaning, the period in which the piglets are moved from the nursery area to their own stall and switch from sow's milk to solid food. This is a time in which the piglets' resistance falls. Van Veen had to use large amounts of antibiotics in 2009 to fight *Streptococcus* among the weaned piglets. The bacteria were established themselves in the wounds from ear biting, and were causing arthritis and meningitis. 'I had to take emergency measures.' Incidentally, even then his antibiotics consumption was no higher than that of fellow pig farmers in 2009.

After that experience Van Veen made two changes. He replaced the boar used to inseminate the sows, a Belgian Piétrain, with a German Piétrain, a breed that grows more slowly but is also less aggressive. That meant a slight decrease in his pigs' meat production but also less ear biting. He also started buying different pig feed that was more digestible for the weaned piglets. As

a result they got fewer intestinal infections, which increased their resistance and meant Van Veen needed fewer antibiotics. Until this point, he had not given any thought to reducing antibiotics consumption. That changed when his old vet retired in 2010, to be replaced by the young graduate Antoine de Vocht. 'He questioned our use of antibiotics', says Van Veen. De Vocht had simple tips, such as not selecting the piglets by weight after weaning but putting brothers and sisters in the same stall instead. The advantage of this is that they have already decided on the pecking order in the group so have fewer quarrels. Also, each family was allowed to keep its own feed trough when it was moved from the nursery rather than getting a new trough. 'That helps them eat properly and keeps their intestines in working order', says Van Veen. This year, he and his vet did a trial to see if his farm could manage without any antibiotics. That went fine until May. 'Then I noticed black rings around the piglets' eyes, which is a sign of respiratory tract infections. The person I sell my piglets to also raised the alarm about their state of health. Then I went back to giving a course of antibiotics in the first few weeks after weaning.' That is why his 'dosage day score' is now 4.25. The dosage day score is the number of days a year that an animal is given antibiotics; so every pig on Van Veen's farm gets antibiotics on an average of just over four days. In 2009 his dosage day score was 25.45. Clearly it is perfectly possible to reduce the use of antibiotics by making a few simple adjustments. But not all pig farmers will manage this, says vet De Vocht. As part of the Animal Drug Authority's registration system, he prints out the antibiotics consumption figures every three months to discuss with the pig farmers. 'There are also pig breeders who find it difficult to manage even a ten percent reduction.' It is not easy to get an interview with these farmers – these days, >

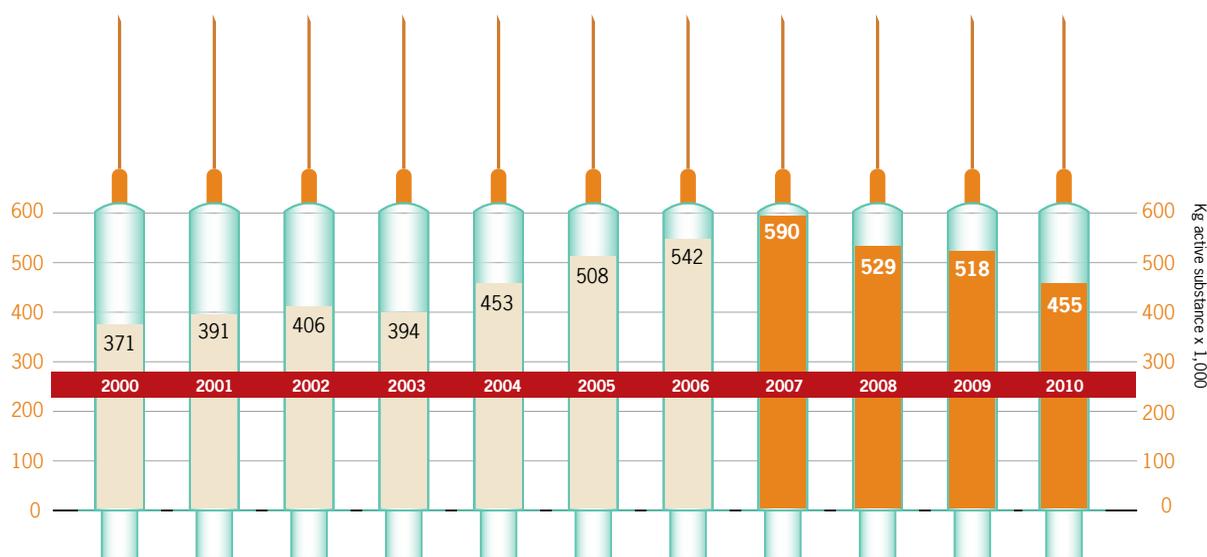
FALL IN USE OF ANTIBIOTICS

The use of antibiotics in Dutch livestock farming has been falling since 2007, according to figures produced by FIDIN, the sector organization for animal drug suppliers. Total consumption fell by 2 percent in 2009 and 12 percent in 2010. The government has decided that consumption needs to fall by 20 percent this year in comparison with 2009. It looks as though this will be achieved. The annual MARAN study (Monitoring of Antimicrobial Resistance and Antibiotic Usage in Animals in the Netherlands) published since 2002 by the LEI and the Central Veterinary Institute (CVI), both part of Wageningen UR, paints a less rosy picture. While antibiotics consumption for dairy cows and pigs bred for meat has indeed fallen – which explains the reduction in kilos found by FIDIN – their use for sows and broiler chickens has yet to drop, and these are precisely

the animals in which the resistant bacteria are developing.

CVI researcher and professor in Utrecht Dik Mevius is coordinating the MARAN study. Mevius is also chair of the Animal Drug Authority. This organization wants to promote responsible antibiotics use in livestock farming by measuring the average consumption per livestock sector and holding heavy users, whether vets or farmers, to account for their consumption. 'The idea is that registration should lead to improvement projects', says Mevius.

Mevius is also monitoring changes in antibiotics resistance in the MARAN study. He sees that resistance is still growing. This year, Mevius published hard evidence that the drug-resistant ESBL bacteria were spreading from intensive livestock farming to hospitals via the food chain.



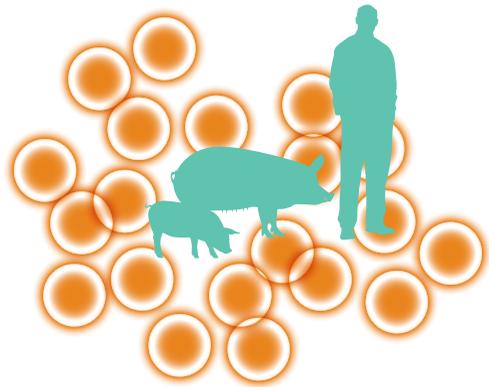
‘Antibiotics measures will inevitably mean less livestock’

TOP THREE RESISTANT BACTERIA

The Health Council of the Netherlands says there are three groups of drug-resistant bacteria in livestock farming that cause major problems for public health.

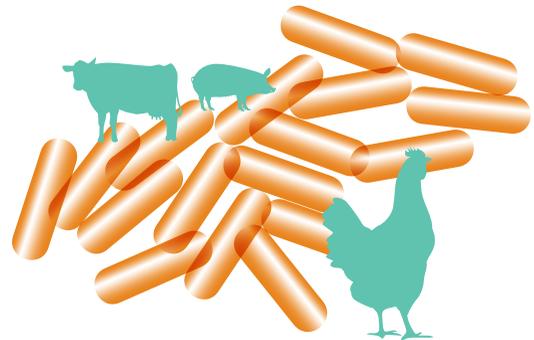
MRSA *Methicillin-resistant Staphylococcus aureus*

MRSA is also known as the ‘hospital bacteria’ as hospitals’ heavy use of antibiotics is leading to resistance. Pig farmers and their families are also becoming infected with MRSA bacteria from pigs. Last year, Denmark had the first cases of humans becoming infected with pig MRSA without having been in direct contact with pigs.



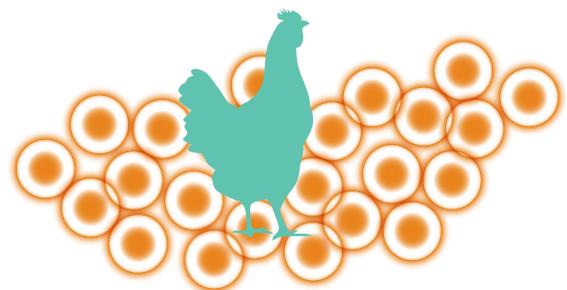
ESBL *Extended Spectrum Beta-Lactamases*

ESBL stands for a group of bacteria (found mainly in chicken but also in other kinds of meat) that produce enzymes which undermine the effectiveness of antibiotics. These bacteria spread rapidly and are not limited to hospitals; they are also found elsewhere, in particular as the cause of difficult-to-treat urinary tract infections.



VRE *Vancomycin-resistant Enterococcus*

The VRE bacteria, which leads to infections in wounds and the urinary tract, is causing serious problems in American hospitals in particular. The Health Council says the link between antibiotics consumption in livestock farming – chickens in particular were believed to be responsible for the transfer to humans – and the rise of VRE in hospitals is not as clear as was once thought.



no one wants to get a reputation for being a heavy user of antibiotics.

Even so, a profile of the heavy users is emerging. Researcher Ine van der Fels-Klerx at RIKILT, part of Wageningen UR, concluded this summer that large farms in areas with a high concentration of pigs tend to use more antibiotics than the average. These are farmers who permanently have pathogenic bacteria on their farms in combination with low resistance among their animals. Possible causes are poor quality feed, leading to problems in the intestines of the young animals, or ageing sheds in which the animals are exposed to draughts. It could also result from the breeding target; farmers who opt for fast-growing breeds with high meat production pay for this with lower resistance among the animals. Van Veen is not aiming for maximum production, which means his piglets are a bit stronger on average.

NEED FOR CHANGE

Van der Fels concluded that the will to make reductions is a key factor in cutting antibiotics use. But economics plays a role in all livestock farmers' decisions. Antibiotics are cheap. Farmers who want to make substantial reductions in antibiotics consumption often have to invest in better feed or improvements to their sheds while at the same time their meat production falls slightly. They have to spend more but their revenue drops. That is not an appealing prospect, especially given the low margins that are common in the pig and poultry sectors. Still, the time for change has come, announced the Health Council at the end of August in its recommendations to the Cabinet. The Council said preventive use, in which all animals get a course of antibiotics as a precautionary measure, should be banned. And the use of antibiotics that are essential for tackling human infections should no longer be permitted in livestock farming.

Jan Kluytmans was a member of the Health Council committee that drew up the recommendations. As well as practising as a doctor, he is also a professor of Microbiology and Infection Prevention at the VU University Amsterdam. 'At the moment the situation in the Netherlands is manageable but the problem is rapidly getting bigger.' The worst-case scenario for him is the situation that has already arisen in countries like Greece and Turkey. 'A lot of the patients in the intensive care departments there are infected with drug-resistant bacteria that are difficult or impossible to treat with antibiotics.' For instance, an MRSA strain has emerged in Greece that is even resistant to the last antibiotic doctors had available. 'We also know that the development of new antibiotics is stagnating; no new, effective drugs are coming on the market', says Kluytmans. The problem can only be tackled by cutting antibiotics consumption in livestock farming to a fraction of the current levels in order to prevent new, resistant bacteria developing. 'Ideally we should move to a system of livestock farming without antibiotics', says Kluytmans. 'Wageningen has the know-how to achieve such sustainable farming through vaccines for animal diseases, better feed and better housing. But consumers will also have to pay more for meat, as at present the livestock sector can't switch to more sustainable methods because of the low margins. Fortunately the livestock sector has now also realized this.'

ENFORCING MEASURES

Three days after the Health Council report, the Van Doorn Commission came up with similar recommendations. This commission wrote a report for Brabant province on the future of intensive livestock farming. This commission, too, thinks the preventive use of antibiotics in livestock farming should be banned and it advocates an antibiotics blacklist.

'What makes our proposals ground-breaking is the food chain approach', claimed alumnus Daan van Doorn, former head of VION, the leading meat processing company in the Netherlands, when he presented the report. The commission wants to enforce the measures throughout the food chain. Nutreco, the main feed supplier for the livestock sector, has signed up to the new rules. Moreover, seventeen supermarket chains – including market leader Albert Heijn – have agreed to the stringent antibiotics policy. Their involvement means the costs of a stricter regime can be passed on to consumers.

Martin Scholten, director of the Animal Sciences Group at Wageningen UR, was a member of the commission. 'The agreement is that as of 1 January 2012 the supermarkets will no longer stock meat in which preventive antibiotics have been used. We want to move to antibiotics-free livestock farming in which only sick animals are treated on an individual basis. The Dutch supermarkets will be making that a requirement for all their meat, including meat from abroad. The meat processing companies will pass that requirement on to the farmers, who will only be able to supply meat if they comply with the new antibiotics stipulations.' The meat processing companies that have signed the commission's guidelines account for ninety percent of all meat produced in the Netherlands. Antibiotics use can be checked using farm audits and data provided by vets. 'This will inevitably lead to a fall in livestock numbers', continues Scholten. 'That may not be the aim of these antibiotics measures but it is the result. The measures will lead to a slight rise in the cost of meat but the supermarkets have said they will be able to pass that on to consumers. The key factor for livestock farmers will be their healthcare management. Farms with persistently high infection levels will go under.' ■

A battery with leaves

Is it possible – plants that produce electricity, recharge your mobile phone and keep your fridge running?

Wageningen pioneers think it is. TEXT RESOURCE ILLUSTRATION KAY COENEN

Getting electricity from plants sounds like science fiction, but David Strik, an Environmental Technology researcher at Wageningen University, part of Wageningen UR, begs to differ. 'It's not a fantasy. Soon people will be able to use a few square metres of vegetation to power LED lamps, charge their mobile phones or run a super-efficient laptop. About 20 per cent of the global population has no access to electricity. Many people live in wetlands, and these are precisely the people we can supply with electricity.'

CLEAN ENERGY

It is already possible to charge a mobile phone using plants. The principle was conceived by Bert Hamelers, who heads the Renewable Energy group within Environmental Technology. This group is using EU funding to investigate new technologies for generating clean energy, using

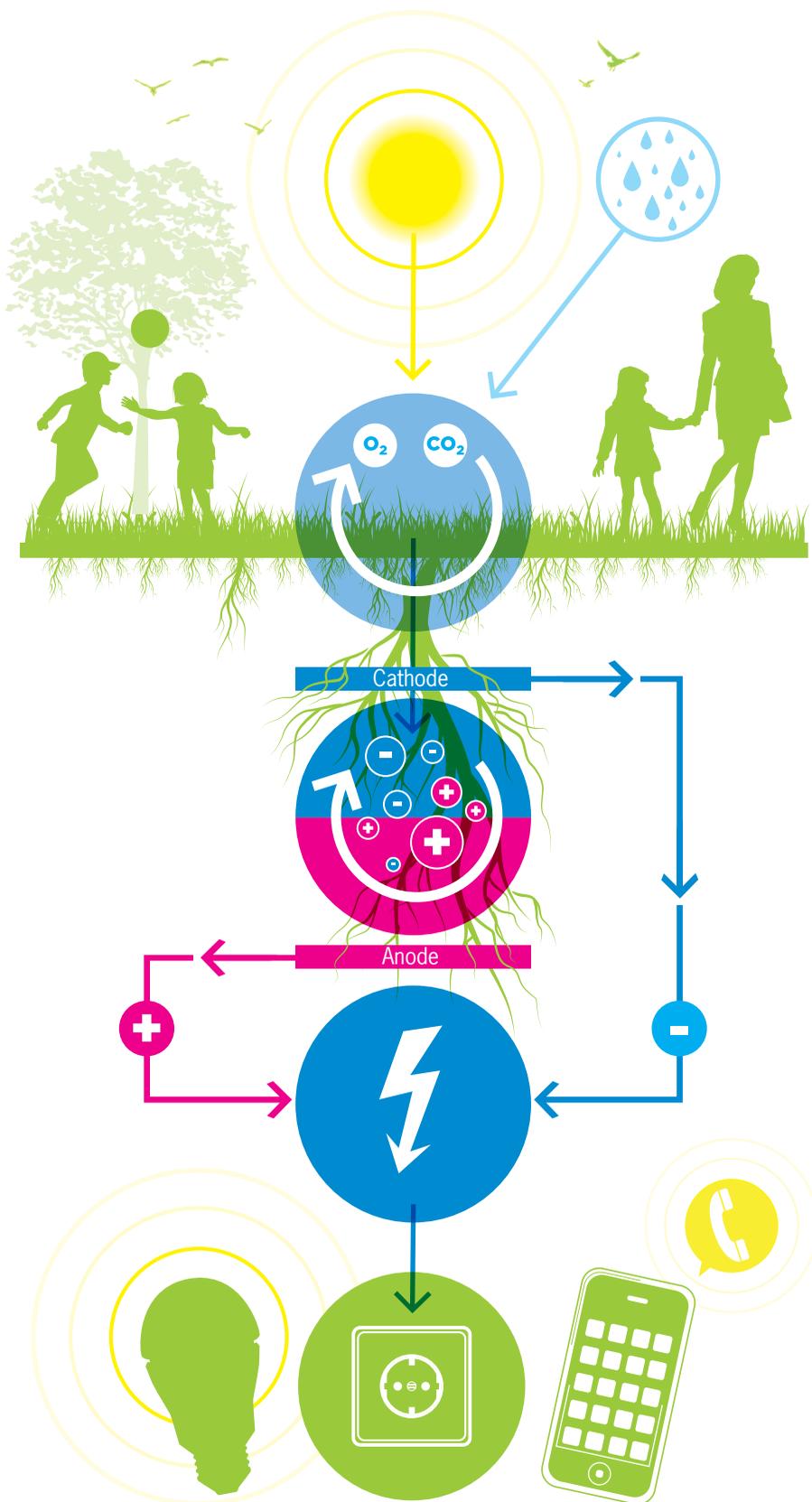
something called a plant-microbial fuel cell, for example. The plant provides the fuel and bacteria convert it into electricity. In this context 'fuel' means the organic compounds, known as exudates, discharged by the plant's roots into the soil. Sugars and organic acids make excellent fuel, for example, as do hydrocarbon polymers, enzymes and dead cell material. Electrochemical bacteria in the soil break this material down by oxidation into CO₂, H⁺ ions and electrons. You can harvest those electrons and hey presto, you've got electricity.

The plant-microbial fuel cell is essentially a planter with a few simple technical fittings to collect the electricity. Plant power is still pioneering work. Marjolein Helder, a PhD student, says the system is still something of a black box. 'We have some insight into which bacteria are doing the work. We know that bacteria of the *Geobacter* genus

are able to make electricity and we have seen them in our system, but we don't know how much fuel a plant produces. These exudates are difficult to measure as they are broken down in the soil straightaway. But the amount of fuel is obviously a decisive factor in the system. One of the challenges we are facing is how to increase that amount.'

ANAEROBIC SOIL

Helder is using two model plants for her research. 'Reed meadow grass is a freshwater plant that can be found all over the campus in the ditches. Cord grass likes salty conditions and is found in coastal areas. Any plant will do in principle, as long as it grows in waterlogged, anaerobic soil. Oxygen is disastrous as it attracts the electrons that are released. Boggy areas, wetlands, deltas and paddy fields could well be highly suitable for this technology.'



ROOF ELECTRICITY

How much electricity does a plant generate? The Environmental Technology number crunchers say an average flat roof of fifty square metres growing the right plants could in theory generate 150 watts continuously, about a third of what a household consumes.

According to Helder, plant power is the greenest energy imaginable. ‘You could generate electricity from plants eleven months a year in the Dutch climate. Day and night, because it works in the dark as well. The process only stops when there’s a ground frost and the system freezes’, says Helder. She and Strik founded the company Plant-e (pronounced plenty) two years ago as a vehicle for commercializing the new technology. The setup that makes it possible has been running on the roof of the new NIOO (Netherlands Institute of Ecology) building on the Mansholtlaan, Wageningen, since August. It consists of sixteen square metres of ‘green battery’ with reed meadow grass and cord grass: Plant-e’s first large-scale experiment. This larger scale should enable the generation of the first ‘useful electricity’, with sufficient voltage and current to charge a mobile phone, for instance. The NIOO trial should pave the way to developing a real product. It has not yet been decided what form that will take. Helder: ‘Should we start with a gadget for a window box? Should it be a do-it-yourself pack or should we market ready-made planters? This should become clearer over the coming year.’ ■



COMPETING CLAIMS ON SCARCE WATER

Fair shares

The growing demand for water will not readily lead to large-scale conflicts, says professor of Water Economics Petra Hellegers. 'With objective information, well-thought-out decisions can be taken.'

TEXT RENÉ DIDDE PHOTOGRAPHY HOLLANDSE HOOGTE ILLUSTRATION WAGENINGEN UR



The world population is projected to reach nine billion by 2050, with 70 percent living in cities. All those people will need to be fed, and that requires additional farmland and water. But the amount of water available is limited: only 2.5 percent of the total amount of water on our blue planet consists of fresh water, and no more than 1 percent of that is easily accessible for human use. Seventy percent of the water used by humans goes into agriculture. Households consume 10 percent and industry the remaining 20 percent. Demand for water is growing, partly due to the rapidly rising standard of living in countries such as China and India, which is leading to an increase in meat consumption. Producing one kilogram of meat takes 15 times more water than producing one kilogram of wheat. To add to this, there is the rising demand for biofuels, including bioethanol made from sugar cane, which is a formidable water guzzler compared with traditional crops such as wheat and rice. And then there is climate change, which is creating an increased demand for irrigation water in many places. And yet anyone who sees these trends as grounds for pessimism will not find a kindred spirit in Petra Hellegers. Hellegers works at the agricultural economics institute LEU, part of Wageningen UR, and was appointed last spring as part-time extraordinary professor of the Economics of Water and Climate Change at Wageningen University (also part of Wageningen UR). She is convinced that an integral water policy based on economic analyses can deliver improvements in the way countries deal with water. It is often contended that water shortages will lead to wars or major conflicts between countries, but Hellegers does not believe that. 'Water is quite simply too important. Countries and re-

gions will do everything possible to sort it out through negotiations. Economic analyses and calculations can support the decision-making and the negotiation processes,' she predicts.

DOWNSTREAM

'You can calculate what farmers can produce in a catchment area per cubic metre of water', says Hellegers, explaining how the economic analysis works. 'We are not just talking about kilograms of crops per cubic metre of water, but also about dollars per cubic metre of water, the economic water productivity. Then we can pre-calculate the consequences of a different distribution of that water over crops, farmers, sectors, regions, or over time.'

These kinds of analysis would enable farmers and managers to decide, for example, to use half the available water for their traditional rice farming, but to use the other half to grow more profitable crops, says the economist. 'Another option is to leave some water for use downstream for products with more added value.' By offering local users such as farmers and managers a range of alternative scenarios like this, improving the water management becomes feasible, Hellegers is convinced. 'With objective information, well-thought-out decisions can be reached. Certainly if the water distribution is done through water rights. Farmers upstream who consciously keep their consumption down can then sell their water rights to interested parties downstream, so that they still benefit from an income.'

CALCULATIONS

Several institutions and organizations are working on developing tools for providing an overview of the vari-

WATER AVAILABLE

Total volume water worldwide

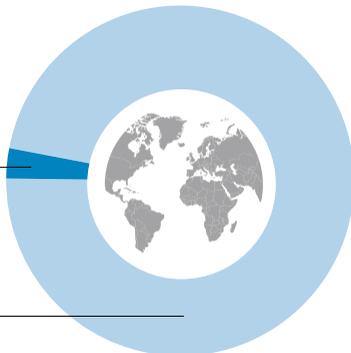
1.4 billion km³

2.5%

Fresh water
35 million km³

97.5%

Salt water
1.05 billion km³



Sources: UNEP, WWAP

Fresh water reserves

35 million km³

0.3%



Surface water
0.1 million km³

30%



Ground water
10.5 million km³

70%



Ice and permanent snow
in mountainous regions,
Antarctic waters and the
Arctic Circle
24.4 million km³

ous claims on water. For example: the calculation tool WIBIS, developed for the complex case of the Incomati river basin in the border region between South Africa, Swaziland and Mozambique by the LEI together with Alterra (part of Wageningen UR), the Wageningen company Waterwatch and local partners in the stakeholder countries. Various parties in this region compete for water for food crops, biofuel crops and nature. The interactive policy support tool WIBIS makes it possible to make some calculations on the competing claims on water. To create the tool Hellegers and her colleagues used satellite images to highlight water consumption and biomass production, and to chart water productivity. ‘We distinguished 24 different management areas in the region and 15 kinds of land use. One of the other things that showed up was the relatively high water consumption of the Kruger Park, which is in the Incomati area’, says Hellegers.

An internet application enables a user to see the impact of an alternative type of land use on water productivity (both in kilos and in Rand per cubic metre of water), on the distribution of the benefits, on employment and on the water supply downstream in normal, dry and wet years. Representatives from the three countries can feed in relevant information such as market prices, the prices of seed and artificial fertilizer, and the available land area. ‘Various different scenarios, such as planting a large area with sugar cane, have already been simulated and discussed with stakeholders from the three countries’, says Hellegers. ‘The nice thing about this tool is that the information is consistent and is established in a straightforward way. That is a great help in strategic negotiations about water distribution. The interactive tool was made so as to be usable in other

regions too, once region-specific data has been fed into it. We provide hard data about the price, costs, and the value of water for various crops at various locations in wet and in dry years.’

Agriculture remains an extremely complex factor, however. It is heavily influenced by globalization and trade policy liberalization, which make countries more dependent on each other for their food supplies. ‘This could mean that agricultural and trade policies could have more of an influence on the demand for water than water policy does’, says Hellegers.

LAND LEASING

A further complicating factor in the demand for water for agriculture is the way food production is shifting to areas with a relatively stable supply of water. As an example, Saudi Arabia announced in 2008 that it would make billions of dollars available to large agricultural companies wanting to invest in agriculture in African countries such as South Sudan. At the same time, Saudi Arabia’s own wheat production has gone down by 12 percent. The aim of all this is to save precious water at home, explains Hellegers. ‘Not just rich desert countries such as Saudi Arabia and the United Arab Emirates, but also companies from China, Korea and Japan are buying and leasing agricultural land in Africa on a large scale.’ >

‘If we have access to cheap energy, the world’s water problems can partially be solved.’

Fresh water reserves

35 million km³

Available fresh water

(for ecosystems and for human use):

0.2 million km³

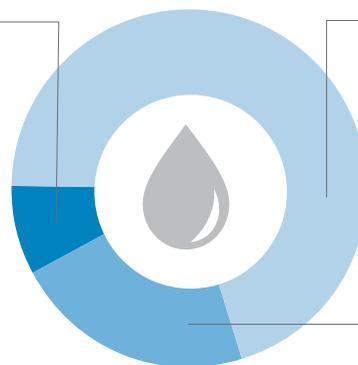
<1%



Global fresh water utilization

8%

Households



70%

Irrigation



22%

Industry



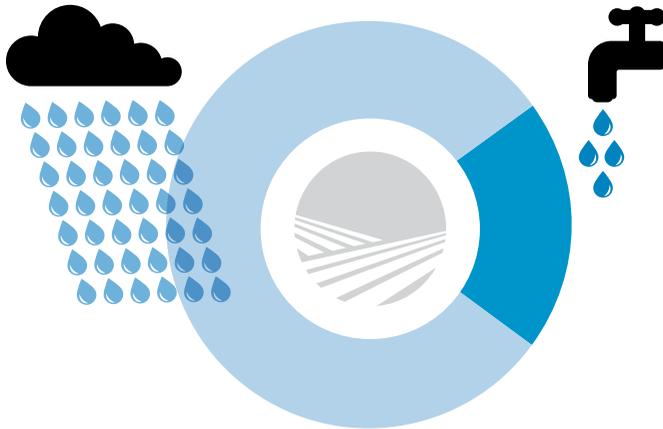
WATER AND AGRICULTURE

Area under cultivation

80%
Rain-fed

20%
Irrigated

Irrigated agriculture currently accounts for about 40 percent of global food production



Crop yield

Without irrigation

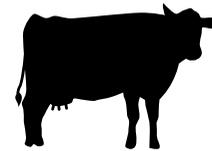
With irrigation



2-5x higher yield



Water consumption in m³ per kilo harvest



Beef



15 m³



Lamb



10 m³



Poultry



6 m³



Rice



3 m³



Grain



1.5 m³



Citrus fruit



1 m³

Source: Food and Agriculture Organization of the United Nations (FAO)

‘These competing claims on scarce water are a major issue’, says Wim Andriesse, coordinator of external collaboration at Wageningen International, the international desk at Wageningen UR. Andriesse specializes in the African continent. ‘New agricultural companies from China and the Middle East are establishing themselves in Africa, and Brazil is getting involved in Portuguese-speaking countries such as Mozambique and Angola. The Brazilians in particular want to set up sugar plantations for the production of biofuels. But when companies from rich but dry oil-producing countries move into Ethiopia and Sudan, where food security is a big problem, it can create some distressing situations too. After all, those countries are already

hard-pressed to feed their own populations and periods of drought can have disastrous consequences.’

EXPLOITING POTENTIAL

There is international criticism of ‘land grabbing’, as the new trend is called in NGO circles, because it can affect local food security and because it lays claims on land and water. The food produced is exported back to the companies’ home country. In universities and among governments, the more neutral term ‘land leasing’ is used. Without trivializing the negative effects, there are potential advantages for the host countries too. ‘Land-leasing raises the total food production and exploits the potential of the land and water better,

because of the big investments in agriculture’, says Hellegers. ‘It creates employment, which also benefits the local population. But a critical analysis should certainly be made of the distribution of the benefits.’ Rik van den Bosch, head of the Water and Climate Centre at Alterra, and his colleague Jochen Froebrich, team leader of Integrated Water Resources Management, agree that investments by large foreign companies can potentially have a positive effect on regional African agriculture. That is, as long as the high technology introduced merges with local knowledge. ‘Private investments can bring out the innovative capacity of local farmers’, says Froebrich. Contracts between local farmers and foreign investors can be used to make sure that farmers’ rights are respected. What the role of the water supply should be in this is a complex question, however. Van den Bosch and Froebrich corroborate the power of sound economic analyses to provide guidance in dealing with competing claims on water. Climate change does not make matters any easier, however. ‘Climate change causes both water scarcity and flooding’, says Van den Bosch. ‘Because it is getting warmer, more water evaporates, while erosion from deforestation, for example, causes rivers to flood downstream’, adds Froebrich.

MORE EFFICIENT IRRIGATION

So it is important to find smart ways of dealing with climate change. Alterra is trying to get to grips with this in the brand-new EAU4Food programme (European Union and African Union cooperative research to increase Food production in irrigated farming systems in Africa). The programme conducts research on how to make irrigation more efficient and is looking for alternative crops that adapt to variable water supplies. The search is on, in countries including Mozambique, South Africa, Ethiopia, Mali and Tunisia. New, private investors from other countries can be drawn into the programme. ‘Through our insights into the management of the river basin and the land use, we can form the cement between the various parties, both between local farmers and investors and between farmers and water managers’, think the Alterra researchers, who are working with local governments, applied science universities and local and international NGOs. One of the field of research is coping with salinization. In a pilot project due to start in Zeeland, Alterra plans to generate knowledge about salinization that could be of use to developing countries. ‘Consider possibilities such as crops that are a little more salt-tolerant, smart water management that anticipates rain showers, and new desalination technology which desalinates water just enough to make it suitable for irrigation’, says Van



PETRA HELLEGERS,

Extraordinary professor of the Economics of Water and Climate Change at Wageningen University

‘We provide hard data about the price, costs and value of water.’

den Bosch. ‘There is a lot more scope for agriculture to adjust to problems such as salinization, making adaptation to new conditions possible.’

In the long term, Hellegers expects a lot from new technology too. For example, the technology developed by the Environmental Technology chair group at Wageningen University and technological institute Wetsus, where research is done on sustainable water technology. An example is the development of energy-saving desalination techniques. ‘If cheap energy becomes available, water can be harvested cheaply, transported and purified’, says Hellegers. ‘It is not yet feasible to use desalinated water for staple food production. In the future, it will depend on the crop prices, energy prices and technical innovation.’

Desalination now costs 50 dollar cents per cubic metre of water, cheap enough for use for drinking water or in industry. Hellegers has done the sums: ‘Before desalination is viable for rice farming, for example, the price will have to go down below 0.15 dollars per cubic metre.’

‘If we have access to cheap energy, the world’s water problems can partially be solved. Until that time, food production will continue to shift to areas where farmers have access to fresh water.’

Andriessie thinks that the claims in these areas can at least be made more visible through objective, economically sound data, and this makes for smoother negotiations about water. ‘With this knowledge fewer irrigation projects will have to fail like they did in the nineteen eighties and nineties due to poor water management.’ ■

More mushroom in the jar

Wageningen UR Food & Biobased Research studied a factory belong to Lutèce, a company that bottles mushrooms. This led to a new production process that is both cheaper and more environmentally friendly. TEXT ASTRID SMIT PHOTOGRAPHY LUTÈCE



When you fry mushrooms, they shrink. The same thing happens in the factory. Almost thirty percent of the mushroom evaporates, in a manner of speaking. And that is a lot, especially if you are bottling mushrooms on a large scale, as the Limburg company Lutèce has been doing for more than a century. Of the 100 million kilos processed every year, roughly 70 million kilos end up in the jars. So Lutèce wanted some research done, to see whether more of the mushroom could be kept after processing. ‘We were due to replace a number of our machines and we wanted to know whether we could strike a blow for efficiency at the same time’, says Eddy Teernstra, director of operations at Lutèce’s biggest factory, in Velden.

In 2007, Lutèce asked Jan Broeze and Miriam Quateart at Wageningen UR Food & Biobased Research to examine the whole production process at the factory, to delve into the scientific literature on each part of the process, and to sit down with eight production staff members and process technologists to document their experiences. This

was a special assignment for Food & Biobased Research. ‘Normally we study one component of a food processing system, experiment with it in our lab, and then give advice’, says Broeze. ‘This time we had to look at the process as a whole and come up with an analysis of its strengths and weaknesses. The discussions with the people on the work floor were particularly useful, giving us a good overview of the production process.’

WATER CHANNELS

The results are impressive. Broeze and Quateart advised the company to keep part of the process the way it was, but to change other parts radically. Lutèce would be better off transporting the newly blanched, still steaming mushrooms through the factory in water-filled tubes than on open, dry conveyor belts. This entailed an investment of two million euros, but Lutèce had recouped that in just one year. ‘Sometimes advisors paint too rosy a picture of the changes they suggest but this time it was the other way round. The returns were even higher than expected’, says Teernstra.

This leaves two to three percent more of the mushrooms over after the bottling process. But these investments also reduced the energy bill and the tax bill from the water board. The waste water at the Velden factory is a good deal cleaner now. With the new production process, in full swing since 2010, there is less leaching from the mushrooms. ‘This has brought the waste water tax down by 20 percent’, says Teernstra. ■

‘The returns were even higher than expected’





Footing the nature bill

Everyone benefits from nature. With the Dutch government making budget cuts, other parties may have to help foot the bill for the Netherlands' nature areas. But can nature do without government support? TEXT ARNO VAN 'T HOOG ILLUSTRATION DEBORAH VAN DER SCHAAF PHOTOGRAPHY JACQUELINE DE HAAS

The Dutch Secretary of State for Nature, Henk Bleker, wants to cut the budget for nature policy by 60 percent, which comes to about 300 million euros per year. If his plan is approved by parliament, Dutch nature areas will be in trouble. Yet both the general public and the business sector benefit from nature through the 'ecosystem services' it provides. So maybe they should pay for these services.

'Although I think nature conservation is the government's job, I hope that the current funding climate will contribute to getting people to think in terms of ecosystem services', says Dolf de Groot of the Environmental Systems Analysis chair group at Wageningen University, part of Wageningen UR. At the beginning of October, together with Leon Braat of Alterra, another part of Wageningen UR, De Groot organized the fourth International Conference on Ecosystem Services. These services include production services (e.g. food and wood), regulatory services (e.g. water and air purification, climate adaptation), social services (leisure and health) and support services (recycling, biodiversity). And the first three kinds of service on this list depend on the last one.

'You can show with hard economic data what the return is

on investments in nature, and what the loss of nature costs', says De Groot. A classic example is New York's drinking water supply. In the early nineteen nineties, the city faced a need to expand its water purification plants massively to cope with river pollution. Instead, large tracts of land on river banks were bought up and turned into nature areas. Farmers were subsidized to process manure. According to the bookkeepers, these measures saved New York billions of dollars. Investing in purification techniques would have cost four times as much as the investments made in ecosystem services.

PAYING FOR LOSS

De Groot hopes that the Netherlands will really start treating the use of nature as part of the economy. 'Now we all pay for the loss of ecosystem services through our taxes, due to the costs of dealing with soil and water pollution, erosion or nature degradation. It would be much better to spend that money on nature conservation and sustainable enterprise: that creates big savings and it makes the world a good deal more beautiful and more sustainable.'

If the general public and private companies benefit from ecosystem services, does that mean that nature can >

thrive without government support? De Groot: 'It is good for stakeholders to help cover the costs, but it should not go so far that the government withdraws completely. Maintaining many ecosystem services – air, water and biodiversity – is a job for the government, just like street lights. Other sectors, such as leisure or fisheries, could be drawn in more; it is fair enough for them to help fund their source of income.'

De Groot conducted a pilot study for the Dutch branch of the Worldwide Fund for Nature on the future of the Haringvliet dam, which will celebrate its 50th anniversary in 2020. 'Removing the dam could give the Dutch economy half a billion euros a year, through improved fishing catches, better water and air quality and a shipping channel.' The costs of raising dikes and dealing with salinization and changes in agriculture could easily be covered in the long term, says De Groot.

According to Fred Tonnejck, senior consultant at Triple E knowledge centre, studies have shown both the strengths and the weaknesses of analysing ecosystem services.

'Much research still has nothing to do with the real econ-

omy. Because just indicating that something is of value doesn't give you the whole economic picture. What researchers say is: the Ecological Main Structure delivers 6 billion in benefits. Okay, but that bit of arithmetic doesn't solve Bleker's budgeting problems because out of all those billions, not a single euro comes his way. We still haven't found a way of closing the cycle when it comes to the flow of money around nature. You have to find ways of linking the costs of nature with the benefits.'

CATERING BRANCH BENEFITS

But this makes the question whether nature can do without government support rather an academic one. 'You can work towards less government support, but the government itself is a beneficiary of ecosystem services and should therefore reinvest some of its profits in nature.' So some government money will always go to nature, for example through tax revenues which cover benefits from ecosystem services. 'We know that the turnover of catering outlets in nature areas is 30 percent higher on average. Houses in green areas are worth more. So is it



DOLF DE GROOT,
Associate professor, Environmental
Systems Analysis, Wageningen University

'The leisure sector could certainly help fund its source of income'



FRED TONNEIJCK,
Senior advisor
Triple E

'That bit of arithmetic doesn't solve Bleker's budgeting problems'



WILLEM FERWERDA,
Executive director
IUCN Netherlands

'You should talk to companies about their dependence on nature'

such a crazy idea to syphon some of those earnings back into nature, through VAT or property tax, for example?

According to Tonneijck, there are some real examples of success in making some money from ecosystem services. Rotterdam municipal council has opted for rooftops planted with vegetation, which can absorb peak rainfall. The water board and the council are the beneficiaries, so they help pay for the roofs.

To Frank Berendse, professor of Nature Management and Plant Ecology at Wageningen University, the idea of nature managing without government support is the product of 'a strange perspective'. 'My answer to that suggestion is a resounding 'no'. Nature conservation, just like health care provision, is a responsibility of the state. It is the government's primary task to make sure that the plant and animal species in the Netherlands are still there in future.' Biodiversity, clean air and clean water are public goods, says Berendse. 'They are core values in our civilization; it's comparable to the way the state combats child labour and poverty.'

According to Berendse, the government has a moral ob-

ligation to create a sustainable future. 'Justifying nature conservation by putting a price on ecosystem services is no substitute for that ethical motivation.'

Funding for nature should be raised through taxes, whether general or specific, says Berendse. He has nothing against introducing new taxes through which private individuals and companies help pay for the nature they benefit from. 'But arrangements with companies must not just be casual 'green deals'. Someone should continuously monitor the effects of use. You can certainly get leisure-seekers to pay something for their use of nature, but if that use causes damage, you must intervene.'

LOOKS GOOD ON PAPER

But Tia Hermans sees real potential for less government interference. 'Nature cannot manage without subsidies on the short term, but in the long term we could get a long way.' Hermans is senior researcher at Alterra, and does a lot of work for the ministry of Economic Affairs, Agriculture and Innovation on projects in the field of >



TIA HERMANS,
Head of Spatial
Dynamics group, Alterra

'We've got to be much more creative and approach other parties more'



FRANK BERENDSE,
Professor of Nature Management and
Plant Ecology, Wageningen University

'Nature conservation, like health care provision, is a responsibility of the state'



‘Donating to a seal nursery is a nice form of charity’

nature, landscape and rural development. Like Tonneijck, she mentions the problem that much research on ecosystem services to date looks good on paper but does not get the money rolling. According to Hermans, researchers should also seek far more collaboration with the business world so as to learn to think outside their agriculture, biodiversity and landscape boxes. ‘If fashion and design are important in a region, then you could link up with the creative sector to look at the production of sustainable fibres and fabrics, then at landscape use and the cultivation of a crop such as hemp, or the production of sheep’s wool.’ These days, researchers working on nature and agriculture are expected to have skills that go way beyond just analysing and writing reports, says Hermans. ‘We’ve got to become a lot more creative and approach other parties to think along with us. That also means that you no longer have to come up with the really innovative solutions all by yourself.’

Willem Ferwerda, director of the Dutch branch of the IUCN, agrees that a lot of ideas could be generated in consultation with the business world. ‘Scientists and NGOs should stop saying that we cannot develop any tools for charging people for ecosystem services. We’ve heard enough of that. We’ve got the big picture now, and we know the figures.’

CORAL REEF SERVICES

The economic value of ecosystems is quite easy to calculate in most cases, in Ferwerda’s view. ‘One hectare of coral reef, for example, delivers 100,000 euros a year in various services, including fish and protection from coastal erosion. If you count tourism you can add a million euros to that amount.’ The figures are also known for the loss of ecosystem services due to loss of biodiversity – an important gauge. The first TEEB study (The Economics of Ecosystems and Biodiversity), led by TEEB chair Pavan Sukhdev, calculated that global loss of biodi-

versity and ecosystems caused damage to the tune of 3,000 billion euros per year, says Ferwerda.

‘The question is: how do you put that on the balance sheet? It means talking to companies. About their impact on the environment, and also about their dependence on nature. Of course it is easier to make that clear for an agricultural business than it is for a high-tech enterprise that manufactures telephones. But it is possible in both cases.’

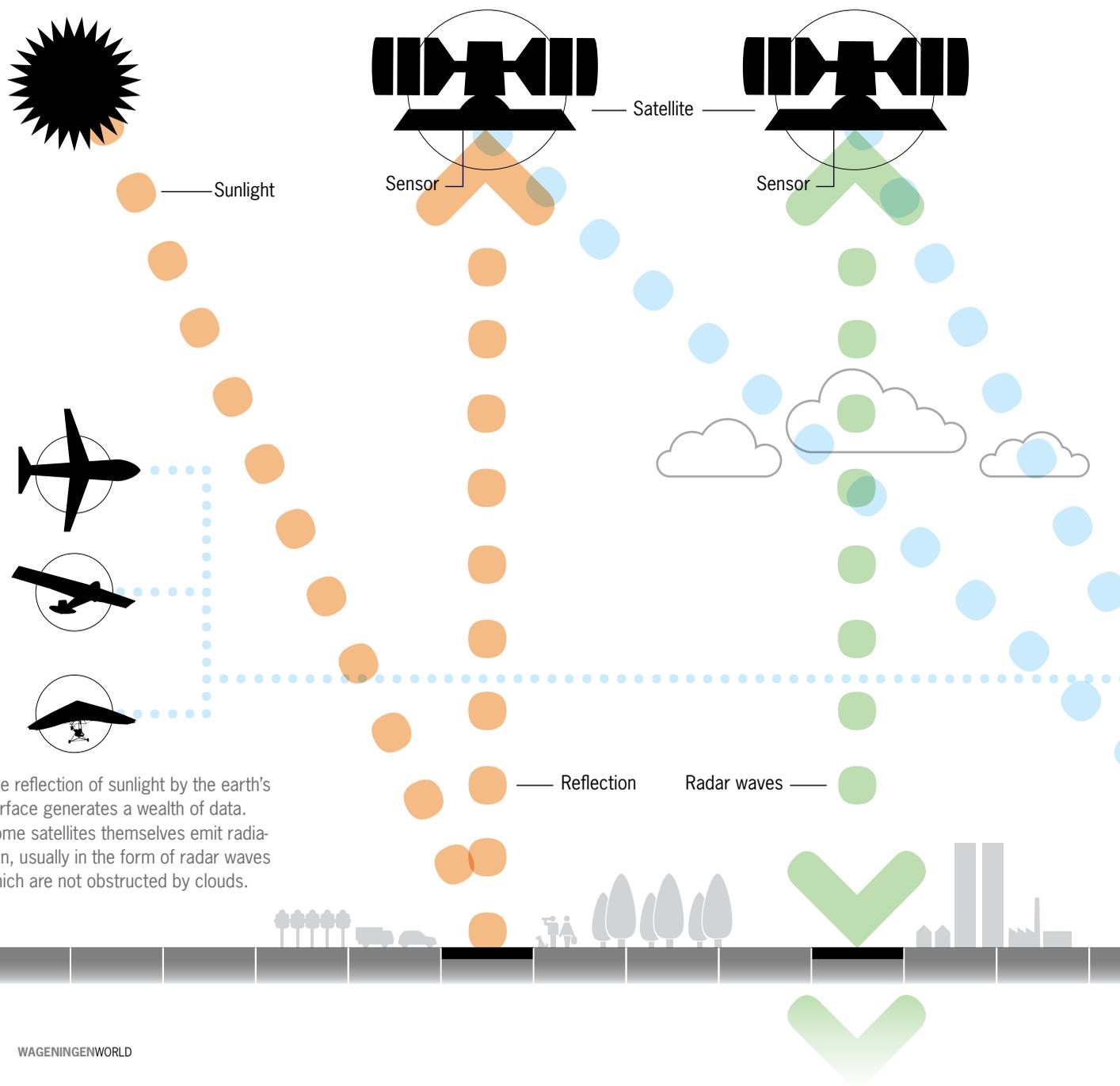
Only if you see government support purely in terms of subsidies might it be possible for nature to do without it, thinks Ferwerda. ‘But I think the government should do a lot more to ensure we have a robust green infrastructure, just as it does for the hard infrastructure of roads and harbours. Because the two are utterly dependent on each other.’

The suggestion that if the government drops out, citizens should save nature through donations to nature organizations, does not do justice to the seriousness of the problem, says Ferwerda. ‘It has been clear for a long time that standing up for nature and biodiversity is no longer the task of nature conservation organizations alone. Making a donation to a seal nursery is a nice form of charity, but keeping ecosystems going is essential for our survival.’

De Groot, from the Environmental System Analysis chair group, thinks governments should provide laws and regulations that stimulate an appreciation of ecosystem services. In this regard, he points to a grave lack of economic thinking. For example, spending on nature is persistently seen as costs, while spending on roads is called investments. De Groot: ‘That is why a short-sighted government imposes heavy cuts on spending on nature conservation. If you are honest about all the benefits of the Ecological Main Structure, they outweigh the costs. Nature conservation should be seen as an investment too. The mindset with which the government looks at nature must change.’ ■

Eyes everywhere

Precise equipment and modern computers have turned remote sensing into a discipline that is making a massive contribution to the earth sciences. Now we have entered a new era, in which it can be a catalyst for public participation. TEXT NIENKE BEINTEMA ILLUSTRATION JENNY VAN DRIEL



The reflection of sunlight by the earth's surface generates a wealth of data. Some satellites themselves emit radiation, usually in the form of radar waves which are not obstructed by clouds.

There is not a corner of the earth that has escaped the attentions of remote sensing equipment. Radar installations, aeroplanes and satellites monitor tracts of land and water down to the last square metre. They record, they measure and they compare, enabling researchers to keep track of how the earth is doing. Where forests are disappearing, where deserts are spreading, where glaciers are melting, and even where single-cell organisms are accumulating in the ocean. ‘Scientists have been keeping an eye on the earth’s surface for a couple of centuries, of course, from air balloons and aeroplanes’, says Martin Herold, professor of Remote Sensing at Wageningen University, part of Wageningen UR. ‘But nowadays we can see things in far more detail and collect better quantitative data.’ For example, special software makes it possible to compare digital aerial photos from year to year. Satellites also register the wavelengths of the light that bounces off the earth’s surface. They look at the whole spectrum from infrared to ultraviolet. From the pattern of the peaks in that spectrum, scientists can deduce what is grassland, what is desert and what is forest. ‘And if you add radar data to that too, it gives you additional information about things like the height, the three-dimensional structure and the biomass of a forest’, says Herold. ‘Then you can see whether it is an old, well-established rainforest or a homogeneous oil plantation.’

GOOGLE EARTH

‘The main application of remote sensing is for policy support’, says Herold. ‘If you want to do something about deforestation or cli-

mate change, or if you want to formulate a policy on urbanization or land use, then you need to register the changes over time. But especially in developing countries, such data are impossible to collect on the ground. They are too complex and too large-scale for that.’ As an example Herold sites the global REDD project: Reducing Emissions from Deforestation and forest Degradation. ‘Felling rainforest speeds up the release of carbon into the atmosphere’, explains the professor. ‘In the framework of the climate treaty, countries therefore want to combat

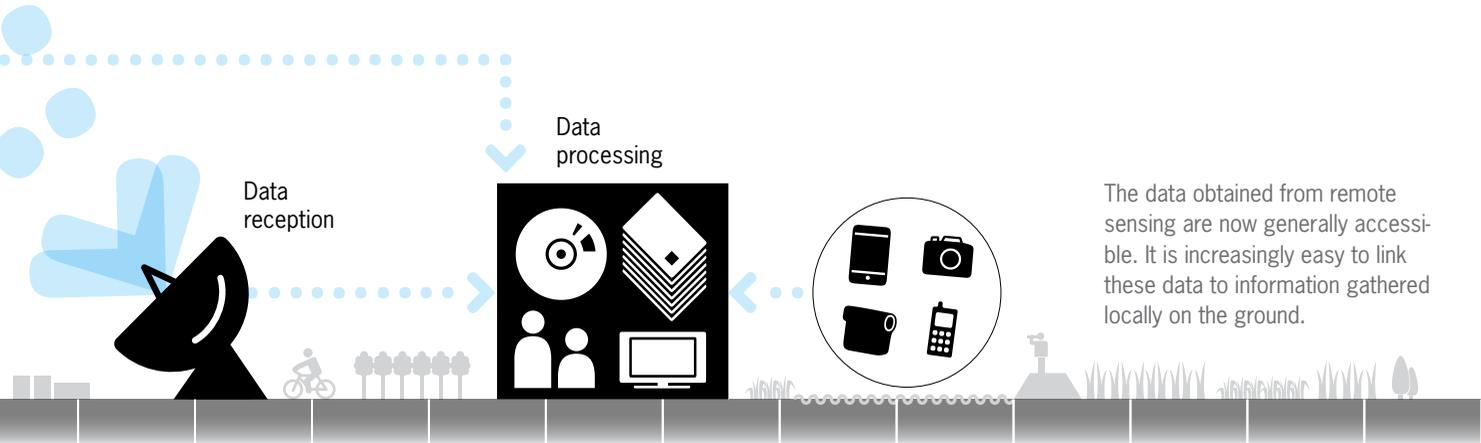
‘Technology is no longer just in the hands of experts’

deforestation. REDD projects are springing up all over the world. Remote sensing is indispensable for them: you want to get a picture of the situation and monitor whether measures are effective.’ The first satellite data were collected in the nineteen sixties, but only with the arrival of more precise measuring apparatus and modern computers for data processing, roughly 20 years later, did remote sensing begin to make a real contribution to the earth sciences. The entire surface of the earth is now monitored, with brief interruptions, the resolution has been improved and modern satellites measure the spectrum of the light reflected off the earth’s surface more precisely. ‘Another thing that has been improved is data

policy’, adds Herold. ‘Formerly, the data were not widely accessible and it was expensive to access them. Now everyone has free access to this constant data flow. Not only can people look at the data, but they can also use them for calculations or, for example, for making maps. Through Google Earth these are then available all over the world.’

FUKUSHIMA

A whole new era has begun, announces Herold with enthusiasm: that of ‘remote sensing 2.0’. ‘Thanks to the internet and modern software, we can very easily link the data we collect with data that people collect locally, on land use, biodiversity, urbanization and the environment, for example’, he says. ‘Like this you give new meaning to fairly abstract remote sensing data.’ Herold waxes almost philosophical once he gets onto the topic of the significance of this development. ‘Technology and what comes out of it is no longer just in the hands of experts’, he says. ‘Remote sensing is changing the way science and society influence each other.’ As an example, he mentions the recent nuclear disaster in Fukushima, Japan, when a stream of recorded observations circulated through the social media. These observations not only enhanced remote sensing data, but they steered it in certain directions, giving scientists a better idea of what they should be looking at. ‘That interaction will only increase in the future’, thinks Herold. And precisely this approach, using remote sensing as a link between science and society, is Wageningen’s strong point, he believes. ‘Remote sensing can be a catalyst for public participation.’ ■



The data obtained from remote sensing are now generally accessible. It is increasingly easy to link these data to information gathered locally on the ground.

Science means business

Research in the Netherlands should focus more on what the business world wants. That will produce more usable knowledge for which companies will dig deeper into their pockets – or so the cabinet believes. There are doubts as to whether it will really work this way. And as to whether the business world has cash to spare for fundamental research. TEXT RIK NIJLAND ILLUSTRATION RHONALD BLOMMESTIJN

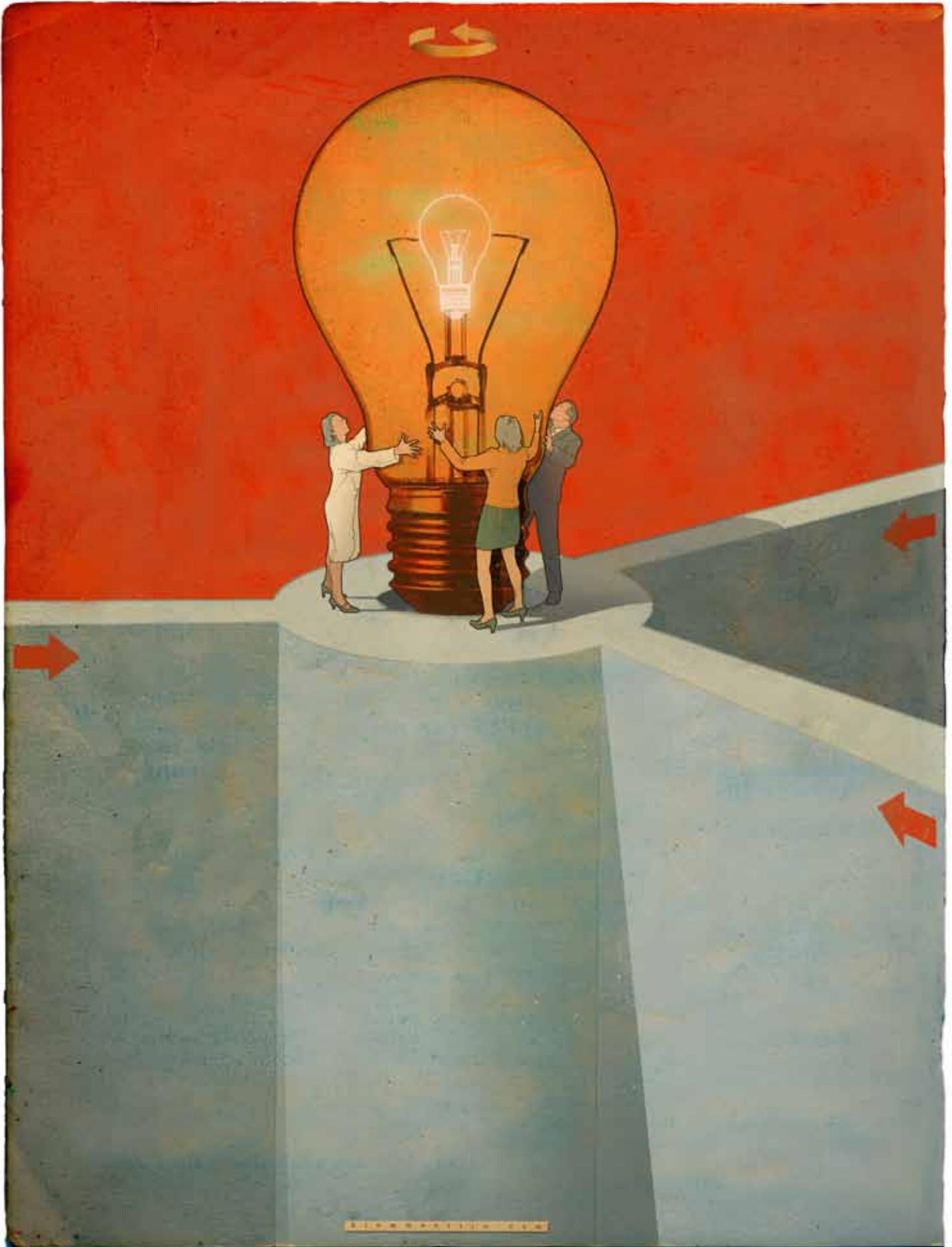
It's a match made in heaven. Science and business. At least, that is the hope of the Dutch minister of Economic Affairs, Agriculture and Innovation Maxim Verhagen. Science and the business world are to join forces to strengthen the Dutch knowledge infrastructure. New knowledge will then more quickly be put to work in innovative products and services. 'Wageningen is a shining example', said Verhagen during the opening of the academic year in September. 'The way you go about things here is actually a polder model for knowledge and innovation', said the minister, referring to the Dutch consensus-based model of collaboration thought to have evolved over centuries of land reclamation. Nowhere, said Verhagen, has the collaboration between knowledge institutions, government and business – the 'golden triangle' – flourished as it does in Wageningen. Verhagen's enthusiasm is based on the well-established and thriving public-private partnerships (PPPs) between the business world and Wageningen UR. On numerous fronts, chair groups and especially research institutes are joining forces with private parties. They have the money to spare to plug a gap in knowledge or to solve a technical problem. But the collaboration also extends to basic, precompetitive research such as the work on the genetic passport of the potato or molecular research on the tomato at the CBSG (Centre for BioSystems Genomics), a PPP and Centre of Excellence. 'In Wageningen we already know this trick, and we are used to collaborating with companies', says Ernst van den Ende, general director of the Plant Sciences Group

at Wageningen UR. 'Because of that, we are 2-0 ahead of sectors which are not familiar with the process yet.' And that is a valuable head start, because Verhagen wants to make PPPs the cornerstone of his policy. His aim for science policy is for the business world to take over the reins from the government.

MATCHING SUPPLY AND DEMAND

From now on, companies are invited to state their ambitions and the knowledge they need to achieve them; then the knowledge institutions can get to work. But those who take the lead must also dip into their pockets. Only once the business world has shown its commitment will the government follow suit. On the long term, for every 100 euros companies put on the table, the government will contribute 150 euros. The science budgets of the ministries of Economic Affairs, Agriculture and Innovation and of Education and Science, which includes the science organization NWO, have been pooled by the cabinet, and may be spent on nine 'top sectors': Agrifood, Horticulture and Propagation Materials, Water, Chemistry, Energy, the Creative Industries, Life Sciences, Logistics and High-tech.

Within each top sector a top team has set to work to match the wishes of the business world with the research on offer. In each sector, this is intended to lead to one or more innovation contracts, which should come through the ministry's letterbox in The Hague by the end of December. These contracts will make >



clear what is going to be researched in the next few years, and by which institutes and universities.

'Two of the top sectors are entirely within the green domain. Never before have we had the luxury of a Dutch government that so expressly supports our sector', says Van den Ende, member of the top team on Horticulture and Propagation Materials. 'That is a real opportunity. Of course, from the government side it is mainly a question of moving budget allocations around, but without 'our' two top sectors, we would certainly have lost some funding sources.'

FORTY THOUSAND ENTREPRENEURS

Yet Van den Ende does see the downsides too. 'This operation is being launched because it is in the government's interests to put the business world at the helm and get it to cough up 40 percent of the funding. There is a lot of tough talk about it but it remains to be seen whether the money is really forthcoming, and whether it has to be in cash or can also be a contribution in kind or in labour. This is not yet clear.' Inadequate organization on the part of companies could also throw a spanner in the works, thinks Van den Ende. 'Take Horticulture and Propagation Materials. The term 'propagation materials' covers the big plant-breeding companies, which are used to investing in research and innovation. Many of the PPPs involving them can be continued without much effort, I think.' But it won't work like that in the horticulture branch, foresees the PSG director. This sector is a conglomerate of about 40,000 small and medium entrepreneurs with a wide range of interests. Van den Ende: 'At present there is still the product board, which raises funding for innovation, but that is being severely cut. If it no longer plays that role, then I think it will be hard to create a new form of collectivism and people's own interests are going to prevail.' And that makes it difficult to reach agreements on innovative research. This will be an even bigger problem in agriculture, which comes under



the Agrifood top sector, according to Van den Ende's predictions. 'There is much less of a tradition of investing in collective innovation there than there is in horticulture.'

So what will become of the committed researchers of Wageningen UR, in research institutes for example, if little or no commitment is forthcoming from the business world in their sector? Will they be out on the street, and will their expertise be lost? 'That is just speculation', thinks Van den Ende. 'If there is no match with the business world then the superfluous research capacity will probably be used in some other way. How? That is up to the government: it has DLO's capacity at its disposal. Meanwhile, there is talk of social research questions – government questions in other words – being allowed to be part of the innovation contract after all. If the business world doesn't want to make any use of the existing research capacity, then maybe it can be used to address a problem in, say, nature policy.'

BASIC RESEARCH

Francine Govers is not sure what the new policy will bring her either. Govers is professor of Phytopathology at Wageningen University, part of Wageningen UR, and also programme director at the CBSG, the Centre for BioSystems Genomics. The current funding source, nat-

HAND IN HAND

Wageningen UR collaborates on tens of projects with companies and other partners, on a wide range of research topics. One of the many examples of this kind of public-private partnership is the *Greenhouse as energy source* project. The aim here is a massive reduction in the use of fossil fuel energy. By

2020, the Dutch greenhouse horticulture sector should become a supplier of heat and electricity.

Meanwhile, the partners in *Biobased Performance Materials* are working to develop applications for biomaterials to replace plastic produced from oil.

The *Cows with better quality milk* project

aims at making DNA solutions usable for breeding cows that produce certain types of milk, for example milk containing more unsaturated fatty acids. And then there is the *Coast Laboratory*, which studies ways of combining agriculture, sustainable fisheries, coastal conservation and beautiful nature.

ural gas revenues, is due to dry up in 2012. The CBSG, which does a lot of basic, precompetitive research with a great deal of input from Wageningen, is then supposed to slot into the new policy of minister Verhagen.

‘We have mainly potato and plant-breeding companies as partners’, explains Govers. ‘Their financial contribution is around 10 percent, much less than the 40 percent asked for in the top sectors. Are companies going to cough up that whole amount? And if not, where is the money going to come from? Not from the NWO, I am afraid, because that organization already has too little money and what it has is earmarked.’

So Govers is afraid that the CBSG may be a victim of the new policy. With a contribution of 40 percent, the business world will probably be strongly inclined to invest in research that leads quickly to solutions, she expects, and not in the fundamental research which most of her PhD students and Postdocs are working on. ‘If our funding disappears, so will the flow of new insights which applied scientists build on, for example in relation to resistance to disease, or taste in tomatoes. And our output of well-trained scientists who can go on to work for companies will also dry up’, says Govers. ‘The CBSG received a positive evaluation, both for applications and valorization, and for scientific output. It would be a great shame if we had to give that up.’

Govers is convinced that the wishes of practitioners should be carefully listened too, but that there should also be some space to steer one’s own course. ‘I myself am working on the cause of the potato disease *Phytophthora*. That has no direct connection with the work of breeding companies. Traditionally, they concentrate on the plant and on breeding resistant species, and not on the pathogen. That companies now know how to break down resistance and what to look out for in the breeding process is thanks to our fundamental research on the pathogen. But would they have wanted to finance it at the time?’

NOT ROLLING IN IT

One thing is clear: Govers need not hold her cap out to research manager Peter Bruinenberg of potato starch company Avebe. ‘The potato sector is not rolling in money. The contribution to the CBSG has sometimes been a little more than the current 10 percent, but it turned out we couldn’t keep that up, let alone provide 40 percent of the funding. Partly due to the CBSG’s results, we at Avebe have invested extra in our own laboratory, in order to do more research, but we can only spend that money once. What is more, other top sectors such as chemistry are tugging at us too’, says Bruinenberg. ‘I predict that the focus is going to shift from precompetitive to applied research,

THE CONSEQUENCES FOR WAGENINGEN UR

Minister Verhagen wants to make public-private partnerships (PPPs) the cornerstone of his policy. This emphasis particularly affects the research institutes at Wageningen UR, explains Frank Bakema, head of the strategy section at Wageningen UR. ‘A major proportion of the government funding they receive is now being tied by the ministry of Economic Affairs, Agriculture and Innovation (EL&I) to the top sectors, nine key spearheads of our national economy. That research, worth 51 million euros last year, can only be continued if money is pumped into it by the business world as well’, says Bakema.

There are exceptions, he says. These include Alterra’s research on nature, landscape and biodiversity; the statutory research assignments that RIKILT carries out on food safety and that the Central Veterinary Institute does on animal health; research at the Dutch Centre for Genetic Resources; and research on fish stocks at IMARES. The core funding of the chair groups at Wageningen University is not affected by the plans. It is however the case that many PhD students and Postdocs take part in research projects that come under the top sectors.

‘In Wageningen we already know this trick, we are used to collaborating with companies’

and I am worried about that.’

Hans Dons, director of Bioseeds BV and professor of Entrepreneurship in the Life Sciences at Wageningen University, is uneasy too. ‘I think we could contribute 40 percent to strategic and applied research, but you can’t expect us to invest heavily in fundamental research. We in the seed sector are very happy with the high standard of the Dutch knowledge infrastructure. Fundamental research driven by scientific curiosity is absolutely essential to that, but you can’t make the business world responsible for it’, says Dons.

Moreover, he reckons it will be no easy task to get the business world in the driving seat in science. ‘I would expect that the research directors in companies will want to keep their cards close to their chests, with the competition in mind. They will wait and see. But within the knowledge institutions, people are bursting with ideas they want to put into action. It will be very important to establish the research agenda together.’ ■

HULLABALOO IN THE KITCHEN AT THE ZOO

No apples for tubby monkeys

Many apes get too much fruit; giraffes and okapis are often fed as if they were cows. Zookeepers' knowledge of animal nutrition is sometimes outdated. Van Hall Larenstein, part of Wageningen UR, developed a course for them.

TEXT ALEXANDRA BRANDERHORST PHOTOGRAPHY ANP

Fruit is healthy. One piece of fruit is good, two pieces of fruit are good, and so twenty pieces of fruit must be good too. That is often how the thinking goes, when it comes to feeding monkeys and great apes. 'Primates in zoos often get fruit all day long. But our cultivated fruits are very sweet. Most wild fruit contains much less sugar and more fibre; comparable with vegetables here', says Anouk Fens. For her graduate research project on the Animal Management programme at Van Hall Larenstein (VHL) university of applied sciences, Fens and a fellow student studied the diet of the golden-headed lion tamarin, a Brazilian species of monkey which is seri-

ously endangered. For this reason there is a European breeding programme for the species, but among the golden-headed lion tamarins in Antwerp zoo there were many stillbirths as a result of overweight. Overweight leads to large babies and a bigger risk of death during delivery for both baby and mother. The main reason lies in a diet with too much sugar: the tamarins' pellets were even being laced with rose hip syrup. Yet the VHL students' recommendations were not immediately taken to heart, says Fens, who is now on a Master's programme in Animal Sciences in Wageningen. Fens: 'As long as people on the job do not under-

stand why they shouldn't give something to 'their' animal, or why they should weigh an apple, it will still be difficult.'

NOT ALL COWS

This experience illustrates how slowly knowledge about animal nutrition finds its way into standard practice. This bothered Tjalling Huisman, who teaches Animal Nutrition at VHL. 'The attention paid to the diet of zoo animals in courses on animal management ranged from little to nothing. What is more, a lot of new insights have been gained in the last couple of decades', says Huisman. One persistent misunderstanding concerns



ruminants. 'For a very long time, the cow was taken as the model for a ruminant's diet, whereas there is a huge variation in the digestive systems of, for instance, deer and antelopes. Many of these animals eat leaves, not grass. This knowledge has been available for a long time, but does not always end up on the work floor. You still see giraffes being fed hay. Actually, there is often no good alternative.'

And what about the importance of vitamin D, made in the body with UVB light, for calcium absorption in reptiles? 'There are UVB lamps hanging up in most zoos, but often at the wrong height. Moreover, the workers often don't know that the lamps lose effec-

tiveness and have to be changed.'

Huisman's plans to offer zookeepers in-service training won the support of the Dutch Zoos Association (NVD) and the European Association of Zoos and Aquaria (EAZA). In 2008, he received funding under the Ministry of Economic Affairs, Agriculture and Innovation's scheme for sharing knowledge and innovation in green educational institutions (KIGO). VHL has already developed a three-day course for zookeepers as well as educational material for use in vocational colleges and applied sciences universities.

Much of the knowledge in the course material came from VHL research. 'Research on

giraffe nutrition, for example, is of no economic interest. And then there are no homogeneous groups in zoos. So, just as in veterinary science, you depend largely on case studies, and they are just the job for applied sciences students', explains Huisman.

SHARK FOOD

VHL students are currently engaged in research on the diets of reindeers and elephants, and the mixes of fish species that are fed to sharks and marine mammals. VHL makes sure the results get into zoo journals and text books, and the students give talks and poster presentations at Dutch and European conferences.

The course for zookeepers has been run three times. 'We brought in the theory and the zookeepers brought in valuable hands-on knowledge and case material. So it went both ways', comments Huisman. The VHL lecturer would like to give the course Europe-wide, with the help of EU funding. A rerun in the Netherlands will be harder to organize without support under the KIGO scheme.

'Our keepers are queuing up for a follow-up course, but time and money are a problem', says Joeke Nijboer, diet expert at Blijdorp Zoo. 'We found that our keepers had too little knowhow about the diets of exotic animals. Thanks to the course they have gained more insight and have a better idea of what the animals need and what they should look out for. This makes communication with the keepers smoother, and information comes to light more easily', thinks Nijboer. 'And in the end the animal benefits from that too.' ■

DEVELOPMENT SCIENTISTS 21 YEARS ON

Conflicts and pomelos in Asia

Both Siebe van Wijk and his 1990s classmate Marco Mezzera are very involved in Asia. Mezzera is a political analyst who has seen with his own eyes the human suffering caused by violent conflicts. Entrepreneur Van Wijk looks for opportunities for his consultancy firm and his fruit export business.

TEXT ALEXANDRA BRANDERHORST PHOTOGRAPHY BART MÜHL AND LORENZO PESCE

I don't see any light at the end of the tunnel for Pakistan at the moment. There are deep-rooted political problems which are hard to resolve. Either there will be an internal implosion leading to another dictatorship, or it will become a safe haven for terrorists.' The speaker is Marco Mezzera, research associate at the Clingendael institute. A Wageningen alumnus, Mezzera has specialized in democratization and security issues in Pakistan and Asia. He explains the complex situation over the phone from Rome. Over the years, Mezzera has become more sceptical about international relations. When he lived and worked in South-East Asia, he saw with his own eyes the misery caused by conflicts in places such as Aceh in Indonesia or Mindanao in the Philippines. 'You talk to people and see their living con-

ditions, in local refugee camps for example. Often these sorts of internal conflicts are preventable, if there is the political will. Economic and power factors play a bigger role than the wellbeing of our fellow human beings. But it is up to us to keep on emphasizing the other, human, side of the story.'

NO CONTROL

Security has been a key theme in the career of Mezzera's classmate Siebe van Wijk too. He is in business in Vietnam, and says, 'In Asia a lot of food products are tampered with in one way or another, from pork or noodles to soya sauce. There is no control, so we lurch from one food scandal to another'. Van Wijk is on the phone too, in this case from Ho Chi Minh City. Together with his wife Irmien Mantingh, who studied Fisheries in Wageningen, Van

Wijk started a consultancy firm called Fresh Studio in 2006, to support companies with sourcing and branding so as to create high quality, safe agricultural products and market them in Asia. For example, the company helps Metro Cash & Carry to source fish and vegetables of consistent quality for their 18 megastores in Vietnam. The company has its own experimental farm and selects and supervises farmers. 'We also support companies wanting to sell seeds, greenhouses or seedlings to farmers, and we give advice

'Vietnam should really have a Wageningen University of its own'



on marketing strategies.'

The Vietnamese branch of Fresh Studio employs 100 people and works with more than 1,000 farmers. Van Wijk also saw opportunities in the fruit trade, including in the export of an outsized citrus fruit called the pomelo. So in 2009, he set up The Fruit Republic. The company already has 150 employees and permanent contracts with 250 farmers. It is the largest fruit export company in Vietnam. When Van Wijk first arrived in the country in 2001, he was staggered by the entrepreneurial spirit he found there.

'The country only started to develop since the nineteen nineties – before that, the government decided what farmers should grow. Everyone was busily working on their own small business. People here have a great sense of responsibility and take a pride in their work. That makes for a pleasant atmosphere in which to live and to work.'

Both Van Wijk and his former classmate Mezzera are real world citizens. Born and bred in Italy, Mezzera studied tropical agriculture in Florence, but found the course >

SIEBE VAN WIJK

Age: 39

Studied: Rural Development Studies 1990 – 1996

Works: as owner-director of consultancy firm Fresh Studio and trading business The Fruit Republic in Vietnam



MARCO MEZZERA

Age: 42

Studied: Rural Development Studies
1990 – 1997

Works: as research associate for
Clingendael, specializing in govern-
ance and democratization in South-
East Asia and Pakistan

there too technical. So, once his Dutch mother had taught him Dutch in three weeks, he transferred to Rural Development Studies in Wageningen. He became particularly interested in the interface between the micro and the macro levels. ‘The problems are often so complex that you cannot really help small farmers if you don’t do anything about the unequal economic relations.’ Mezzera took a course in International Relations in Leiden. This turned out to be a decisive decision for his career, as did an internship in 1996 in the Philippines. There

he got to know his future boss, Walden Bello, who set up the NGO Focus on the Global South.

After working briefly for Novib, at the beginning of 1998 Mezzera left for the Bangkok branch of Focus. His work there included research on the financial crisis in Asia. ‘We studied the role of the international financial system and we looked at how you can stop capital markets from behaving like casinos.’

Mezzera spent five years working for Focus from Bangkok and Singapore on various

WHERE DO DEVELOPMENT SCIENTISTS END UP?

Between 1986 and 2000, almost 400 people graduated in Rural Development Studies (which includes Rural Sociology and Development Economics). There is data on the current employment of half of them. Sixteen are living abroad. About 18 percent are working for international or development organizations; 14 percent work at a university, 11 percent for a technical or consultancy bureau, and another 11 percent for the Dutch government. And 12 percent of all the graduates have their own business or work freelance. *Source: KLV Wageningen Alumni Network*

issues related to human security. In his own words, the key questions were: ‘How do you protect people from financial shocks and from violence, and how do you ensure political stability, peace-building and conflict prevention?’

NURTURING TALENT

Siebe van Wijk’s development connection goes back to his infancy in Kenya. His mother, a Delft graduate, worked on water provision there and his father, a ‘Wageningen’, was a plant breeder. ‘I was always very inspired by the stories in the children’s magazine *Samsam* about people who worked their way out of poverty with their small businesses.’ So after the first year of Development Studies, Van Wijk chose to specialize in Development Economics. In his spare time he was actively involved in the rowing club *Argo*, where he was a coach. ‘Team-building and spotting and nurturing talent are things I do now too. You need to motivate people and make sure they are well-placed to concentrate fully on the things they are good at.’ After graduating in 1997, Van Wijk got a job at LEI, part of Wageningen UR. ‘We used to joke about office-based development workers who do the job from the Netherlands. Now I found myself in their shoes.’ He worked in a multidisciplinary team on improving soil fertility for farmers in East Africa. Then he was asked to do as-

signments in Asia. Once he got to know Vietnam he acquired so many big projects there that he could base himself in Hanoi from 2004. His partner found work there as a consultant in the fisheries sector. ‘You could see how dynamic Vietnam was: a country with only small farmers that climbed from nowhere to be one of the top five exporters of agricultural products.’ But in the end, Van Wijk did not find project work very satisfying. ‘Things would just be getting going and then the project team would fall apart again. I like to build up things that keep going.’ So it was a logical next step to set up a consultancy bureau. In the coming years he wants to expand *Fresh Studio* in other Asian countries. After five years in South-east Asia, Marco Mezzera returned to Europe, where his wife Kim-Anh Tempelman, another Wageningen graduate (in Livestock Science) got a job with the FAO in Rome. Mezzera took on freelance assignments and became a consultant. In 2007 he joined Clingendael and moved to the Netherlands with his family. ‘It was a unique opportunity to work close to the policy world. You can see Clingendael’s input reflected in the policy at Foreign Affairs. While working for the institute he built up an expertise on Pakistan, for which there was increasing demand.

A great deal has changed in his field, says Mezzera, who this year started to work

for Clingendael on a freelance basis, and moved back to Rome. ‘By now, even in developing countries there are a lot of well-educated people. But I do think western sociologists can still help bridge the gap between them and the politicians and science policymakers on their own continent.’ As for the agricultural sector, Mezzera feels there is still a lot to be done there. This view is endorsed by Siebe van Wijk. His great dream – apart from *Argo* winning the Varsity race – is to set up an agricultural university in Vietnam. ‘If you really want to change something, you have to put good institutions in place. A country with so much agricultural potential should have a Wageningen University of its own.’ ■

‘You cannot really help small farmers if you don’t do anything about the unequal economic relations’

GENEROUS DONORS HELP RESEARCHERS

New approach to malaria



Willem Takken shows Daan van Doorn his captive mosquitoes.

With the support of a generous private donor, Willem Takken can now try to make his dream come true. He is going to research a new method of combatting malaria without using chemicals.

TEXT RIK NIJLAND PHOTOGRAPHY JOSJE DEEKENS

In spite of the billions of euros that are thrown at it, the malaria parasite is still public health risk number one in the developing world. It is a humanitarian disaster, says Takken, professor of Entomology at Wageningen University, part of Wageningen UR. The disease claims 850 victims per year, most of them African children. But it also means a loss of working days in malarial regions, affecting food production. Early next year, Takken will depart for the island of Rusinga, in the Kenyan part of Lake Victoria, to test a new approach to keeping the disease under control.

In and around the houses of the 30,000 islanders, odour traps will be set to catch and kill malaria mosquitoes. 'Over the past 15 years we have discovered which odours lure the mosquito to its victim. We use the five main odours in the trap. No doubt we won't catch all mosquitoes with these, but we hope to reduce their numbers to such an extent that the number of malaria cases is decimated, making it manageable for the local health services', says Takken. 'At present the costs are out of control because nearly everybody gets infected.'

BUSINESS BACKING

Current methods of combatting malaria seem to make very little impression on either the mosquito or the parasite, Takken emphasizes. Mosquitos are largely resistant to the insecticides they are sprayed with and nets are impregnated with, while the parasites are responding less and less to antimalarial drugs. But it is not easy to try out a new approach. According to new Dutch government regulations, in order to qualify for a grant for applied research, you must have a contribution from a partner from the business world. And that is the catch. 'It's Africa – can you really earn your money back there? In short, companies are hesitant. What is more, there is no guarantee that our approach will work.' A donation from the COMOn Foundation relieved Takken of all his money worries. 'And you know what the lovely thing about it is: the residents will be getting electricity too. Electricity is needed for the mosquito traps, so solar panels will be installed on all the roofs. That means people can get rid of those smelly, unhealthy paraffin lamps and everyone will have light in their houses in the evenings.' This is partly thanks to Daan van Doorn, chair of the fundraising committee of the Wageningen

Ambassadors, a group of prominent Wageningen alumni. Together with Wageningen UR and the Wageningen University Fund, the ambassadors are working on the Food for Thought campaign, in which individuals and private institutions are asked to help fund research. 'We are heading for a world population of 9 million in 2050', says Van Doorn. 'We need ground-breaking scientific research to enable us to produce more food sustainably'. But scientific breakthroughs take nerve and patience, says Van Doorn, and it is precisely for that sort of research that it is difficult to find funding. 'For this reason, a year ago we started looking for private funding for nine trailblazing and appealing projects. Our aim was to attract 15 million in five years. That's a tough one, I thought, but it is going better than expected: in the first year we shall already top seven million and there is a lot more in the pipeline.'

Van Doorn himself was the matchmaker for Takken's dream research. 'The donor is someone from my network, someone who already knew 'Wageningen' from his former companies, and had a great deal of respect for the organization. What do I do? Well, not so much. I bring people together and try to make sure it clicks.' ■

VISITING THE RESEARCHER

The Wageningen University Fund is organizing the Food for Thought campaign together with Wageningen UR. In the campaign, private individuals and institutions are asked for contributions to cutting-edge research aimed at feeding the growing world population in a sustainable manner. This means tapping into new creativity. The implementation of the research is in the hands of nine selected top researchers. 'We won't solve the world food problem in a couple of years,' says Monique Montenarie, major donor fundraiser at Wageningen UR, 'but our research can serve as a catalyst to get other financiers to take the plunge.' Private donors who contribute at least 25 thousand euros spread over five years are also kept in close touch with the progress of the project of their choice. 'That appeals to donors; they like having a chat with the researcher and visiting the project.'

The brochure Food for Thought, Thought for Food, in which the nine researchers outline their plans, can be found at www.foodforthought.wur.nl/NL/projecten Info: monique.montenarie@wur.nl



"HELP COMBAT FOOD WASTE"

The parliament of alumni votes on proposals for 'How to feed our world?' at the jubilee conference

Thirteen proposals were presented at the KLV's Main Conference, focusing on the jubilee theme: 'How to feed our world?' They varied from setting up cooperatives for Chinese farmers through to replacing international trade barriers by a 'World Food Authority', and from setting up 'agro-hubs' around major cities through to better methods for onward charging of the costs of ecological innovations. These are the results of a year's brainstorming about the many aspects of food production and distribution - subjects that almost everyone associated with Wageningen is involved with, directly or indirectly.



Photo: Guy Ackermans

Wageningen's alumni have spoken. The Main Conference was more than just a conference: it was also a parliamentary 'game'. KLV put together a 'world government' for the occasion, consisting of prominent figures such as Gerda Verburg, Rudy Rabbinge, Sylvia Borren and Harry Smit. The 350 participants in the hall took on the role of a 'world parliament'. There were various rounds of debates, with interruptions and votes on the various proposals. Because, no matter how simple many of the proposals may have sounded, there is a complex discussion hidden beneath the surface. Two proposals were the most popular among the 'world parliament': the proposal from the Africa Agribusiness Academy (AAA) to provide support for businesses in Africa received the most votes in the first round, and in

the second round it was the proposal by the Euro League Student Association (ELSA) and Toine Timmermans (Wageningen UR) for combating food wastage.

Wasted food

A lot of food is wasted during production, transport and distribution, as well as because consumers throw it away. Airen Lugt says, "We should really be looking for a cultural shift, so that people start feeling ashamed of throwing food away."

"Ten per cent of all bananas are thrown away immediately after being harvested," adds Toine Timmermans. "Not because of the taste, nutritional value or quality, but simply because they aren't quite the right size or perfectly curved. Does that really matter so much to us?"

One questioner from the floor asked what

you can actually do about it yourself. Various suggestions were put forward. Eating less meat, so that less animal feed has to be imported from abroad. Buying and selling bread that is a day old. Asking for straight bananas in the supermarket. Getting the distributors to work with food banks or the Salvation Army. "First of all, we need more awareness," says Toine Timmermans. "We're targeting our suggestion not only at consumers, but also at the government. They could give an extra impulse to the change in mind-set through measures for positive and negative stimulation. That worked in the end for the smoking ban."

Extra attention

Over the coming period, KLV will be giving the theme of food wastage a higher priority by putting it on the agenda within its broad network of alumni and partners. As well as food wastage, two further proposals will be given extra attention. KLV wants to support Ethiopia in setting up an Ethiopian alumni network. In addition, KLV is going to make efforts to get business people from its network to support their African colleagues. "The high scores for the two winning proposals have given us an extra impetus to follow them up from within KLV," says Paul den Besten, the director of KLV. "We'll be keeping our members informed: they can follow the process through the KLV media. We'll also be paying a lot of attention to the alumni network in Ethiopia."

If you are interested in the proposals, most of the presentations and clips of the various suggestions can be found on www.klv.nl/en

A call to entrepreneurs who are Wageningen alumni to coach their African colleagues

BUSINESS SUPPORTING EACH OTHER

How to feed our world? One of the proposals that was presented and adopted at the KLV's jubilee conference is addressed to alumni who are entrepreneurs in agriculture and foodstuffs technology. Piet Heemskerck, chairman of the Africa Agribusiness Academy (AAA) and former director of Heineken, says: "We would like to invite these business people to share their knowledge and experience with their African colleagues, helping them to improve their entrepreneurial skills."

How do you build up a brand? How do you ensure constant product quality? How do you find financial backers? What is the best way to write a business plan? Fundamental questions for anyone who is setting up a business. However, it is often awkward for African entrepreneurs - often one-person businesses - to switch to this kind of professional approach.

The Wageningen Ambassadors, eminent alumni from the university, set up the Africa Agribusiness Academy (AAA) two years ago. It is a platform where entrepreneurs can exchange knowledge, experience and best practices. "The AAA focuses on SMEs in the chain, producers, processors and seed suppliers," says Piet Heemskerck. "We put heads together, for example to transfer successful practices from a Kenyan company to one in Tanzania. The successful entrepreneurs will in turn recruit less successful ones to

become members, and then support them. In just one year, we've grown from fifteen participants to sixty."

After consultations with the KLV's director, AAA proposed getting alumni who are entrepreneurs involved. "Why shouldn't we make use of the huge amount of knowledge available from Wageningen?" asks Heemskerck. "We'd like to expand our pool of experts to include alumni with SME experience. We'd like to invite them to support their East African colleagues, in word and deed. And then definitely not just with a one-off piece of advice, but as a coach in a longer-term relationship."



Photo: Africa Agribusiness Academy

More information about the Africa Agribusiness Academy can be found on bit.ly/rGp0XJ

More KLV news you can read in the KLV Update.
Check our website www.klv.nl/en for our online English version.

ACTIVITIES

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

2011

14 December

SKOV

Seminar: Small holder versus large scale agriculture in Africa

15 December

KLV and Startlife
Businesscafé

16 -31 December

KLV closed

2012

19 January

KLV and Startlife
Business Cafe

24 January

Young KLV
Course: CV writing

8 February

Young KLV
Training: Speed

16 February

KLV and Startlife
Business Cafe

28 February

Young KLV
Course: CV writing



WANT TO BECOME A MEMBER?
Go to <http://bit.ly/membershipKLV>



PHOTOS: HARMEN DE JONG

‘You are what you eat’

Diet affects how our genes function. That was the message Michael Müller, professor of Nutrigenomics, had for his audience at an alumni conference on genetics and nutrition, mid-October in Leiden.

The conference at Leiden BioSciencePark was attended by around 70 alumni. The focus was on what scientists and companies can do with modern DNA technology. Which is rather a lot, as it turned out. The machines that analyse the DNA of organisms – so-called sequencers – are already so advanced that the Leiden company ServiceXS (founded by the Wageningen alumnus Wilbert van Workum) is able to decipher an entire human genome in a fortnight. Just ten years ago, this was still taking scientists fifteen years. ‘The technology is developing very fast. The DNA sequencer we have just bought will virtually be obsolete in two years’ time’, says Van Workum. Medical science is benefiting from this rapid progress. It is increasingly easy for doctors to track down diseases caused by flaws in the genes. But the nutritional sciences are also taking advantage of the new possibilities. Michael Müller, professor of Nutrigenomics at Wageningen University, part of Wageningen UR: ‘For

example, we can now follow simultaneously all 20 thousand genes making up the human genome in a specific cell in the body.’ Müller uses the technology mainly to find out exactly what diet does to those genes. ‘We now know that our diet affects the fine-tuning of those genes. It is one of the factors determining which genes in a cell are read and which proteins and metabolites the cell produces. A diet with lots of saturated fat leads to different proteins from a diet with olive oil.’ Nutrition leaves traces in our genome and as a result in our cells, says Müller. ‘You are what you eat and have eaten.’ When the talks finished, the alumni had an opportunity to network while enjoying soup and rolls. The deep-fried croquettes were noticeably unpopular, though.

Alumni conferences are organized by Alumni & Funds, Wageningen University and KLV Wageningen Alumni Network. www.wageningenalumniportal.nl/en

FUNDS

Legacy for research on potato resistance

Alumnus Cees Mastenbroek left more than 11,000 euros to the Wageningen University Fund. The money is earmarked for research that continues his own work on how to make potatoes resistant to *Phytophthora*.

Cees Mastenbroek studied at the Agricultural Plant Breeding faculty, graduated in 1942 and was for many years the director of CEBECO, a company specialized in plant breeding for cereals. In 1953 he and W. Black developed the ‘Mastenbroek set’: a set of resistance genes able to resist the potato disease *Phytophthora*. The set is still in use and Mastenbroek’s research is frequently cited to this day. Mastenbroek remained a member of the Plant Breeding Study Group right up until 2010. He died

in February this year, aged 93.

The WUF will be using Mastenbroek’s legacy for research within the Plant Breeding group on sustainable resistance to *Phytophthora* that builds on the ‘Mastenbroek set’. The researchers want to gain a better understanding of the sustainability of resistance genes and mutual interactions in cases of accumulation.

Info: monique.montenarie@wur.nl



WAGENINGEN WORLD

Wageningen in the world



'Alberta is sixteen times bigger than the Netherlands. It is really difficult to organize anything because we live so far apart', emails Sandra Dakurah-Baijards, who has started up an alumni group in Alberta. Last February five Wageningers met up in Olds, north of Calgary. On the photo, from left to right, are Rajesh Jha (Animal Science, graduated 2006), Miranda Smit (Animal Science, 2007), Sandra Dakurah-Baijards (Environmental Protection, 1994), Anke Wellen (Animal Science, 2005) and Gijs van Rooijen (Molecular Sciences, 1988). 'We talk about the good old days in Wageningen, what we are doing now and all kinds of other things. It is just nice to meet people who also studied in Wageningen', writes Dakurah-Baijards. Soon they will be meeting up again, probably in Red Deer, between Edmonton and Calgary. Do you live in Alberta (or Canada) and would you like to join them? Then send an email to Sandra Dakurah-Baijards: sandaku@telus.net

**Are you also reading this magazine a long way from Wageningen?
Mail your photographic evidence to wageningen.world@wur.nl**

DECORATION

Decoration for Anne van den Ban

Prof. Anne van den Ban was made an Officer in the Order of Oranje-Nassau on 15 September. He received the Royal decoration from the mayor of Wageningen, Geert van Rumund, on the occasion of the awarding of the 200th scholarship offered by the Anne van den Ban Fund.

Van den Ban is a co-founder and active board member of the Anne van den Ban Fund. This fund has been giving financial support to promising Master's students from developing countries in Wageningen since 1992.

In the course of his academic career, Van den Ban played a crucial role in the development of extension science. He was professor of Agricultural Extension at Wageningen

University between 1964 and 1983. His book *Introduction to agricultural extension* has been a standard work for decades and has been translated into more than ten languages.



Anne van der Ban

WAGENINGEN UNIVERSITY

Wageningen in Top 100

Wageningen UR has risen from 144th place to rank 75th in the Times Higher Education (THE) World University Rankings. Utrecht is the highest placed Dutch university in 68th place. The Netherlands and Germany now share third place in the list of countries, after the United States and United Kingdom.

WAGENINGEN UNIVERSITY

Fewer African students coming to Wageningen

Recruitment of new students at Wageningen University has dropped slightly. After several years of steady growth, this year's intake of both Bachelor's and Master's students was a few percent lower than that of 2010. There was a particularly big fall in numbers of students from African countries as a result of Dutch government cuts in scholarships for international students. The Huygens Scholarship scheme has been terminated, for instance, and the Netherlands Fellowship Programme (NFP) severely pruned.

COURSES

Climate change in East Africa

Global climate change is having a serious impact, including in East Africa. Countries that are dependent on agriculture, fishing and forestry will be hit particularly hard, and this will put considerable pressure on food production, economic development and efforts to combat poverty. The Wageningen UR Centre for Development Innovation (CDI) is organizing a course in East Africa from 5 to 16 March 2012 on how to adapt to

climate change in agriculture and nature management. The course is for policymakers, researchers and policy advisers in developing countries. They can use the new information to make an effective contribution to the debate about how to adapt. The CDI organizes courses in Africa and the Netherlands on such subjects as food safety, governance, sustainable nature management and climate change. Info: www.cdi.wur.nl

PERSONALIA



Johan van Arendonk

Prof. Johan van Arendonk,

WU Zootechnics 1982, was awarded an honorary doctorate by the University of Poznan in Poland for his great services to his discipline. 13 September 2011.

Maarten Batterink PhD,

WU Agro Systems 2003, was awarded a national prize by NOBEM for the best thesis in business administration and business economics. 8 September 2011.

Prof. Tiny van Boekel,

WU Food Technology 1977, has been appointed the new director of the Educational Institute at Wageningen University, part of Wageningen UR, with effect from 1 July 2012. 6 October 2011.

VENI AND VIDI

Sanne Boesveldt PhD, VU University Amsterdam Biology 2003, working in the Human Nutrition department of Wageningen University, has been awarded an NWO Veni grant of 250,000 euros for research on the relationship between sensory characteristics and eating behaviour. 23 August 2011.

Joris Sprakel PhD,

WU Food Technology 2005, assistant professor at the Laboratory for Physical Chemistry and Colloid Science at Wageningen University, has been awarded an NWO Veni grant of 250,000 euros for research on the limitations of adhesion. 23 August 2011.

Tom Wennekes PhD, assistant professor at the Laboratory for Organic Chemistry at Wageningen University, has

Prof. Imke de Boer, WU Zootechnics 1989, has been appointed professor of Animal Production Systems at Wageningen University. 1 September 2011.

Lonneke Janssen Duijghuijsen BSc,

WU Nutrition and Health 2010, was handed a scholarship in person by Queen Silvia of Sweden. The scholarship was awarded by the Frimurare Barnhuset Foundation for her Master's research in Stockholm on the effect of the mother's diet on the development of allergic sensitization in her children. 29 September 2011.

Prof. Klaas van Egmond,

WU Food Technology 1972, was the joint winner with Lucas Reijnders of the 2nd edition of the Rachel Carson Oeuvre prize, awarded every five years by the association of environmental professionals VVM, for their work over the years for a cleaner environment. 10 October 2011.

Karen Engel MSc,

Utrecht University Conflict Studies and Human Rights 2005, a PhD student with the Disaster Studies Group at Wageningen University, has been awarded an NWO research grant of

250,000 euros for the development of a molecular toolbox for studying the role of microbial sugars in human intestines. 23 August 2011.

Rumyana Karlova PhD,

WU PhD 2008, researcher at Plant Research International, part of Wageningen UR, has been awarded an NWO Veni grant of 250,000 euros for research on the control systems for ripening tomatoes. 18 October 2011.

Vera Ros PhD,

WU Biology 2003, researcher at the Laboratory of Virology at Wageningen University, has been awarded an NWO Veni grant of 250,000 euros for research on changes in the behaviour of a host after manipulation by a virus. 18 October 2011.

200,000 euros under the Mosaic programme to enable her to do doctoral research as a young, talented scientist from an ethnic minority. 17 October 2011.

Prof. Bart Gremmen,

Radboud University Nijmegen Philosophy 1980, has been appointed professor by special appointment in Ethics of the Life Sciences at Wageningen University. 18 October 2011.

Prof. Lisette de Groot,

WU Human Nutrition 1984, and **Prof. Sander Kersten,** WU Human Nutrition 1993, have been appointed professors holding a personal chair in Nutrition and Health by Wageningen University. De Groot had previously been a professor by special appointment and Kersten an associate professor in the Division of Human Nutrition at Wageningen University. 18 October 2011.

Pascal ten Have BSc,

WU Forest and Nature Conservation 2009, has been elected chair of the National Students' Union (LSVb). 26 June 2011.

Prof. Petra Hellegers,

WU Economics of Agriculture and the Environment 1993, has been appointed professor by special appointment in the Economics of Water and Climate Change at Wageningen University. 1 May 2011.

Prof. Marc Naguib,

Freie Universität Berlin Biology 1991, has been appointed professor of Behavioural Ecology at Wageningen University. 1 December 2011.

Prof. Rudy Rabbinge,

WU Phytopathology 1971, professor of Sustainable Development and Food Security at Wageningen University, gave his farewell address during a farewell symposium on 24 November. He has reached retirement age. 8 November 2011.

Ferdinand Sibbing PhD,

WU PhD 1984, who works in the Experimental Zoology Group at Wageningen University, has been appointed Knight of the Order of Oranje-Nassau in recognition of his services as a researcher and lecturer. 29 April 2011.

Prof. Jan Tatenhove, WU Rural Sociology of the Western Regions 1987, has been appointed professor holding an endowed chair in Marine Governance within the Environmental Policy Group of Wageningen University. 27 October 2011.

Toine Timmermans MSc, WU Farming Technology 1989, has been appointed Theme Director of Food Chain Sustainability and Dynamics at TI Food and Nutrition. Timmermans is also the Sustainable Food Chains Programme Manager at Wageningen UR Food & Biobased Research. 14 October 2011.

Prof. Roel Veerkamp, WU Zootechnics 1991, WU PhD 1995, has been appointed

professor by special appointment in Numerical Genetics and Genomics at Wageningen University. Veerkamp is also head of the Animal Breeding and Genomics Centre at Wageningen UR Livestock Research. 28 September 2011.

Prof. Cor van der Weele, Utrecht University Biology, University of Groningen Philosophy, has been appointed by the Socrates Foundation as the new professor of an endowed chair in Humanist Philosophy at Wageningen University, and given the assignment of studying the relationship between man and nature. Van der Weele works as a researcher in the Consumer and Behaviour department of LEI, part of Wageningen UR. 1 September 2011.

Prof. Cees van Woerkum,

Radboud University Nijmegen Sociology and Mass Communication 1971, WU PhD 1982, and professor of Communication Strategies, gave his farewell address on 17 November as he had reached retirement age. 31 October 2011.



Cees van
Woerkom

IN MEMORIAM

P. Anema MSc,

WU Agricultural Plant Breeding 1953, passed away at the age of 86. 3 September 2011.

W.T. Binnerts PhD,

a member of KLV, passed away at the age of 88. 23 June 2011.

Ms E.M. Castro Prada,

WU trainee research assistant in the Food Chemistry Group, passed away at the age of 37. 28 September 2011.

A.J.M. Corten MSc,

WU Agricultural Plant Breeding 1956, passed away at the age of 88. 17 July 2011.

J.G.C. van Dam PhD,

WU Horticulture 1952, passed away at the age of 85. 19 August 2011.

K. Dilz PhD,

WU Agricultural Plant Breeding 1953, passed away at the age of 85. 10 August 2011.

H.W.F.C. Donkersloot MSc,

WU Rural Economics 1971, passed away at the age of 66. 21 August 2011.

Ms M.M.A. Hendriks MSc,

WU Human Nutrition 1979, passed away at the age of 58. 21 August 2011.

J.F. Jansen van Tuikwerd MSc,

WU Agricultural Plant Breeding 1943, passed away at the age of 95. 21 June 2011.

A.C. de Kam MSc,

WU Rural Sociology of the Western Regions 1971, has passed away.

Prof. E.H. Kampelmacher,

emeritus professor of Wageningen University, passed away at the age of 91. 12 September 2011.

G.G. Ketelaar MSc,

WU Zootechnics 1987, passed away at the age of 49. 3 October 2011.

P. Kleijburg MSc,

WU Horticulture 1961, passed away at the age of 80. 15 August 2010.

D. Kloen MSc,

WU Agricultural Plant Breeding 1946, passed away at the age of 92. 19 August 2011.

S.S. Koliijn MSc,

WU Farming Technology 1993, passed away at the age of 43. 15 July 2011.

G.J. Kruisselbrink MSc,

WU Agricultural Plant Breeding 1950, passed away at the age of 87. 26 June 2011.

Ms S.E.E.M. Lijmbach PhD,

WU Phytopathology 1980, passed away at the age of 58. 30 September 2011.

J.M. Miedema MSc,

WU Rural Economics 1972, passed away at the age of 71. 8 October 2011.

Prof. G.C. Nielen,

WU Land Development 1953, passed

away at the age of 85. 8 July 2011.

A.J.D. Nijman MSc,

WU Rural Economics 1970, passed away at the age of 69. 4 August 2011.

F.S. Riemer MSc,

WU Rural Economics 1959, passed away on 5 October 2010.

J.B. Smit PhD,

passed away at the age of 54. 8 April 2011.

Ms C.H. Verdonshot MSc,

WU Agricultural Plant Breeding 1987, passed away at the age of 49. 23 August 2011.

J.G.M. van Vugt MSc,

WU Zootechnics 1974, passed away at the age of 64. 20 September 2011.

G. Wansink MSc,

WU Agricultural Plant Breeding 1948, passed away at the age of 89. 25 June 2011.

B.D.H. van de Weerdt MSc,

WU Phytopathology 1980, passed away at the age of 58. 4 July 2011.

J.J. Westerhof Gzn MSc,

WU Tropical Plant Breeding 1946, has passed away.

G.P. Wiersema MSc,

WU Tropical Plant Breeding 1955, passed away at the age of 82. 14 June 2011.



PHOTO FRANK MAZEAS

Expedition to the coral reefs of Saba

This is not a holiday snap, but an impression of an ecological inspection tour of the Saba Bank, four kilometres south-west of the Caribbean island of Saba. This gigantic underwater atoll is famous for the great diversity of its sea life. A team of 16 researchers from IMARES and Wageningen University, both part of Wageningen UR, spent a week studying the at-

oll's coral reefs. Since the constitutional reforms of October 2010, which saw the dissolution of the Dutch Antilles, Saba has been part of the Netherlands. The expedition, on board the Caribbean Explorer II, focused largely on the coverage of the coral, its state of health, the biomass, the variety of fish species present, the pattern of the

ocean currents and the presence of sea birds, explains tropical marine ecologist Erik Meesters of IMARES. A number of sound receivers were also placed on the seabed. They will pick up signals from whales over a period of six months, so that researchers can establish whether there are many marine mammals in the area. Info: erik.meesters@wur.nl ■