

THE WONDERFUL WORLD OF WUR SCIENCE

Much WUR research is on issues that are very much in the spotlight and that urgently demand solutions. Sometimes the solutions seem far off or even impossible, but WUR scientists are working away at turning the tides of the climate crisis, the nitrogen crisis, deforestation and biodiversity loss. A few examples of research that gives cause for hope • Text Editorial team

‘HELP BRING ABOUT THE TRANSFORMATIONS THE WORLD NEEDS’

‘LIGHT AS PART OF BIOLOGICAL CROP PROTECTION’

Light in the darkness for hothouse plants



Colours in LED light may improve the growth and photosynthesis of plants, as well as their resistance to insects.

The Wageningen PhD students Martina Lazzarin, Davy Meijer and Mara Meisenburg are studying this. Far-red

light is particularly important for the plant. This type of light stimulates plants to grow faster, but that happens at the expense of their defences against insects. Red light boosts photosynthesis and provides protection against diseases and pests, but too much of it can lead to light stress. So every light frequency has its pros and cons for the greenhouse horticulturalist. The PhD researchers are looking for the right balance between the light colours so as to achieve both good growth and strong resistance. Meijer reckons the right light composition can greatly reduce the numbers of pest insects on tomato plants. ‘You can see light as part of biological crop protection.’



From loss to restoration of biodiversity

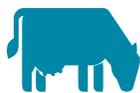
With a new initiative, Wageningen researchers want to reverse the trend of biodiversity loss and help build a nature-inclusive society. Together with other WUR researchers, Liesje Mommer, professor of Plant Ecology and Nature Management, launched the Wageningen Biodiversity Initiative (WBI) in June 2021. ‘We want to achieve a turnaround by pooling the expertise in this field within WUR,’ says Mommer, ‘and by doing so we want to help bring about the transformations the world needs.’ The WBI community on the intranet already has 200 members from all the science schools. The research will focus on three areas next year: food systems that are positive for biodiversity, human-animal interactions and the various ways in which nature is of value. The first PhD course started this autumn: ‘How to be transformative as a researcher’. The WBI is also working on a student challenge on ‘nature-based futures’ and is organizing dialogues in collaboration with Wageningen Dialogues. Interested? Visit the ‘Biodiversity’ intranet group or send an email to biodiversity@wur.nl.



Vaccination against Rift Valley fever

Vaccines against the dangerous Rift Valley fever virus are in the making: one for animals and one for humans. Although Rift Valley fever mainly affects sheep in Africa, humans are not out of the line of fire. So virologist Jeroen Kortekaas and his team at Wageningen Bioveterinary Research have developed a vaccine based on a live-attenuated virus. The virus thrives and alarms the immune system, but it is harmless, as it lacks pathogenic powers. This is due to small adjustments the researchers made to the genetic material. The approach is the same for the vaccines for humans and for animals. ‘That is a nice example of One Health,’ says Kortekaas. ‘We are using technology from the veterinary field to develop a human vaccine. By protecting animals, ultimately you protect humans too.’ The veterinary vaccine is currently being produced and prepared for registration. For the human vaccine, the first clinical studies in humans are due to start soon.

Breeding a climate cow



Precision breeding of cows can lower methane emissions by these animals by one per cent per year, says Wageningen Livestock Research. Together with breeding organization CRV and dairy giant FrieslandCampina,

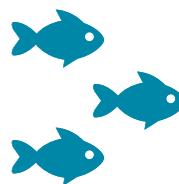
the researchers are studying how genetic factors affect methane emissions. There can be a 30 per cent difference in the amount of methane individual cows produce. Researchers are now selecting bulls whose offspring produce relatively little methane in their stomachs. If bulls are given a breeding value for low emissions, livestock farmers can breed specifically for that. That is an improvement on the current breeding policy, with which methane emissions per cow are rising slightly. With the new breeding policy, which will be ready in 2025, dairy farmers can reduce methane emissions by 10 per cent in 10 years. And that can be increased by applying additional technical measures. For example, DSM has developed an anti-methane additive that farmers can add to livestock feed. This cuts the cow’s methane emissions by over 20 per cent, earlier research on WUR’s Dairy Campus showed. The additive has not yet been approved by the EU, however.

Meeting nature and environmental targets with precision agriculture



Precision agriculture offers farmers better and more precise ways of applying fertilizer, combatting diseases, irrigating their crops and meeting nature targets.

The evidence for this comes from the Dutch national precision agriculture living lab (NPPL). Arable farmer Pieter van Leeuwen Boomkamp has been practising precision farming in Nijkerk. He applies weedkiller very precisely using an electronic scanner fitted on his tractor. This saves him 10 to 15 per cent on pesticides. He also has a harvester with a location-specific yield meter, so he can adjust his soil management strategy according to the yield. Thirdly, he makes use of precision irrigation, in which sensors measure the soil humidity and report where crops are suffering drought stress. He constantly weighs up the costs and the environmental benefits. ‘If the chemical and the technical options cost the same, I opt for the technical one.’



Global fish farming much more environmentally friendly

Vistelers produceren drie keer zoveel vis met minder Fish farmers are producing three times as much fish than 20 years ago, with a smaller environmental impact. This finding comes from an overview published in *Nature* in March by Simon Bush and his international colleagues. Twenty years ago, farmed salmon, shrimp, tilapia and catfish were fed on large quantities of other fish, in the form of fishmeal. The excess nutrients and drugs also led to water pollution. ‘Since then, fish production has been tripled but the quantities of fishmeal have been reduced,’ says Bush, professor of Environmental Policy at WUR. The aquaculture sector makes much more efficient use of feed, most of which is sourced from waste streams in the food industry, and it has developed plant-based fish feed. The global aquaculture industry now produces 112 million tons of fish. Asia accounts for 92 per cent of fish farming. Few Asian fish farmers have any links with western sustainability labels, and yet the environmental impact is decreasing there as well. This is due to stringent legislation and regulation, and the fact that fishmeal has become much more expensive. ■