Commons-based varieties – clear advantages

Agricultural approaches in which plant varieties are jointly developed by many different breeders and then made freely available for cultivation promote biodiversity and reduce farmers' dependence on international markets. The practice of "commons-based" plant breeding and seed production can thus help to make the agricultural sector more resilient, as demonstrated by Prof. Dr Stefanie Sievers-Glotzbach from the university's Department of Business Administration, Economics and Law and Lea Kliem from the Berlin-based Institute for Ecological Economy Research (IÖW) in a study published in the International Journal of Agricultural Sustainability.

The researchers investigated the impact of industrial seed production on agricultural resilience –defined as the ability of agroecosystems to adapt to changes such as climate change or disease – and compared it with that of commons-based seed production. To measure this impact, they identified 14 indicators including supply chain variability, the availability of regionally adapted varieties and the cost-effectiveness of seed production.

The two economists then analysed the sustainability reports and brochures of conventional seed producers in German-speaking countries and compared them with the publications of a selection of companies and initiatives producing seeds on a commons basis. The comparison led to the conclusion that the commons-based approach to plant varieties has clear advantages over the standard practices of large seed companies, reports Sievers-Glotzbach, who heads the Junior Research Group RightSeeds, which is funded by the Federal Ministry of Education and Research (BMBF). Rather than focusing on just a few high-yielding varieties that thrive only under optimal cultivation conditions, plant breeders and seed producers who use a commons-based approach work with a wide range of varieties that can adapt to regional particularities and climate-related changes. However, the analysis also showed that commons-based initiatives have not yet developed a funding model that can cover the costs of the labour-intensive breeding of new, adapted varieties in the medium term. Kliem and Sievers-Glotzbach therefore recommend the creation of long-term funding programmes and an improved political framework for such initiatives.

Commons-based seed production focuses on breeding diverse varieties that can adapt to regional conditions and changing climate. Until the beginning of the 20th century, farmers took it for granted that they could freely use different plant varieties, exchange seeds and develop new varieties in their fields.

Faster wind energy expansion

Where is there enough space and support among the population to successfully expand wind energy projects? This is the key question for the social scientists working on the WindGISKI research project, which has secured two million euros in funding from the Federal Ministry for the Environment within the framework of the AI lighthouses funding programme. The aim of the collaborative project, which is led by the Leibniz University Hannover, is to use a geographic information system (GIS) in combination with artificial intelligence (AI) to identify promising areas for future wind energy projects. In a sub-project led by Prof. Dr Jannika Mattes, the Oldenburg working group Organisation & Innovation examines sociological factors that influence change and social obstacles to expansion. The ultimate goal of the scientists' work is to help accelerate the expansion of wind energy in Germany.

Sustainable protection for the sea

Making the interaction between humans and the sea as sustainable as possible is the goal of the CREATE collaborative project led by Oldenburg biodiversity expert Prof. Dr Helmut Hillebrand. CREATE is one of seven projects in the German Marine Research Alliance's second research mission. The Federal Ministry of Education and Research is funding the project with an initial grant of around four million euros over a three-year funding period. Experts from the natural and social sciences, economics, engineering and society at large are working together in the project and will set up three living labs in the North Sea and the Baltic Sea. The goal is to work with all stakeholders to develop measures to make human use of the oceans more sustainable and effective – and to jointly implement these measures in specific regions. The living labs will be located in the conservation areas Borkum Riffgrund, Sylt Outer Reef and Eckernförder Bucht.

The future of gas supplies in Lower Saxony

The aim of Oldenburg management scholars Prof. Dr Christian Busse and Julien Minnemann is to launch a discussion about gas supplies in the transition to a sustainable heating sector with stakeholders in Lower Saxony's gas industry and also involve the public in the debate. In their project, the two scientists are creating a platform for discussions about alternatives to natural gas, affordability, the security of supplies and implications for business models. The scheme is part of the Ministry for Science and Culture of Lower Saxony's "Future Discourses" funding programme and will receive just under 120,000 euros in funding over 15 months starting January 2023.

Making dark semiconductors glow

Whether or not a solid can emit light depends on the energy levels of the electrons it contains. An international team led by Oldenburg physicists Dr Hangyon Shan and Prof. Dr Christian Schneider was able to rearrange the energy levels in an ultra-thin sample of the semiconductor tungsten diselenide in such a way that this material, which normally has a low luminescence yield, began to glow. The team reported its results in an article published in the journal Nature Communications. The light effect could be used to optimize the optical properties of semiconductors and thus contribute among other things to the development of innovative LEDs and solar cells.

AI for smart hearing aids

The German Research Foundation has extended its funding for the Oldenburg-based Hearing Acoustics Collaborative Research Centre (CRC). Led by hearing researcher Prof. Dr Volker Hohmann, the CRC will receive up to 8.1 million euros in its second funding period from 2022 to 2026. Under the official project title "Hearing Acoustics: Perceptive Principles, Algorithms and Applications" (HAPPAA), the scientists in the collaborative project are developing hearing aids and assistive listening devices that use artificial intelligence methods to automatically adapt to different acoustic environments.

In this second funding period, the CRC team aims to improve and integrate the models, algorithms and applications it has developed so far. One goal is to develop algorithms for active noise control which automatically adjust to different acoustic environments. The long-term goal is for each hearing aid to learn continuously so that it can better predict which setting is optimal for the individual user in any given situation.

The thin skin of the oceans

The surface layer of the oceans is the focus of a new research group led by oceanographer Prof. Dr Oliver Wurl from the Institute for Chemistry and Biology of the Marine Environment (ICBM). The project, entitled "Biogeochemical Processes and Air-Sea exchange in the Sea-Surface Microlayer" (BASS), investigates the complex biological, chemical and physical relationships in the surface microlayer, which in many places is less than a millimetre thick and regulates the exchange of gases, energy and momentum between water and atmosphere. The German Research Foundation (DFG) and the Austrian Science Fund (FWF) are funding the project for the next four years. The researchers applied for 4.1 million euros in total.
To gain a better understanding of the processes in this paper-thin layer, the team is conducting field investigations as well as experiments in the lab, in the wind-wave tank of the Universität Hamburg and at the Sea Surface Facility of the Wilhelmshaven campus of the ICBM. A three-week measurement campaign is planned for the summer of 2024, with members from all participating project groups on two research vessels in the North Sea near Helgoland. The team will use various measurement techniques on different platforms, such as ICBM's new autonomous research catamaran "Halobates".

Face masks: obstacles to lip-reading

The fact that it is more difficult to understand what a person is saying when they are wearing a face mask is mostly due to their mouth being hidden, experiments conducted by hearing researchers at the university's medical faculty revealed. This leads to the conclusion that everyone, not just people with impaired hearing, uses lip-reading to some extent to understand speech. The interdisciplinary team of researchers from the Department of Medical Physics and Acoustics and the University Clinic for Otorhinolaryngology presented their results in the science journal Otology & Neurotology. To find out how face masks impact speech comprehension, the researchers played sentences to test subjects in various scenarios. They found that even if the sound quality remained constant, when the speaker's mouth was hidden behind a virtual mask, speech comprehension decreased by more than a fourth – just as much as when participants couldn't see the speaker at all.

How neuromodulation works

Neuromodulation can help to improve memory, mobility and speech in people with neurological diseases. The scientists in the Research Training Group Neuromodulation of Motor and Cognitive Function in Brain Health and Disease are investigating the effects of electrical, magnetic or pharmacological stimulation on the brain, as well as the effects these treatment methods have on patients' daily lives.
The German Research Foundation (DFG) is providing a five-year grant for the group, which is based at the Department of Psychology at the School of Medicine and Health Sciences. The researchers applied for 6.5 million euros in funding, which will enable 13 doctoral students to conduct research in this area. They will be supervised by eleven Oldenburg scientists and one scientist from the University of Cologne.
The spokespersons of the new research training group are Prof. Dr Christiane Thiel, head of the Biological Psychology Lab, and neuropsychologist Dr Cornelia Kranczioch. The researchers are focusing on how and why different methods of neuromodulation can be effective in treating neurological disorders such as stroke or Parkinson's disease. Their research makes use of cutting-edge technologies such as magnetic resonance imaging, magnetoencephalography and electroencephalography.