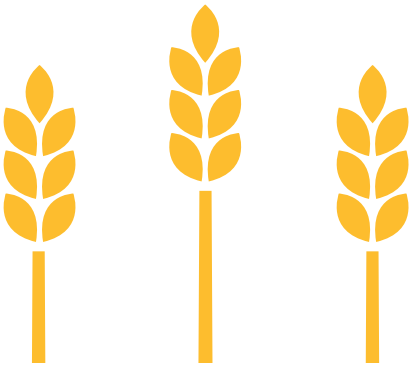
University of East Anglia

KNOW MORE GROW MORE



HOW UEA'S AGRI-FOOD EXPERTISE AND TALENT CAN HELP YOUR BUSINESS

KNOW MORE GROW MORE

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Breaking boundaries and pioneering innovation for over 50 years

WELCOME TO UEA

UEA helps businesses throughout the region and further afield find solutions to their challenges, and we have a range of specialist knowledge and facilities to support and help develop the food and agriculture sectors.

Read on to find out how we can work together and help your business grow.

UEA HAS THE AGRI-SCIENCE EXPERTISE

Our globally renowned research is helping tackle critical challenges facing agriculture and is leading innovation in the sector.

'Securing Energy, Food and Water' is one of UEA's six key research themes, placing this global challenge at the forefront of our work to ensure we move forward sustainably and profitably.

Agricultural expertise flourishes throughout the University from Norwich Business School through to the Schools of Biological Sciences, Chemistry, Computing Sciences, and Environmental Sciences.

As one of the longest established and largest interdisciplinary departments of environmental sciences in Europe, UEA's School of Environmental Sciences, founded in 1967, is internationally renowned for its pioneering research. In 2017, the School received a Queen's Anniversary Prize for Higher and Further Education. This is the UK's most prestigious higher education award, given to those who can demonstrate outstanding work at a world-class level.

TOP 10
UEA ranking in the UK for research citations

TOP 50
UEA ranking in the world for research citations

Times Higher Education World University Rankings 2022

WORK WITH US TO GROW YOUR BUSINESS

How will we collaborate? We believe that bright thinking helps businesses grow. That's why we work with organisations of all sizes to help them realise their ambitions.

Whether you're an ambitious startup, a charity, or an established corporation, we can help your business grow, recruit talent, and access new funding, markets and ideas.

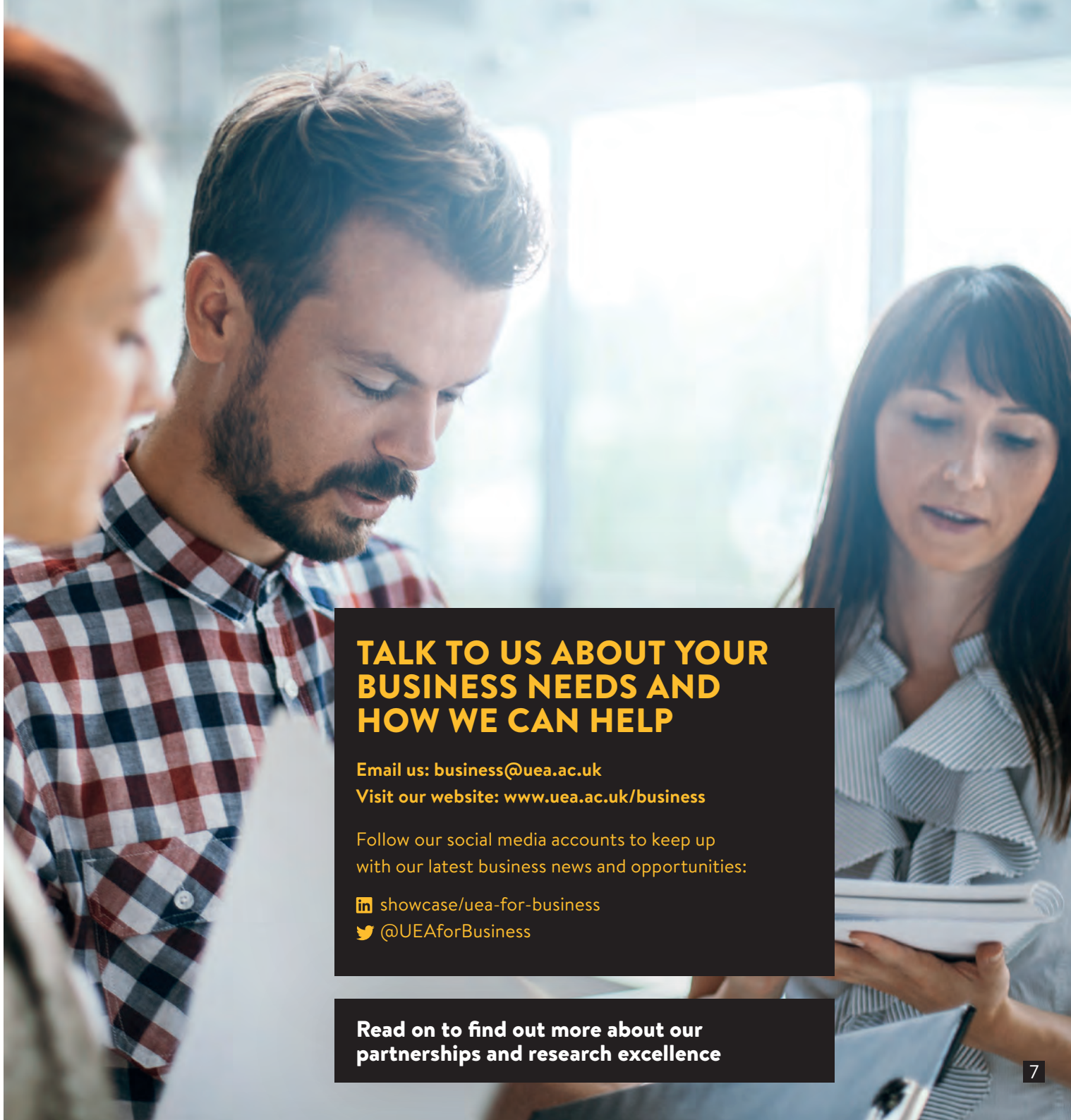
We support businesses and organisations from creation to growth and beyond. We offer facilities, networks, and the opportunity to access student and graduate talent and collaborate with world-leading researchers.

UEA IS IN THE

TOP 200

UNIVERSITIES IN THE WORLD

Times Higher Education World University Rankings 2021



TALK TO US ABOUT YOUR BUSINESS NEEDS AND HOW WE CAN HELP

Email us: business@uea.ac.uk
Visit our website: www.uea.ac.uk/business

Follow our social media accounts to keep up with our latest business news and opportunities:

showcase/uea-for-business
@UEAforBusiness

Read on to find out more about our partnerships and research excellence

THE NEW GENERATION OF TALENT

The right recruits could transform your business. Connect with the 17,000 students and 4,000 recent graduates at UEA and give your workforce an injection of dynamism, fresh thinking and enthusiasm.

Placements are part of the university curriculum for a range of degree courses, allowing organisations to draw from a breadth of subject knowledge when engaging with UEA students. Depending on your needs, you can recruit undergraduates, postgraduates or PhD students. Placements provide students with invaluable experience in the workplace but are also an excellent opportunity for businesses who need skilled researchers, or extra help on projects.

Our interns provide vital support on projects. An internship can be part or full-time and range from short to long term contracts. They can provide an excellent way to trial a student or graduate before hiring them permanently.

A Knowledge Transfer Partnership (KTP) is a partnership between a business or not-for-profit organisation, a team of academic experts and a qualified graduate. A KTP is a tried-and-trusted way to embed the knowledge of UEA talent in your organisation.

SAM'S SUCCESS

"The internship with GreenWorld provided me the ideal opportunity to practically demonstrate the knowledge I had gained at university and provided me the skills and experience necessary for my PhD."

Sam Keenor, PhD Researcher, School of Environmental Studies, UEA

"Sam's internship has provided us with a valuable route to have specific studies done on aspects of our operations to gain greater understanding of their benefits."

Steve Kilham, CEO, Greenworld

Find out more about how a UEA student or graduate could benefit your business:

Email us:
placements@uea.ac.uk

www.uea.ac.uk/business/talent/placements-internships/placements

www.uea.ac.uk/web/business/access-student-talent/internships

www.uea.ac.uk/web/business/access-entrepreneurship-and-innovation/knowledge-transfer-partnerships

OUR PARTNERSHIPS

UEA is a pioneer of interdisciplinarity, fostering innovation and collaboration both on and off campus. Our relationships with networks and organisations help drive agri-food innovations, linking researchers with businesses and facilitating developments to tackle the challenges facing the sector.

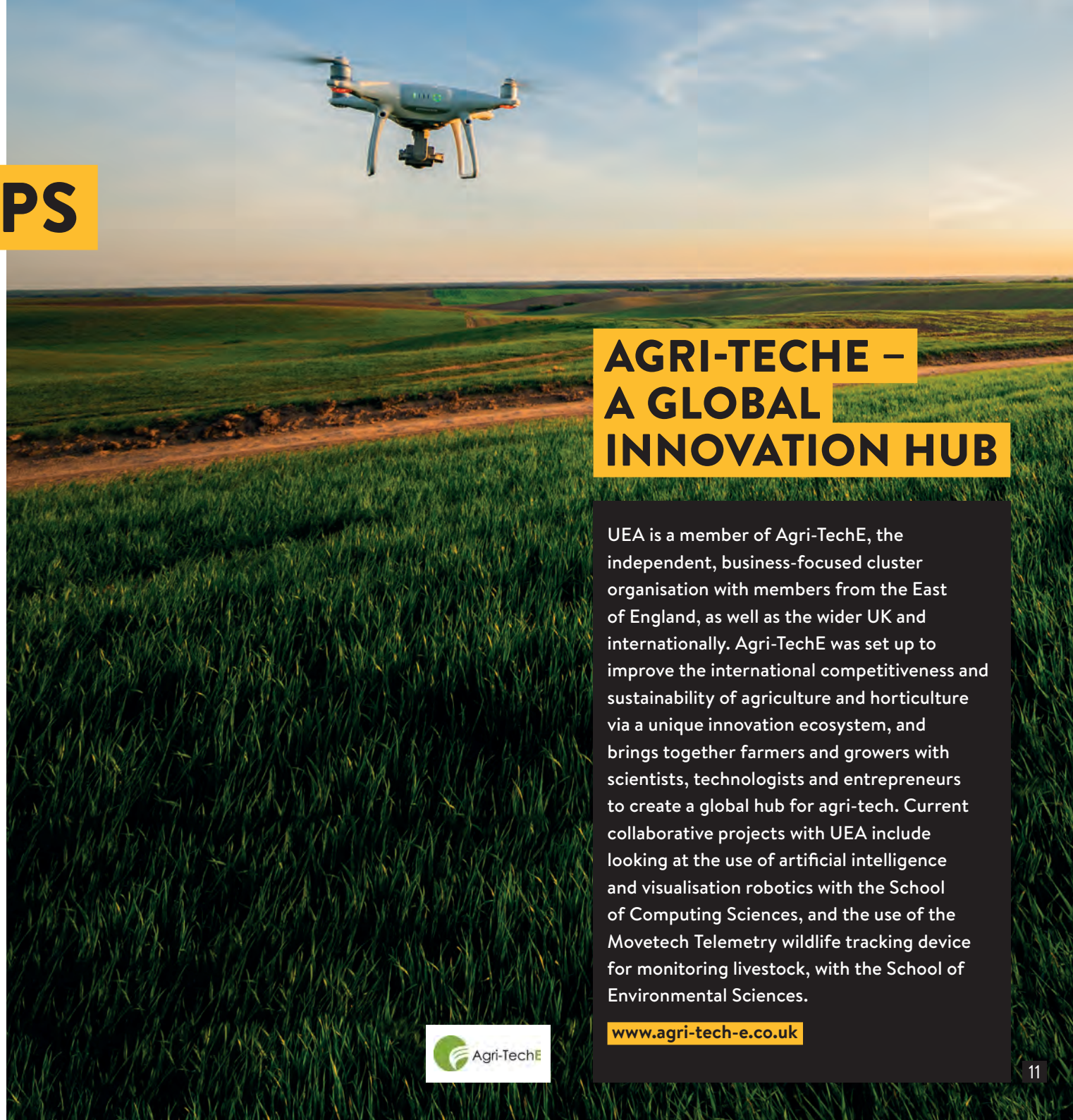
NORWICH RESEARCH PARK

Norwich Research Park's vision is to change lives and rethink society through pioneering research and innovation, reframing the future of research and delivering regional growth. It is home to a wealth of world class research in some of the areas of greatest importance to society today.

As one of six institutions on Norwich Research Park, UEA researchers collaborate with a community of more than 3,000 world-leading experts, and 100 businesses based on the Park.

www.norwichresearchpark.com

norwich research park



AGRI-TECHE – A GLOBAL INNOVATION HUB

UEA is a member of Agri-TechE, the independent, business-focused cluster organisation with members from the East of England, as well as the wider UK and internationally. Agri-TechE was set up to improve the international competitiveness and sustainability of agriculture and horticulture via a unique innovation ecosystem, and brings together farmers and growers with scientists, technologists and entrepreneurs to create a global hub for agri-tech. Current collaborative projects with UEA include looking at the use of artificial intelligence and visualisation robotics with the School of Computing Sciences, and the use of the Movetech Telemetry wildlife tracking device for monitoring livestock, with the School of Environmental Sciences.

www.agri-tech-e.co.uk

Agri-TechE

Collaborative projects tackle challenges faced by the UK food chain

FUNDING THE FUTURE OF AGRI-FOOD ROBOTICS

AGRIFORWARDS

UEA is a proud member of the AgriFoRwArdS EPSRC Centre for Doctoral Training, along with the Universities of Lincoln and Cambridge; and industrial partners including Beeswax Dyson Farming, Cefas, G's Growers, John Deere, the Manufacturing Technology Centre, the NFU and Syngenta.

AgriFoRwArdS offers funding for PhD research into AI, Vision and Robotics to find innovative solutions to real-world problems in the agri-food sector. Postgraduate researchers will work with supervisors from two partner universities and at least one industrial partner on three-year research projects that will advance our understanding of AI and robotics in the context of the UK's agri-food sector. Research may be proposed by industry, by university staff, or by the researchers themselves, but in all cases will be truly collaborative projects in which AgriFoRwArdS' interdisciplinary expertise is brought to bear on the challenges facing the sector and society.

AgriFoRwArdS' remit is broad, and research projects will address issues across the agri-food industry, from farms and fisheries through supply chains, food manufacturing, logistics, and into retail and home environments. Projects might seek to increase productivity, make efficiencies, mitigate challenges in the labour market, or relate to improving soils or our impact on biodiversity or the environment.

Graduates of the AgriFoRwArdS CDT will become leaders of the next generation of talented and highly qualified researchers, engineers, entrepreneurs, and executives who will drive forward innovation and make the UK and East of England a world-leading centre for robotics and autonomous systems in agri-food.

For more information, contact agriforwards.cdt@uea.ac.uk

www.uea.ac.uk/agriforwards

CERES – FUNDING AGRI-TECH FROM IDEA TO FRUITION

£4.8m INVESTMENT

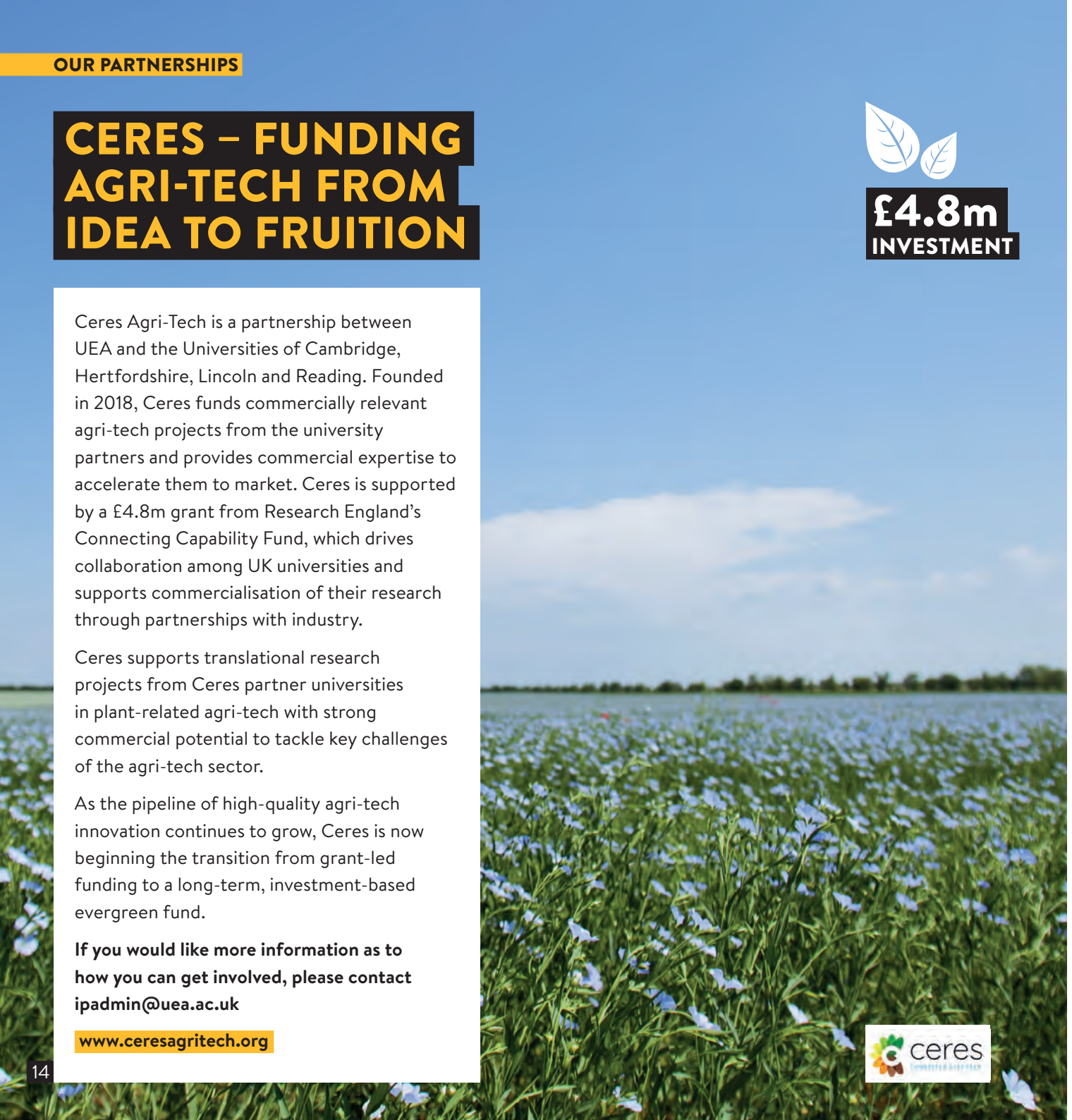
Ceres Agri-Tech is a partnership between UEA and the Universities of Cambridge, Hertfordshire, Lincoln and Reading. Founded in 2018, Ceres funds commercially relevant agri-tech projects from the university partners and provides commercial expertise to accelerate them to market. Ceres is supported by a £4.8m grant from Research England's Connecting Capability Fund, which drives collaboration among UK universities and supports commercialisation of their research through partnerships with industry.

Ceres supports translational research projects from Ceres partner universities in plant-related agri-tech with strong commercial potential to tackle key challenges of the agri-tech sector.

As the pipeline of high-quality agri-tech innovation continues to grow, Ceres is now beginning the transition from grant-led funding to a long-term, investment-based evergreen fund.

If you would like more information as to how you can get involved, please contact ipadmin@uea.ac.uk

www.ceresagritech.org



FUNDED BY CERES: EXPLORING FLAX AS A MATERIAL FOR THE AUTO INDUSTRY

Composites (materials made from resin-reinforced fibres), are widely used in the car industry with the global market predicted to reach US $24bn by 2024. The most popular fibres have been fibreglass and carbon fibre, but these are non-renewable and energy intensive to produce.

Replacing fibreglass and carbon fibre with renewable bio-based materials like flax promises to improve vehicle safety, sustainability, and carbon footprint. However, currently available flax-based composites are not water resistant and therefore cannot be used on car exteriors, severely limiting their applications.

This project, led by Prof Richard Stephenson and with funding from Ceres Agritech, is developing a novel process to make water-resistant bio-based materials from industrial flax fabrics, which will allow far wider use of bio-based composites across the automotive and other industries. Ultimately this will add value to agricultural products and agricultural waste, as well as helping to reduce carbon emissions.

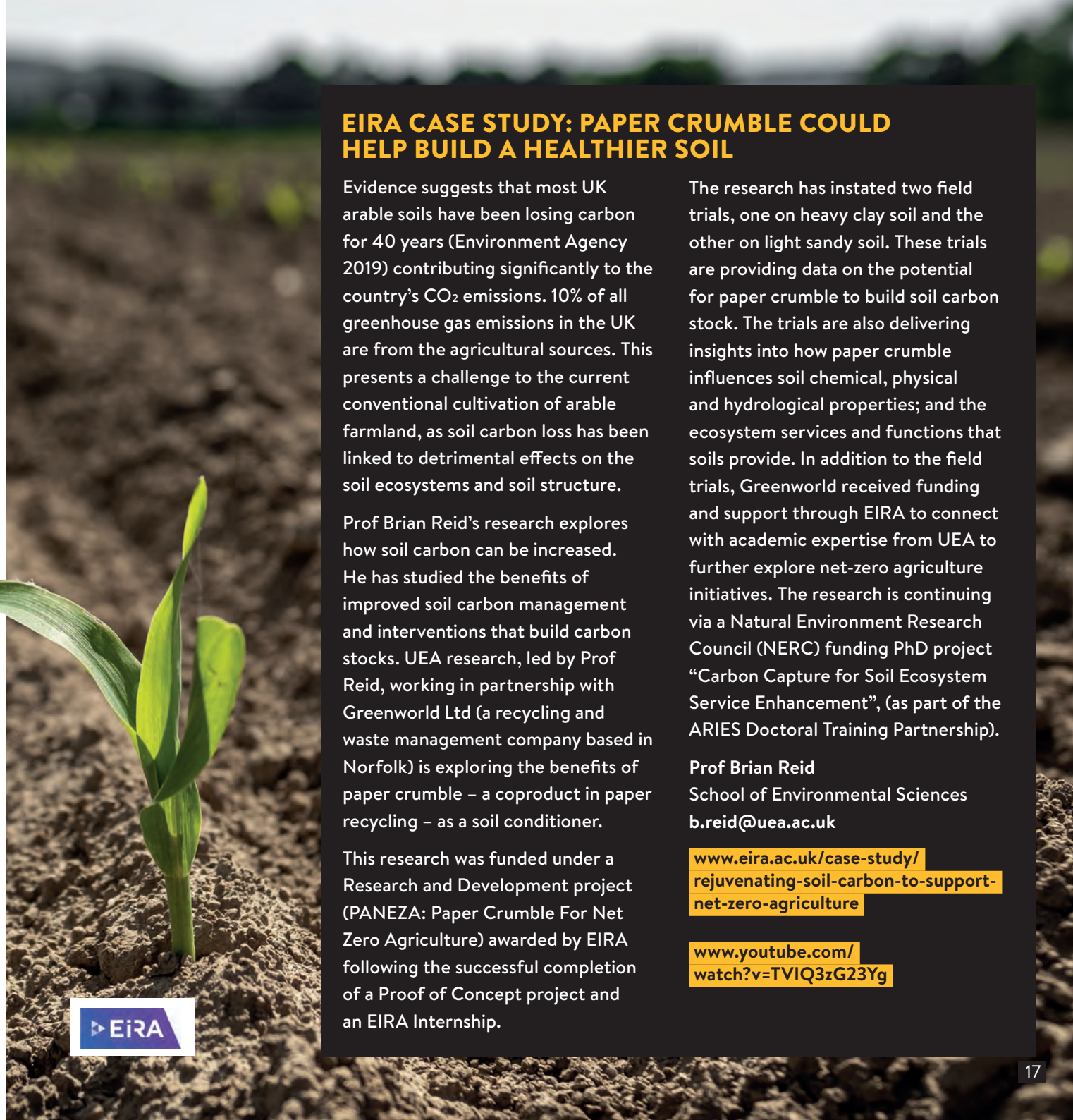
Prof Richard Stephenson
School of Chemistry
g.r.stephenson@uea.ac.uk

EIRA – ENABLING INNOVATION: RESEARCH TO APPLICATION

EIRA was a collaborative project that harnessed the expertise of seven universities and colleges in the East of England: UEA, the Universities of Essex, Kent and Suffolk, Harlow College, Norwich University of the Arts, and Writtle University College. Funded by £4.7 million from Research England's Connecting Capability Fund, EIRA connected businesses with access to academic expertise, consultancy, specialist facilities and funding opportunities.

The project boosted innovation across three key areas: artificial intelligence, biotechnology and digital creative. UEA led the biotech theme which supported innovations across health, food, agri-tech, and environmental science.

www.eira.ac.uk



EIRA CASE STUDY: PAPER CRUMBLE COULD HELP BUILD A HEALTHIER SOIL

Evidence suggests that most UK arable soils have been losing carbon for 40 years (Environment Agency 2019) contributing significantly to the country's CO_2 emissions. 10% of all greenhouse gas emissions in the UK are from the agricultural sources. This presents a challenge to the current conventional cultivation of arable farmland, as soil carbon loss has been linked to detrimental effects on the soil ecosystems and soil structure.

Prof Brian Reid's research explores how soil carbon can be increased. He has studied the benefits of improved soil carbon management and interventions that build carbon stocks. UEA research, led by Prof Reid, working in partnership with Greenworld Ltd (a recycling and waste management company based in Norfolk) is exploring the benefits of paper crumble – a coproduct in paper recycling – as a soil conditioner.

This research was funded under a Research and Development project (PANEZA: Paper Crumble For Net Zero Agriculture) awarded by EIRA following the successful completion of a Proof of Concept project and an EIRA Internship.

The research has instated two field trials, one on heavy clay soil and the other on light sandy soil. These trials are providing data on the potential for paper crumble to build soil carbon stock. The trials are also delivering insights into how paper crumble influences soil chemical, physical and hydrological properties; and the ecosystem services and functions that soils provide. In addition to the field trials, Greenworld received funding and support through EIRA to connect with academic expertise from UEA to further explore net-zero agriculture initiatives. The research is continuing via a Natural Environment Research Council (NERC) funding PhD project "Carbon Capture for Soil Ecosystem Service Enhancement", (as part of the ARIES Doctoral Training Partnership).

Prof Brian Reid
School of Environmental Sciences
b.reid@uea.ac.uk

www.eira.ac.uk/case-study/rejuvenating-soil-carbon-to-support-net-zero-agriculture

www.youtube.com/watch?v=TVIQ3zG23Yg

THE ANGLIAN CENTRE FOR WATER STUDIES

The Anglian Centre for Water Studies is an industry led research centre that seeks to ensure excellent independent research informs business outcomes, policy and research.

Already one of the driest places in the UK – forecast to have one of the highest level of population growth with an economy highly dependent on agriculture – the Anglian region faces some particular challenges in ensuring a sustainable supply of water into the future. The response to these challenges lies not only in the development of new technologies but in how we understand and mitigate the impacts of climate change on the water available to us and how as a society we value and use water.

In collaboration with others the Anglian Centre for Water Studies works to inform policy and underpin innovation in four core areas:

- The impact of climate change on water resources – leading the application of research to build long term resilience to changes in weather leading to drought or flooding, and adapt to the increasing demands of a growing population
- Circular economy and environmental sustainability – how can we optimise biodiversity in our region, prevent pollution and raw water deterioration, making sure it recycles water to the environment effectively and with no waste
- How we engage society – research in areas such as how societal change can drive environmental benefits, behaviour change and economics, to reduce the amount of water we use
- Competition policy – predicting long-term market changes and informing policy.

www.acwaterstudies.org

THE ANGLIAN CENTRE FOR WATER STUDIES
ANGLIAN WATER AND UEA WORKING IN PARTNERSHIP

BROADLAND FOOD INNOVATION PROJECT

This exciting £11.4m project offers a unique opportunity for the food and drink sector in Norfolk and Suffolk to fast-track growth through innovation. The ambition is to create the ideal conditions for innovation, creativity and productivity, supporting the regional economy with wealth creation and high-quality employment opportunities.

The Food Innovation Cluster (developed and managed by UEA) will promote knowledge exchange, collaboration and innovation, driving economic growth of the food and drink sector and raising the profile of the region's offerings nationally and internationally. The Innovation Support Programme (managed by Hethel Innovation) has been developed to help guide food and drink SMEs and start-ups to market; removing barriers, avoiding pitfalls, and opening doors for businesses in a sector which is heavily regulated. The Broadland Food Innovation Centre has been designed to meet both sustainable development criteria and British Retail Consortium requirements, allowing food and drink businesses requiring food grade premises to accelerate their growth plans. Businesses will be able to move into one of the units full-time or book the facilities on an ad hoc basis for tastings, presentations, meetings and more.

Broadland District Council has received £5.7m of funding from the European Regional Development Fund towards developing the Project. New Anglia LEP has contributed £4.14m from its Getting Building Fund from HM Government, and the balance of funds will come from partners Broadland District Council, Hethel Innovation and UEA.

For more information email business@uea.ac.uk or visit

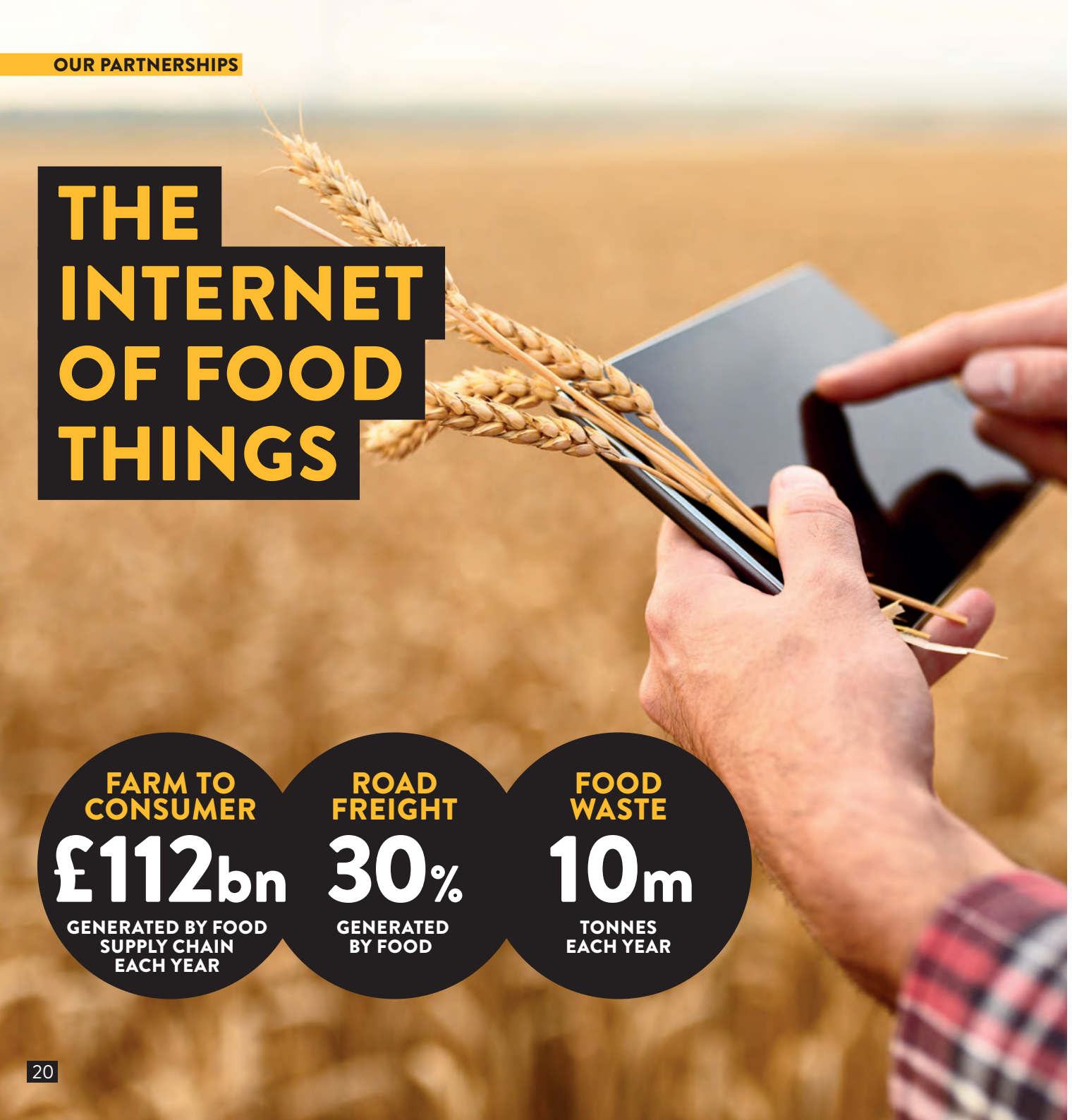
www.foodinnovationbroadland.com

F:D BROADLAND FOOD INNOVATION CENTRE

European Union
European Regional Development Fund

HM Government

THE INTERNET OF FOOD THINGS



UEA researchers are part of the Internet of Food Things Network Plus, which is exploring innovations to transform the food and agriculture industries. The network, led by the University of Lincoln in partnership with UEA and the universities of Southampton, Surrey, and the Open University, brings together data and computer scientists, chemists, economists and behaviourists to investigate how artificial intelligence, data analytics and emerging technologies can enhance the digitalisation of the UK food supply chain.

The project – which also involves regulators such as the Food Standards Agency and industry specialists such as Siemens and Tesco – is examining the application of the Internet of Things in connected supply chains of the future – taking into account the use of sensors in different settings such as farms, production environments, smart refrigerators which trigger a grocery order when food items run low, or cooking appliances that help us eat more healthily.

The use of machine learning and artificial intelligence could be utilised in these innovations to extract value from the vast amounts of data available across the whole food industry, which will help resolve many challenges such as food traceability, food waste, and environmental impact across the supply chain.

The project is funded by a £1.14 million grant from the Engineering and Physical Sciences Research Council (EPSRC) to nurture and grow the UK's food manufacturing digital economy.

Prof Gerard Parr
School of Computing Sciences
g.parr@uea.ac.uk

www.foodchain.ac.uk

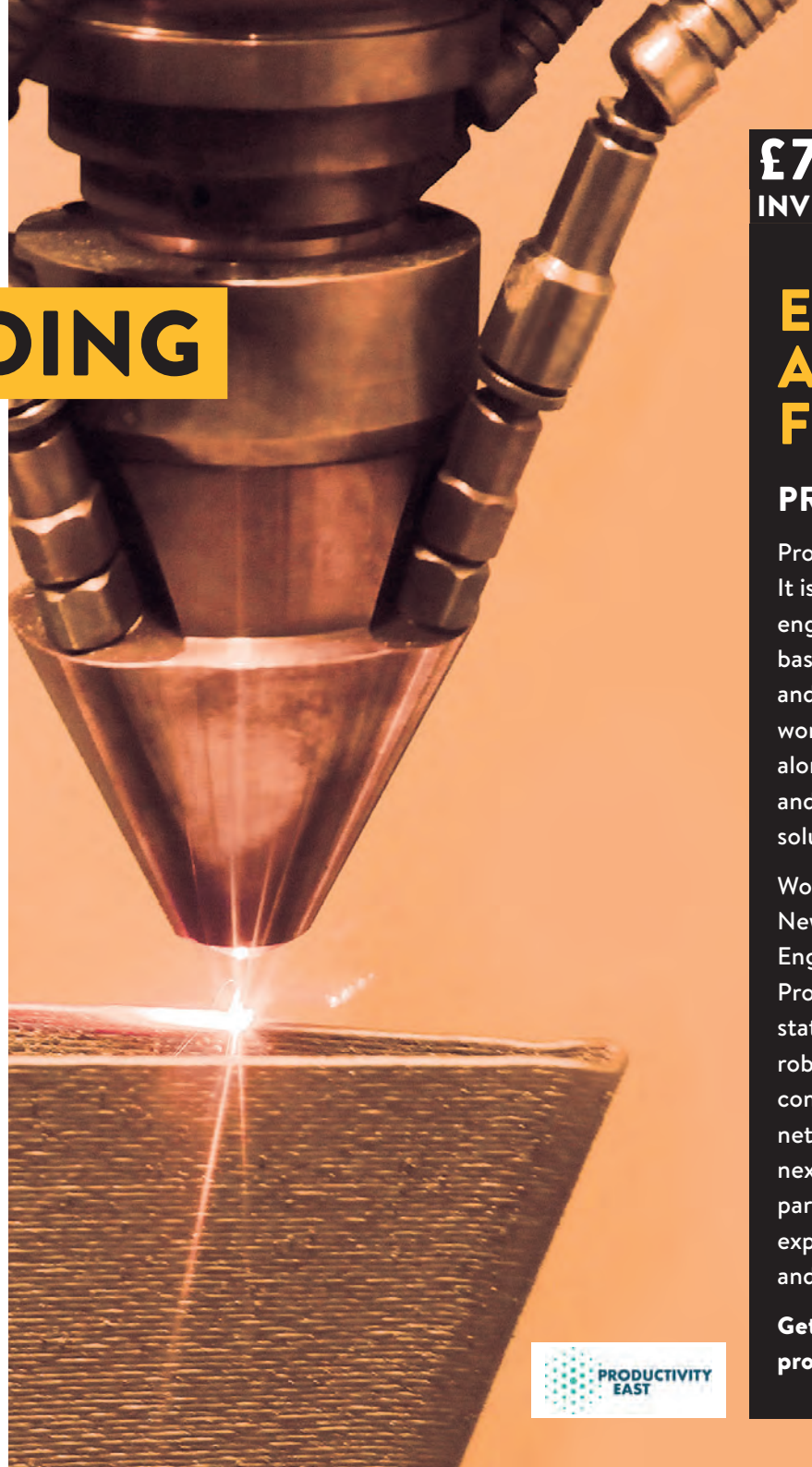
WORLD-LEADING RESEARCH

Our research tackles the challenges facing the agri-food sector head-on – in our hubs, centres and institutes of research, through to individual research projects.

82%

OF OUR RESEARCH IS WORLD-LEADING OR INTERNATIONALLY EXCELLENT

Research Excellence Framework 2014



£7.4m INVESTMENT

ENGINEERING AND TECH HUB FOR THE EAST

PRODUCTIVITY EAST

Productivity East opened in September 2021. It is a major new £7.4 million regional hub for engineering, technology and management based at UEA. The facility supports industrial and education partners, including those working in food and agriculture, to work alongside our world-leading researchers and talented students to discover practical solutions to current and future challenges.

Working in partnership with New Anglia LEP, New Anglia Advanced Manufacturing and Engineering (NAAME) and Tech East, Productivity East provides workshops with state-of-the-art equipment – including advanced robotics and CNC, 3D printing, a dedicated computer aided design (CAD) studio, and a network design laboratory – to educate the next generation of engineers. Working in partnership, students, academics and businesses explore new ideas, develop prototype designs and create innovative products and services.

Get in touch with the team via productivity.east@uea.ac.uk

PRODUCTIVITY EAST

"SETI is an exciting initiative that will help drive agri-tech in the Eastern region and beyond. By bringing farmers and agronomists together with world-leading research expertise and facilities, SETI's improved collaboration and connectivity will allow innovative ideas and research to be tested more easily and at a larger scale. SETI will hugely benefit the agri-tech community by creating a faster route to commercialisation for solutions to some of the real-world challenges facing agriculture. These include smarter systems using cutting edge technology, concept validation on a huge scale, and increased productivity, which we expect will lead to increased economic growth in the sector. By reducing the technical barriers to increased research and innovation quality, SETI will support Agri-TechE by adding significant value to the existing agri-tech innovation ecosystem."

Dr Belinda Clarke, Director, Agri-TechE

DRIVING THE INNOVATION ECOSYSTEM OF THE FUTURE

EAST OF ENGLAND SMART EMERGING TECHNOLOGIES INSTITUTE (SETI)

SETI is a research and innovation initiative led by UEA, aiming to create the fastest collaborative research testbed in Europe. The virtual Institute will aim to connect UEA with core ICT Research groups at the Universities of Cambridge and Essex, Norwich Research Park, Cambridge Science Park, Adastral Park Ipswich, and Essex Knowledge Gateway.

By linking world-leading researchers with local industrial stakeholders, SETI will improve collaboration and enable research to move to large-scale field trials more quickly and easily. SETI will support experiments in a range of science and engineering areas using data technologies such as artificial intelligence, the Internet of Things and 5G linked to key sectors such as Agritech, Supply Chain, Energy and Intelligent Manufacturing.

SETI will nurture a unique research and innovation ecosystem, providing support for the development of new applications and services from concept to prototype to validation. SETI will demonstrate smart technology in the field whilst capturing valuable real-world, real-time data. This will help turn research insights into business opportunities that will provide jobs and grow the economy.

www.uea.ac.uk/business/access-entrepreneurship-and-innovation/seti

WHO BUYS MY FOOD?

Researchers have helped

700+

Small food and drink producers

Locally sourced produce is becoming increasingly important to consumers in the UK as the Covid-19 pandemic has focused attention on food security and the sustainability of our food system. This has created opportunities for farmers and small food producers. However, the food and drink sector is extremely competitive and the majority of small businesses lack the capacity to make use of market information to target their resources effectively and ensure that their products meet the differing needs of consumers.

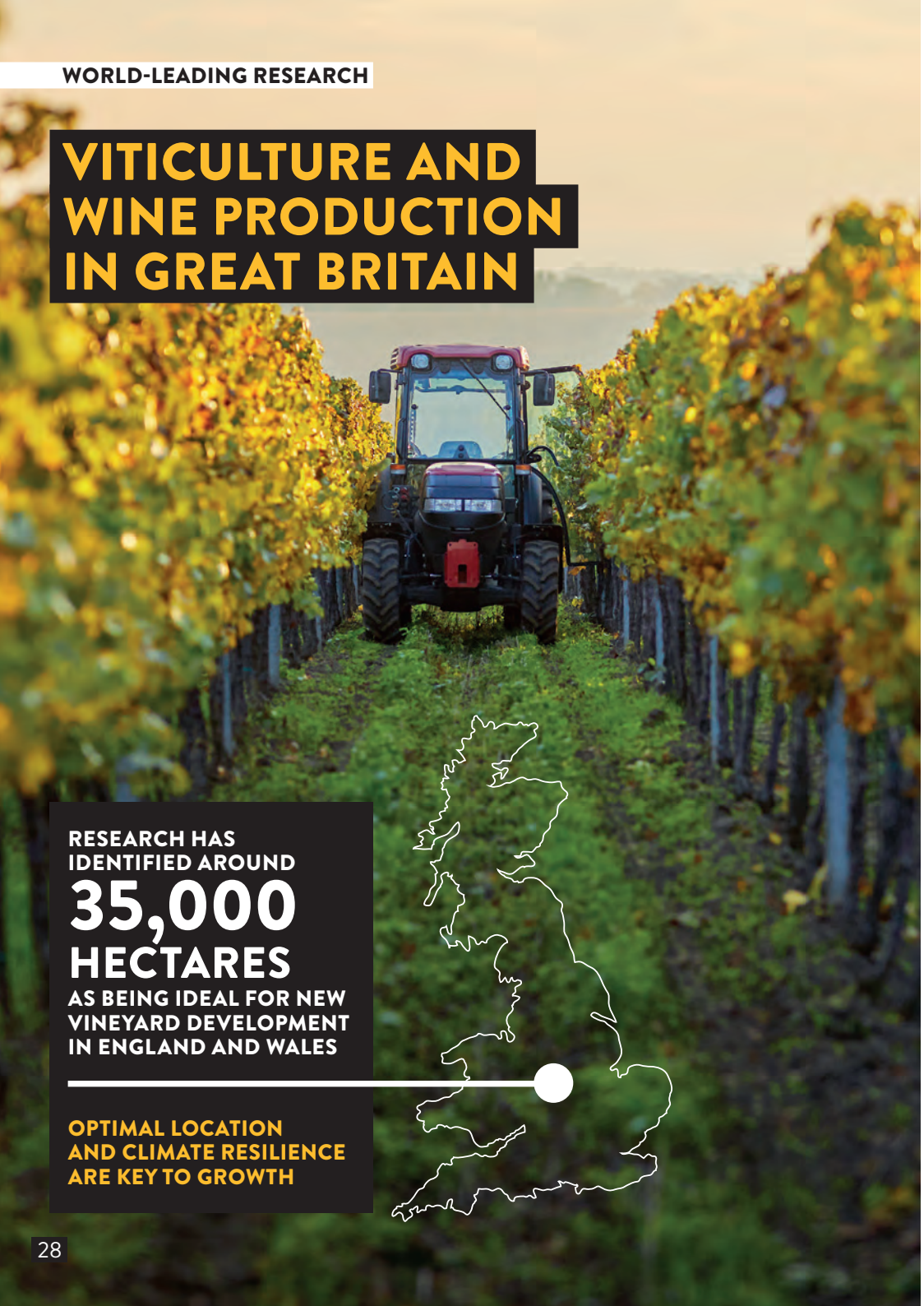
The *Who Buys My Food?* research project, led by Prof Andrew Fearne, is now in its fifteenth year of providing targeted market intelligence, free of charge, to food and drink SMEs seeking to grow their businesses. Researchers from Norwich Business School derive behavioural insights from a variety of data sources, including supermarket loyalty card data, and make them available via a web-application that enables decision-makers to access critical information at critical times, to ensure that the marketing decisions they take are evidence-based. Businesses involved in the project receive additional support in the application of market intelligence through regular webinars and workshops, enabling them to 'punch above their weight'.

Over the lifetime of the project, researchers have helped over 700 small food and drink producers to change their decision-making processes and improve their performance, developing new products and more relevant brands for consumers and retailers, increasing sales and building customer loyalty in the process.

Prof Andrew Fearne
Norwich Business School
a.fearne@uea.ac.uk

www.whobuysmyfood.com

VITICULTURE AND WINE PRODUCTION IN GREAT BRITAIN



RESEARCH HAS IDENTIFIED AROUND

35,000 HECTARES

AS BEING IDEAL FOR NEW VINEYARD DEVELOPMENT IN ENGLAND AND WALES

OPTIMAL LOCATION AND CLIMATE RESILIENCE ARE KEY TO GROWTH

Wines from Great Britain, especially sparkling wines, are now frequently winning international awards. Near perfect growing conditions in 2018 led to record grape harvests in English and Welsh vineyards and production of 13.2 million bottles of wine. The UK vineyard area under production is consequently growing rapidly, but not always in optimal locations.

Dr Alistair Nesbitt and Prof Steve Dorling identified a new area of land the size of the French Champagne region, around 35,000 hectares, as being ideal for new vineyard development in England and Wales.

By combining expert knowledge and machine learning with a Geographical Information System, every 50m^2 plot of land in England and Wales was assessed and graded for suitability. Some of the most viable land was found to be in areas where relatively few vineyards are currently in existence – including East Anglia. These areas were shown to combine terrain, soil and climate conditions which were equally or more suitable than those of established and successful vineyard locations. The study is the second most downloaded paper from the Journal of Land Use Science and the technique is powering a new service, VINEMAP, which is improving resilience to the UK's varying weather conditions and enhancing future productivity within the wine sector.

The warming climate is one important factor in driving the growth of the wine sector in Great Britain. However, as the climate continues to change, it is important to match varietal choice to the evolving climatic conditions – with a typical lifetime of vines of 30-40 years, investing in climatically-suited (as well as highly marketable) grape varieties is critical. Prof Dorling's research, funded by UK Research and Innovation (UKRI), is now helping to match varietal choice to anticipated climate change, over the next few decades, to enhance resilience and support the industry on a growth path which is projected to potentially reach 40 million bottles by 2040.

Prof Steve Dorling
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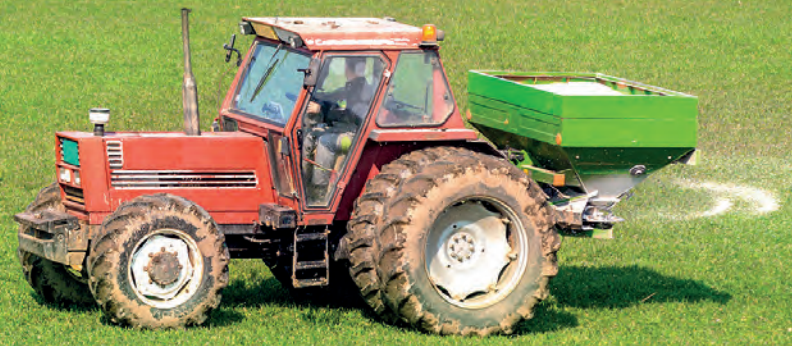
Research paper
https://doi.org/10.1080/174743X.2018.1537312

Wine GB Report
www.winegb.co.uk/wp-content/uploads/2018/06/WineGB-Industry-Report-April-2018.pdf

www.vinescapes.com/vinemap-online

RISING NITROUS OXIDE LEVELS CAUSED BY FERTILISERS



A study of the global sources of nitrous oxide (N_2O) by an international team of researchers, including Dr Parvadha Suntharalingam, found that the main source of human-induced N_2O emissions over recent decades is linked to the increasing use of nitrogen fertilisers in agriculture, and that the growing demand for food and animal feed will continue to increase emissions.

Rising levels of N_2O are threatening to jeopardise our chances of meeting the goals of the Paris Agreement. As a greenhouse gas, N_2O is 300 times more potent than carbon dioxide and can remain in the atmosphere for over 100 years.

The study is the most comprehensive assessment to date of all global sources of N_2O. It covers 21 natural and human related sectors between 1980 and 2016, and accounts for the interaction between nitrogen additions to the earth system and biogeochemical processes. The study found that atmospheric levels of N_2O have risen faster than predicted by recent Intergovernmental Panel on Climate Change (IPCC) emission scenarios, with the last 50 years being the fastest period of emissions growth.

The largest levels of N_2O emissions come from South and East Asia, Africa and South America, and are linked to use of synthetic fertilizers and livestock manure fertilizer. Growth rates are also rapidly increasing in emerging economies where crop production and livestock numbers are increasing. However, N_2O emissions in Europe have decreased. This is in part due to the more efficient and managed application of nitrogen fertilizer, which also simultaneously reduces environmental impacts in other areas, such as water pollution.

While the findings highlight the urgency to slow N_2O emissions growth, the study's authors conclude that managed strategies of fertilizer application can achieve emissions reductions without having to sacrifice levels of food production.

Prof Parvadha Suntharalingam
School of Environmental Sciences
p.suntharalingam@uea.ac.uk

Research paper
www.nature.com/articles/s41586-020-2780-0

MEETING THE DEMAND FOR WATER

The growth in water demand due to population increase and the need to maintain food production at a time when climate change and pressures on the environment are placing existing water supply infrastructure under strain, requires new methods to manage available water resources.

Under the FRESH4Cs project funded by the EU Interreg 2 Seas Programme, Prof Kevin Hiscock and Dr Richard Cooper are working with partners at Felixstowe Hydrocycle, the Environment Agency and Suffolk County Council to investigate the feasibility of transferring water from the King's Fleet at Felixstowe Ferry via an 11km pipeline to recharge the Crag sand and gravel aquifer further up catchment. This Managed Aquifer Recharge scheme (MAR), in which surplus water from the King's Fleet is used to recharge the aquifer during the winter to then abstract for irrigation water use in the summer, should help meet the demand for water by local growers.

The project draws upon experience of project partners in The Netherlands and Belgium where there are existing examples of MAR. If successful, the project will provide a demonstration of how the conjunctive use of surface water and groundwater can be maximised to meet water demand while protecting the environment. The project runs until 2022.

www.fresh4cs.eu

WATER QUALITY IN RIVERS

UEA researchers led by Prof Kevin Hiscock and Prof Andrew Lovett have worked with DEFRA on the Wensum Demonstration Test Catchment project looking at the water quality in rivers. The long-term project has assessed the effectiveness of a variety of land management measures to reduce pollution from agricultural activities across the whole river catchment whilst maintaining farm profitability.

Working closely with Salle Farms Company near Reepham, Norfolk, the project used state-of-the-art measuring devices to both identify and record pollutants and to evaluate the effectiveness of different mitigation measures. This has included assessments of a biobed, cover crops, reduced cultivation methods and sediment traps. The latter found that the amount of harmful sludge entering rivers from farmers' fields could be more than halved with special ditches.

Scientists dug and tested sediment traps beside the River Blackwater in Norfolk for the project. The water downriver was then tested and found a 58% reduction in sediment year on year.

The project finished in 2019 and the findings have been written up as a series of research papers and reports. These are available on the project website plus summaries of evidence from the national Demonstration Test Catchments programme.

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IMPROVING ANIMAL NUTRITION

Ninety percent of commercial feeds for poultry are supplemented with the enzyme phytase. The per-annum market for phytase is currently more than $1 billion, and the market is projected to grow to around $2.4 billion by 2024. The major players in this enzyme market include companies such as Dupont, Novo-Nordisk, BASF and AB Vista.

Phytases improve animal digestion by degrading a molecule called phytate that is an abundant anti-nutrient in the grain and bean components of animal feed.

Since 2012, Prof Charles Brearley has worked with AB Vista to provide understanding of how phytases improve animal growth. This collaborative research funded by the UK Biotechnology and Biological Sciences Research Council (BBSRC) has highlighted how phytases work, how they degrade phytate and where in the digestive tract this occurs.

Most importantly, the research has shown how inositol, a nutrient released from phytate, is critical to poultry growth.

With Prof Andrew Hemmings and funding from BBSRC, the team is also engineering novel phytase enzymes as candidates for the industry's next generation commercial products.

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Research paper
www.frontiersin.org/articles/10.3389/fphys.2019.01251/full

www.uea.ac.uk/research/explore/feeding-animals-sustainably

GARLIC – AN ENVIRONMENTALLY FRIENDLY PEST CONTROL

In collaboration with a UK biopesticide company, ECOspray Ltd, Dr Chris Hamilton has elucidated the mechanisms of action of polysulfides found in garlic-derived pesticides. These research discoveries have assisted its regulatory approval in the UK, Europe, Africa and Australasia as a biopesticide for use on crops including potatoes, tomatoes, cucumbers, carrots, brassicas, peppers, aubergine, and melons. Dr Hamilton's research has helped to increase farmer and grower confidence in environmentally sustainable alternatives to current synthetic chemical pesticides and as a result, usage of polysulfide pesticides in sustainable farming practice has continued to rise.

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