

# TRANSFORM

Environment ●  
Economy ●  
Society ●

FOR ENVIRONMENT AND SUSTAINABILITY PROFESSIONALS

June 2019  
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**Make a mealworm of it** Are insects the future of sustainable protein?

**Field of conflict** Getting a grip on agricultural ammonia emissions

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IMAGE: INGHAM'S

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TIM BALCON, CEO OF IEMA

# Knowledge into action

In recent weeks, we have seen the world waking up to the impending threat of climate change, with influencers such as Greta Thunberg and Extinction Rebellion making public stands for the environment and high-profile politicians making 'warm noises' around the climate emergencies taking place all over the world.

Despite all this, however, we still need to see actual progress. The profile of climate change has been raised, but this boost in awareness has to be translated into action. More policies need to be created that will make a real change, and business leadership is required – corporations must not just recognise that they have a role to play, but should look at what that role is and how it should play out.

Unless we develop skills, climate change will be a problem without a solution. Leadership must have the knowledge to inform policies, while organisations need the skills to deliver the necessary changes identified by leaders. Among our corporate members, we have seen a rise in training providers delivering what's needed in these areas.

The Climate Change and Energy network is one of IEMA's most active networks; it has been campaigning for change almost since IEMA began, with some notable successes around greenhouse gas reporting, among other achievements. It's important that our members are recognised as being central to informing and educating individuals and organisations, helping them make the transformation that is necessary to avoid climate breakdown. Awareness of the issue is increasing, which is great, but we need professionals to steer this awareness towards logical solutions for change. I remain very proud of our members and the changes we are enacting.

"It's important that our members are recognised as being central to informing and educating individuals and organisations"



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IEMA is the professional body for everyone working in environment and sustainability. We provide resources and tools, research and knowledge sharing along with high quality formal training and qualifications to meet the real-world needs of our members. We believe that together we're positively changing attitudes to sustainability as a progressive force for good. Together we're transforming the world to sustainability.

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## BIODIVERSITY

### Agriculture named among biggest causes of 'unprecedented' biodiversity loss

**A**gricultural expansion, unsustainable fishing and various other changes in land and sea use are the main causes of biodiversity loss rates that are "unprecedented in human history". That is according to a landmark UN-backed report, which reveals that more than one million species are now threatened with extinction, many of which could be wiped out within decades.

Changes to land and sea management were found to be the biggest culprit, followed by direct exploitation of organisms, climate change, pollution and invasive alien species.

The researchers warned that more than two-thirds of the planet's natural environment has now been "significantly altered" by humans, and that extinction rates are accelerating.

"The essential, interconnected web of life on Earth is getting smaller and

increasingly frayed," said report author, professor Josef Settele. "This loss is a direct result of human activity and constitutes a direct threat to human wellbeing in all regions of the world."

The report, from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Service (IPBES), has been compiled by 140 authors from 50 countries during the past three years, and is the most comprehensive assessment of its kind. It reveals that extinction rates today could be hundreds of times higher than they have been on average during the past 10m years, with the number of native species in most major land-based habitats having fallen by at least 20% – mostly in the past three decades.

Food crop production, meanwhile, has increased by 300% since 1970, while a third of marine fish stocks have been harvested at unsustainable levels in recent years.

The report calls for deeper engagement from all actors throughout the food chain to tackle the problem, and promotes good agricultural practices and multifunctional landscape planning. It also highlights the need for ecosystem-based approaches to fisheries management, effective quotas, marine protected areas, a reduction in run-off pollution into oceans, and close work with producers and consumers.

In urban areas, the researchers recommend nature-based planning solutions that improve access to green spaces and boost ecological connectivity with native species.

IPBES chair Sir Robert Watson said: "The report offers the best available expert evidence to help inform these decisions, policies and actions, and provides the scientific basis for the biodiversity framework and new decadal targets for biodiversity."

➤ Report: [bit.ly/2HkuuKa](https://bit.ly/2HkuuKa)



PHOTOGRAPHY: ISTOCK



## BUSINESSWATCH



### Retail and hospitality firms pledge to halve food waste by 2030

Nestlé, Tesco and Sainsbury's are among a group of major food and hospitality brands that have committed to halve food waste outputs by 2030. The 'Step up to the Plate' pledge also includes a promise from signatories to measure, report and act on their food waste by the end of this year. Brands will also encourage customers to buy only what they need and eat all they buy, with social media influencers and chefs also signing up.

➔ [bit.ly/2LFqbNp](https://bit.ly/2LFqbNp)



### Bosch announces unprecedented carbon neutral timeframe

Technology giant Bosch has announced that it will be carbon neutral by as early as next year, a timeframe that is thought to be unprecedented for any major industrial enterprise. The firm has said all its 400 directly owned and managed facilities will no longer have a carbon footprint by 2020, mitigating 3.3m tonnes of CO<sub>2</sub> emissions. This will involve a €1bn investment in energy efficiency, larger purchases of green electricity, and the use of carbon offsets.

➔ [bit.ly/2vWuJob](https://bit.ly/2vWuJob)



### Marks and Spencer leads the way on tackling modern slavery

Marks and Spencer has topped an annual ranking of Britain's 100 largest listed companies for its compliance with the UK Modern Slavery Act and good practice in human rights. Development International's Global Governance FTSE 100 Index shows that 87% of the 24 companies that reported in 2019 have demonstrated year-on-year improvements. Tesco, British American Tobacco and Morrisons complete the top four; NMC Health, the Scottish Mortgage Investment Trust and the Ashted Group have never reported their progress.

➔ [bit.ly/2VqjftW](https://bit.ly/2VqjftW)

## MITIGATION

### Stringent climate policies could push millions into hunger

Tough climate change mitigation policies could leave up to 280 million extra people at risk from hunger in 2050, a study from the International Institute for Applied Systems Analysis (IIASA) has revealed.

The researchers said it would be "increasingly crucial" to make the connection between climate action and the UN's Sustainable Development Goal to end hunger, and made a series of "smart and inclusive" policy recommendations.

These include agricultural subsidies, food aid to low-income countries, and support for populations at risk from hunger, with the IIASA warning that

climate policies must "go beyond carbon pricing and shield the poor".

The recommendations would cost between 0 and 0.46% of GDP to implement, far less than the price of climate change mitigation policies, although the study did not assess the direct impact of global warming on crop yields.

It was concluded that the world's climate targets are achievable with sustainable land-use and agricultural development policies, and that the costs of these strategies would be "relatively small".

"We emphasise that land and food-related climate change mitigation policies should be carefully designed," said report author Shinichiro Fujimori of Kyoto University. "Policymakers should be aware that issues could arise as a result of the uniqueness of the food system compared to, for example, the energy system."

## FOOD

### Investment in plant-based meat companies soars in past decade

More than \$16bn (£12.4bn) has been invested in US plant-based 'meat, egg and dairy' companies during the past decade, including a massive \$13bn in 2017 and 2018 alone. In addition, almost half of all acquisitions of plant-based companies since 2009 have happened in the past two years, with investors increasingly looking to cash in as more people embrace a vegan diet to minimise their environmental impact.

The findings were published in the Good Food Institute's (GFI) latest industry update report, which also shows that retail sales of plant-based meat grew 23% during the past two years, compared with growth of 2% for all other foods.

The largest and most developed plant-based category is plant-based milk, which accounts for \$1.8bn in sales and represents 13% of the total US retail milk market. Once plant-based meat reaches

market share parity with plant-based milk, the market could be worth more than \$10bn.

"With global demand for meat set to double by 2050, capturing even a fraction of this burgeoning market would represent a massive opportunity for plant-based meat companies," said GFI director of innovation Brad Barbera. "Investors and entrepreneurs recognise the vast market opportunity on offer to get involved while these industries take form."





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LEGISLATION

# IEMA input on Environment Bill

IEMA's chief policy advisor Martin Baxter met with the Chancellor Phillip Hammond and Environment Secretary Michael Gove at 11 Downing Street to discuss the forthcoming Environment Bill. The Bill is a one-off opportunity to create a coherent framework that puts sustainability at the heart of our economic model.

As part of the Broadway Initiative, IEMA continues to work with a wide range of stakeholders to develop

an ambitious Environment Act as the UK leaves the EU. Our Blueprint for a new Environment Act sets out the governance framework needed to create the conditions for society and the economy to improve the environment in a way that aligns with business investment cycles. It reflects the long-term nature of environmental challenges

and their solutions, and the interconnected nature of environmental, social and economic systems.

IEMA will continue to advocate a high level of ambition to government and stakeholders as the Bill enters parliament.



"The Bill is a one-off opportunity to create a coherent framework"

ETHICS

## Environmental and social justice roundtable

Martin Baxter, IEMA's chief policy advisor, participated in a roundtable with cross-party MPs to explore how to put social and environmental justice at the heart of decision-making. Consideration is being given on how to ensure that actions today aren't at the expense of future generations.

Organised by Compassion in Politics, the discussion focused on a set of values: that no policy should adversely affect future generations and should in fact enhance their wellbeing; that the vulnerable must be helped and those who have fallen on hard times looked after by all; and that policies should make life better for people, not just the economy. With politics under pressure, we mustn't lose focus on tackling environmental and social challenges.

Participants included Caroline Lucas, Heidi Allen, Jo Swinson, Clive Lewis, Debbie Abrahams, Tracey Crouch and Lord Dubs.



WASTE

## Circular economy workshops

IEMA members with an interest in sustainable resource management and the circular economy came together for two afternoon workshops in April to provide their insight on the Resources and Waste Strategy for England (RWS), published in December of last year.

The workshops, chaired in London and Birmingham by IEMA policy and engagement lead Marc Jourdan, focused on four key areas

of the strategy that are subject to consultation: the introduction of a deposit return scheme for disposable beverage containers, extended producer responsibility for packaging, reforming the regulations for duty of care for waste carriers, and transposition of the Circular Economy Package.

The sessions ran in parallel to a webinar series on RWS, which began on 2 April with an introductory session by DEFRA.

Sign up to our Circular Economy Network for updates on workshops on this topic by emailing us at [cenetwork@iema.net](mailto:cenetwork@iema.net)

MEDIA

## Sustainability forum

Industry leaders at our recent Sustainability Leaders Forum sketched out a path to net zero, with Nick Molho presenting on recent Aldersgate Group work ([bit.ly/2YN5gut](https://bit.ly/2YN5gut)) and examples of innovation and efficiencies. At the event, former Green Party leader Natalie Bennett questioned the use of a 'climate fear' narrative. Media messaging has helped escalate action – so what is the concern? Is messaging what we can achieve the more effective approach? On 28 June, a conference organised by the Going Green Working Group from the British Psychological Society and IEMA's Climate network will explore these questions and more. For more information and to book, go to [bit.ly/ComCCPsych](https://bit.ly/ComCCPsych)

## STRATEGY

# IEMA's new Impact Assessment Strategy

By Spencer Clubb, IEMA head of policy and practice, and Peter George, chair of the Impact Assessment Network Steering Group

As you may be aware, IEMA and the Impact Assessment (IA) Network Steering Group have been working to create a new strategy and delivery plan to meet the needs of our IA members and ensure that we respond effectively to future challenges within the sector.

In last month's *Transform* we shared the feedback received from more than 500 IEMA members on the draft strategy through the Let's Talk Impact Assessment member engagement process.

This month we are setting out what we are going to do in response in some of these areas. This is the next step on that journey, so the plan has not yet been finalised. Some details may change, particularly around the exact wording or timing of some activities, but we wanted to update you on how things are shaping up. Further work will be done ahead of the next IA Network Steering Group meeting in July.

**You told us that we needed to set out a bold and ambitious vision.** Although still a work in progress, we have tried to capture your feedback with the following revised vision: "IEMA and its members will ensure impact assessment is widely recognised as delivering valuable input, positively influencing development design and seeking to provide lasting benefits to the environment, communities and the economy."

**You told us to be clearer about what our objectives were.**

We have narrowed down our objectives from the 10 we presented to the following four. Exact details may change, but this will give you a good steer:

- 1. Promote professional standards and best practice, and showcase the benefits of IA** to deliver positive outcomes for the environment and society.
- 2. Develop guidance and training and promote knowledge sharing and collaboration** to provide practitioners with the skills and knowledge to deliver effective and proportionate IA.
- 3. Improve the effectiveness of IA** through **innovation in practice and effective policy and regulations.**
- 4. Encourage and develop the careers of impact assessment professionals** so that there is a vibrant supply of qualified practitioners to meet the needs of the future of IA.

**You told us to be clearer about how we were going to achieve our objectives.**

We have reframed many of the objectives as being about 'how' to achieve the above four. For example, there were objectives relating to collaborating with other professional bodies, with regulators, academics or with international practitioners. We need to be clearer about 'why' or 'to achieve what?'

We have also developed some specific SMART objectives for the

next year that clearly link up our proposed activities. For example, to progress objective 3 on effective policy and regulations, we intend to meet with officials in each of the four UK countries to discuss key policy, legislative and regulatory changes that may be needed and opportunities to shape consultation proposals.

**You asked us to collaborate with others, particularly local authority planners.**

We will be looking to organise joint events and webinars with other organisations. For example, Steering Group member David Hoare is organising a series of events at WSP in Manchester, hosted jointly with the Royal Town Planning Institute. We will look to further expand our collaborative work during the coming year.

**You asked us to increase the amount of activities that we run for members, particularly webinars.**

We will re-introduce regular impact assessment webinars. During the rest of the year, you will see webinars on topics such as cumulative effects, photography and visualisations in EIA, cultural heritage, materials and waste in EIA, and many more. There are a number of areas of the new strategy that will take more time to realise. For example, you asked for more opportunities to network with each other. You also provided feedback on the Quality Mark scheme and IEMA's specialist registers and professional grades. Further progress updates will follow in these areas.

We are positive about the new strategy and look forward to engaging with you during the coming months. To keep in touch with all of our work, sign up to the Impact Assessment Network by emailing [IA@iema.net](mailto:IA@iema.net)



# NEW REGULATIONS

THE LATEST

■ LEGISLATION ■ GUIDANCE ■ CONSULTATION

**31 MAY 2019**

## Wildlife

The Humane Trapping Standards Regulations (Northern Ireland) 2019 and the Spring Traps Approval Order (Northern Ireland) 2019 implement International Humane Trapping Standards and update the list of spring traps that are authorised for use, respectively.

➔ [cedr.ec/5za](http://cedr.ec/5za)

**1 MAY 2019**

## Water pollution

The Nitrate Pollution Prevention (Wales) (Amendment) Regulations 2019 make various amendments relating to the monitoring of nitrate pollution and designation of nitrate vulnerable zones.

➔ [cedr.ec/5z9](http://cedr.ec/5z9)

**1 APRIL 2019**

## Carbon reporting

All large UK companies are now required to report their carbon emissions and energy use as part of their annual reports under the new Streamlined Energy and Carbon Reporting (SECR) framework.

➔ [cedr.ec/5z6](http://cedr.ec/5z6)

**2 MAY 2019**

## Waste management

The Waste (Fees and Charges) (Amendment) Regulations (Northern Ireland) 2019 amend the fees and charges for waste management licenses and registration as a carrier and/or broker of controlled waste, to make sure they are sufficient to recover incurred costs.

➔ [cedr.ec/5z7](http://cedr.ec/5z7)

**30 APRIL 2019**

## Energy

The Energy Performance of Buildings (Certificates and Inspections) (Amendment) Regulations (Northern Ireland) 2019 set fees for entering information on a register of energy performance certificates, display energy certificates and air conditioning inspection reports.

➔ [cedr.ec/5z8](http://cedr.ec/5z8)

**13 MAY 2019**

## Water pollution

Updated documents have been published, which identify the rivers and bodies of water in England that have been identified as urban waste water sensitive areas. This includes the 2019 notice, schedule and maps.

➔ [cedr.ec/5z4](http://cedr.ec/5z4)

**18 APRIL 2019**

## WEEE

The Scottish Environmental Protection Agency seeks views on the proposed charges for operators of schemes covered by the Waste Electrical and Electronic Equipment Regulations 2013.

➔ [cedr.ec/5z3](http://cedr.ec/5z3)

**29 APRIL 2019**

## Environmental permitting

The Environment Agency is consulting on plans to change the standard rules sets SR 2018 No 1 to 6 and SR 2018 No 8 to accommodate specified generators that may include new medium combustion plants.

➔ [cedr.ec/5zb](http://cedr.ec/5zb)



# INCOURT

## POLLUTION

## Sewage pollution leads to £200,000 restorative charity donation

**T**he Environment Agency has secured a £200,000 donation through an Enforcement Undertaking following a pollution incident near Doncaster.

Yorkshire Water Services Ltd paid £200,000 to the Yorkshire Wildlife Trust, admitting it caused sewage to enter the Pissie Beds Drain, a tributary of the River Trent.

Enforcement Undertakings are a restorative enforcement sanction. Polluters can make an offer to the Environment Agency to pay for, or carry out, environmental improvements as an alternative to other enforcement action. The Agency then considers whether the remedial efforts offered by the polluter are acceptable.

In September 2015, the Environment Agency was made aware of a burst at a main surface water sewer. Further investigations showed that a transfer of foul sewage between pumping stations led to raw sewage entering the Pissie Beds Drain near Hatfield Colliery.

Elevated ammonia and low dissolved oxygen levels were detected due to sewage entering the watercourse, which had potential to harm fish and the invertebrate life. The Environment Agency and Yorkshire Water Services' response meant the pollution was contained while the burst was located, stopped and fixed.

Yorkshire Water Services cleaned the watercourse and repaired the rising main that burst at a cost of £235,000. It also paid the Environment Agency's costs and carried out a review of its telemetry system to ensure early warnings are received and acted on, with additional alarms put in place.

The Enforcement Undertaking offers were accepted by the Environment Agency in February 2019 and payments to the charity have been made. The donation of £200,000 to the Yorkshire Wildlife Trust will be used to fund Humberhead Levels Nature Improvement Area.



## OTHER NEWS

## New evidence to plan for flood and coastal risks

The Environment Agency has published a new economic assessment to plan for flooding and coastal risk management during the next 50 years. The study will use climate change, population and mapping data to identify potential scenarios and assess how funding should be allocated.

The Long-Term Investment Scenarios Report states that, without sustained investment, flood damage to properties and infrastructure in England will increase. The Agency estimates that an average investment of £1bn will be needed up to 2065.

A variety of measures are needed to ensure communities are resilient. This includes building and maintaining large-scale engineered defences, natural flood management techniques such as planting trees and slowing water flow, and flood resilience for homes.

During the next 50 years, the number of properties on the floodplain is estimated to double. Continuing to make the right decisions will be crucial to keep pace with population growth and climate change.

Julie Foley, the Environment Agency's director of flood strategy, said: "This report sets out the level of investment we need to consider over the next 50 years, alongside the action we need to take."

"The scenarios are a key evidence base to inform our Flood and Coastal Erosion Risk Management Strategy, due later this year, and will help government, businesses and the insurance industry plan for the future."



## CASE LAW

## Judicial review against hen harriers brood management trial dismissed

An application for judicial review of a decision by Natural England has been dismissed. The Royal Society for the Protection of Birds (RSPB), and scientist and conservation campaigner Dr Avery, applied for judicial review against the decision to grant licence to conduct a trial into the brood management of hen harriers pursuant to the Wildlife and Countryside Act 1981.

Hen harriers are protected by the Wild Birds Directive 2009/147/EC. However, hen harriers were being illegally killed and their nests destroyed because they feed grouse chicks to their young – harming the grouse-shooting industry.

Natural England proposed a scheme that would remove hen harrier eggs and chicks from nests, rear them in captivity, and release them away from grouse moors when fledged. It wanted to hold a trial to investigate the effect of brood management on the behaviour of the moorland community, and to investigate whether it could rear hen harriers in captivity and release them to become successful breeding adults in the English uplands.

The RSPB and Avery said the scheme was unlawful because of the disturbance it would cause to hen harriers. They also claimed that Natural England had misapplied the

Wildlife and Countryside Act 1981 by treating the purpose of the licence solely as research and not including the conservation of hen harriers, despite conservation being the ultimate purpose.

The judge concluded that Natural England's interpretation of the 1981 Act was correct and that there was no evidence it was trying to avoid the statutory purpose of conservation of an endangered species. The scheme of care for the hen harriers was adequately secured and it was clear that Natural England's purpose was to further conservation, not to protect the grouse-shooting industry.



The global food system is damaging the planet and our health, the Wellcome Trust's **Modi Mwatsama** tells Huw Morris.

Only a wide-ranging food revolution – encompassing production, policy, marketing and diet – will change that

# Hard to Swallow

**T**here are times when Modi Mwatsama ponders the intricate links between food systems, public health and climate change and wonders where to start.

Every country is wrestling with the monumental health and environmental consequences of people's diets. Around 820 million people across the globe do not have enough food. Many more eat badly,

and consequently suffer from conditions such as diabetes, heart disease and obesity. On the other side of the coin, global food production puts enormous pressure on the planet's resources, swallowing up 40% of the world's land and 70% of its freshwater.

The way we eat is hurting the planet and ourselves. Mwatsama grapples with this challenge in her role as senior science lead in food systems, nutrition and health at the Wellcome Trust's 'Our Planet, Our Health' programme. The programme focuses on a panoply of issues affecting planetary health: how to make the earth a healthy home for humanity; what we eat; how we produce it; how we design cities to promote healthy lifestyles; how we shift societies to more sustainable energy sources.

Policymakers do not have the resources to gather evidence and analyse it. Our Planet, Our Health aims to plug that gap. Like many in her field, Mwatsama has learned to take a deep breath.

## The scale of the problem

"If you stop and look at the big picture you can think: 'where do you start?'" Mwatsama says. "But it's the nature of complex systems, and all governments have these challenges. This is just one of many they have to solve.

"The easiest way is to start off with the one bit of the picture where the evidence really shows a measurable impact. We are seeing salt reduction, traffic light labelling and sugar taxes starting to work. When you break it down into chunks you can start to make a difference."

The three big threats to public health, according to Mwatsama, are mental health, drug-resistant infections and climate change. The health risks of poor diet sit in the background of this unholy trinity, outweighing the combined damage from alcohol, smoking, unsafe sex and drug abuse. Meanwhile, food systems contribute around 30% of global greenhouse gas emissions. Two thirds of these emissions are due to the production of animal-based foods and animal feed. With the global population set to reach 10bn by 2050, we need to start eating healthily and sustainably.

Mwatsama points to landmark figures revealed by the Institute of Health Metrics' Global Burden of Disease, published in *The Lancet*. Around 70% of the burden of global disease is down to non-communicable diseases such as heart disease, diabetes, obesity and cancer, all of which are related to diet. Globally, one billion people are under-nourished, another two billion suffer from a micronutrient deficiencies, and two billion are overweight or obese.

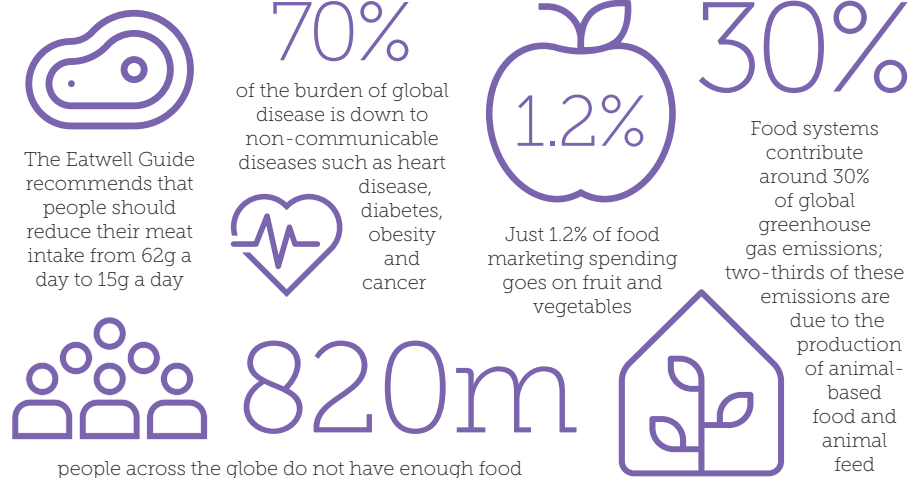
"Until the Global Burden of Disease project, nobody really attempted to add up the combinations of different risk factors or find out what proportion are diet-related," she says. "We have started to appreciate the scale of the problem, although that's not to say other risks are not important. But huge numbers of the world's population are affected by poor diet."

## Plant-based for the planet

So what is the answer? One place to start is meat. In the UK, under the Eatwell Guide, the recommendation is that the typical person should reduce their meat intake

## THE BIG FOOD FIGHT

The global food system stacks the odds against health and the environment



"We are seeing salt reduction, traffic light labelling and sugar taxes starting to work"

from around 62g a day to around 15g a day. "That's a significant reduction of around 75% just to meet health recommendations," says Mwatsama.

Eating more plant-based food – fruit, vegetables, pulses, nuts – is as good for the environment as it is for health. "They have a lower impact on the environment and they're good for health as they increase fibre intake," Mwatsama says. "At least 70% of the UK population is not meeting their target for eating fruit and vegetables. Pulses are much better for the environment than meat and they are a very good source of protein and iron, so they make a good substitute."

Our Planet, Our Health is also funding research into how much people need to cut their meat intake to reduce impact on water and land. "That's a win-win benefit that people weren't talking about a few years ago and are only starting to recognise. Now we need to think about how to make it happen."

Agricultural subsidies are a big obstacle. The Common Agriculture Policy accounts for 40% of the European Budget, with the vast majority of its subsidies supporting animal feed or production – and this is a trend repeated around the world. "The impacts of the food system on the environment are phenomenal," says Mwatsama. "You need to look at what the drivers within the food system are; there are challenges all the way. Very few subsidies go to plant-based food, pulses, fruit, vegetables or nuts."

Mwatsama points to guidelines set by the EAT-Lancet Commission on healthy diets from sustainable food systems. "What we need now is for governments to translate global scientific targets into national targets for each country based on what they eat and currently produce, then use those as a guide to inform policy. Most subsidies have not been set with health or environmental considerations in mind."

## Set up to fail

However, there are other factors driving food systems. Unhealthy food is cheaper for the consumer, but makes huge profits. Mwatsama points out that, per kilo, crisps are about 12 times more profitable than raw potatoes. Huge amounts of food are also wasted; estimates put this loss at





## Interview

between 30-50% from production through to consumption. Around a third of food in the UK is wasted, with 60% of that lost at farms. Procurement standards set by supermarkets are another obstacle, and many consumers do not understand use-by dates on food labels.

"Multi-buy offers on fresh food are not a good idea," she adds. "It's good to have discounts to make it more affordable, but promotions make people buy more when they are not going to eat that extra bag of salad before it goes off."


Other drivers are subliminal. The food industry's marketing culture "not only causes people to eat the wrong things, but makes them eat more – and the more people are exposed to marketing, the more they are likely to eat the food they see," Mwatsama says, adding that just 1.2% of food marketing spending goes on fruit and vegetables.

"There is an element of choice driving people's individual behaviour, but at the same time it's very hard to do the right thing when the whole system is structured for you to do the exact opposite."

This helps to explain why the public is largely unaware of the issues. Until recently, many professionals did not join the dots, either.

"Experts in climate change and sustainable food systems are aware of this, but I don't think there is a general awareness among the wider public or policymakers and governments. Perhaps some private sector actors think about the risk to their businesses. But the figures are not well known and we need to address that.

"Some of these problems have been tackled in silos. Those who work on environmental issues will probably be up to speed on the challenges to freshwater and greenhouse gas emissions, but until recently they have not reached out to those working in the food and nutrition space to say: 'have you considered environmental impacts?'"

"My career in public health nutrition has focused on tackling the biggest diseases related to unhealthy diet, but it's not until the past four to five years that I started to think about the environmental impact. As climate change has risen in prominence, we are realising that, if you look at health consequences in isolation, you are going to end up with a new set of problems with the environment." 

**HUW MORRIS** is a freelance journalist.



"It's hard to do the right thing when the whole system is structured for you to do the exact opposite"

### CHANGING TASTES

Modi Mwatsama was director of policy and global health at the UK Health Forum between 2009 and 2018, and joined the Wellcome Trust last year. She was previously a senior researcher at the Global Research Network on Urban Health Equity at University College London, and a manager at Heart of Mersey, England's largest cardiovascular disease prevention programme. Before that, she was a policy officer at the National Heart Forum.

Mwatsama has served on several national advisory committees, including Public Health England groups on dietary guidelines, sugar and global health.

She has a degree in human nutrition from London South Bank University and a masters in public health nutrition from the London School of Hygiene and Tropical Medicine. She also gained a doctorate in public health from the latter institution, and is an honorary assistant professor there.



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# DATA FROM do it

With manual monitoring of water quality and flow rate often presenting challenges, **Rosa Richards** examines some of the remote monitoring options that have emerged

**T**he announcement that England is set to run short of water within 25 years made the headlines in March 2019. As freshwater resources become scarcer, accurate measurement of water quantity and quality is more critical than ever. Flooding events also cause water quantity and quality issues, causing damage and public health issues – as seen in the catastrophic flooding in Mozambique resulting from Cyclone Idai in March 2019.

Monitoring the quality and flow rate of water bodies is necessary in order to meet regulations and protect ecological health, human health and the environment. However, effective manual monitoring is often impractical. High river flows during flooding events, for example, can make manual monitoring too dangerous. In addition, budgets for environmental monitoring may be tight. Fortunately, remote and autonomous methods for monitoring water bodies can offer safe, cost effective and efficient alternatives.

### Satellite imaging

Satellite images used to be too crude to be useful for environmental monitoring purposes, with pixels corresponding to 300m<sup>2</sup> groundcover, but resolution now goes down to pixels of 10m<sup>2</sup>. "The resolution of images from the second generation of European satellites is now detailed enough to provide useful optical

data to environmental agencies," says Dr Bill Brierley, CEO of the Freshwater Biological Association. "Another benefit is that satellites revisit the UK every one to five days, which is much more frequent than manual sampling by environment protection agencies."

A Natural Environment Research Council project evaluated the use of satellite remote sensing for regulation and monitoring of inland water quality in the UK. Dr Claire Neil of the University of Stirling assessed algorithms for inferring valuable water quality parameters from satellite images using reflectance data; she found that satellite data could be used to accurately predict the quantity of chlorophyll a (a surrogate measurement of algal biomass in water) present in Scottish lochs when compared to actual water samples.

The University of Stirling is currently developing a method for using satellite images to classify water bodies according to the European Water Framework Directive, which could be used across Europe. The next step will be to add in other common water quality parameters using publicly available data sets from the Google Earth Engine. Maps can then be produced to monitor water quality using satellite images. This can help with environmental regulation, and also boost early detection of quality issues in drinking water reservoirs. Satellite images can also be used to identify where samples should

be taken on the ground, so that water quality can be investigated further and pollution sources located.

Of course, satellite imagery has limitations: a satellite pass-over can only take useful images on a cloud-free day. At Loch Leven in Scotland, for example, there were only 95 days in one year when satellite images could be taken. However, this is a much bigger dataset than the 12 samples that were taken by the Scottish Environmental Protection Agency (SEPA) that year. Additionally, thousands of lakes can be monitored in one satellite pass-over, whereas only 60 lakes are manually monitored by SEPA, and remote sensing using satellites is especially useful for monitoring lakes in areas that are inaccessible for ground sampling.

Another benefit is the fact that a satellite can obtain a picture of the water quality across the whole lake, rather than just one spot sample from one location. This equates to millions of satellite 'water samples' per year – far more than the 720 manual samples per lake per year taken by SEPA. Satellite monitoring could thus help environmental protection agencies deliver more for less at a time when environmental regulation budgets are tight.

Satellite imagery can even be used to monitor river flow rate; Professor Fujita Ichiro at Kobe University has developed a piece of software that can measure flow rate using image analysis. This could be used for flood risk management.



# a n c e

## ARC boats

"Remote sensing methods offer a much safer way to measure fast-flowing rivers," says Andy Roberts, technical specialist at the Environment Agency. "Methods have advanced a long way since the old days of sending out a manned boat in dangerous conditions to measure river flows, or sending staff to a gauging weir, which itself can become flooded when we experience extreme events. We now use remote control ARC-boats with integrated acoustic Doppler current profilers (ADCP), among other methods."

An ADCP sends out sound beams to measure river flows and map the river profile. When ARC-boats are used, data

can be collected by two people 15 times more efficiently than by a manned boat – two people can cover six sites in one day (three sites per person per day), whereas five people manning one boat for one day for one site (0.2 sites per person per day). ARC-boats also achieve better results at difficult sites.

River flow monitoring is used not just for managing flood risks, but also for managing a host of other issues, including droughts, water supply, discharges from

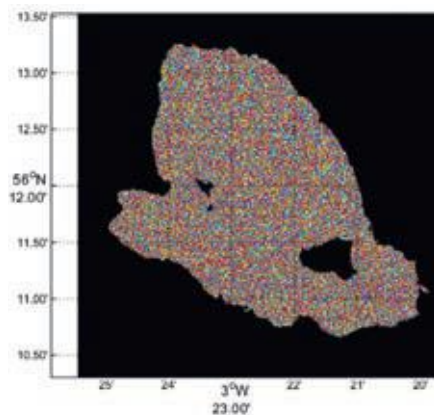
"Remote sensing using satellites is especially useful for monitoring lakes in areas that are inaccessible for ground sampling"

industry, ecology and environment, infrastructure planning, design and protection, agriculture, house building and climate change research.

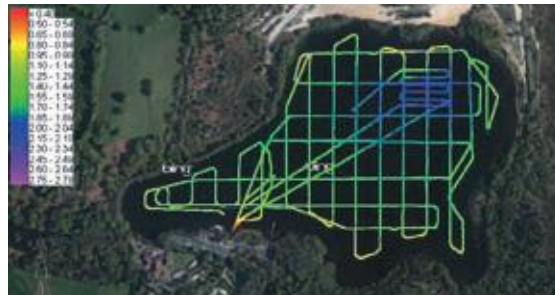
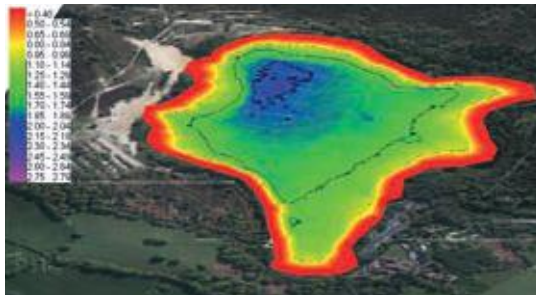
Even more advanced than remote control vehicles are autonomous aquatic vehicles (AVs), which can be programmed to run repeatable missions for a series of data, even at sites with difficult access. There is an investment cost, but AVs pay for themselves over time as field resources can be reduced – an AV can feasibly be deployed by just one person, and this can be done outside of normal working hours if needed. The AV can even be left unsupervised to navigate a water body on a pre-programmed course and create a detailed profile before being picked up later.

An aquatic AV can collect various types of data: bathymetric data, hydrometric data, environmental water quality, industrial water quality and side scan sonar, depending on the sensors on board. This data has a wide range of applications, such as bathymetry

✓ Second-generation Sentinel-2 MSI satellite image of Lake Vänern, Sweden, with 10m<sup>2</sup> pixels



✗ Sentinel 2b satellite image of Loch Leven, Scotland, which has 34,692 10m<sup>2</sup> 'pixels' of optical data that can be used to predict water quality based upon the frequencies of light reflected off the lake surface



- 3D bathymetry of a lake, visualised using data collected by an autonomous rQPOD – a type of remote survey boat © Xylem Analytics
- Depth 'soundings' of the same lake, taken using an rQPOD © Xylem Analytics
- ARC-boat with integrated ADCP, developed by HR Wallingford © Environment Agency
- An rQPOD in action © Xylem Analytics



surveys, flow/velocity/discharge, habitats surveys, reservoir management, bathing water monitoring, combined sewer overflows, unlicensed industrial discharges, pollution tracking and tracing, dredging and construction, commercial aquaculture, thermal discharge and saline intrusion into a freshwater body.

## Sensors

A joint India-UK research project is evaluating the use of water quality sensors to indicate aquatic ecological health in India. A fluorescence sensor can be used to detect the processing activity in water, distinguishing peaks of fluorescence associated with microbial activity in order to measure the presence of the amino acid tryptophan. The project is deploying, adapting and networking sensors along the Hooghly River in urban Kolkata, India, to undertake catchment-scale monitoring of freshwater systems.

Researchers at the University of the West of England (UWE) propose that measuring aquatic fluorescence organic matter in situ and in real

time, alongside other water quality parameters in a multi-parameter probe, will enable them to monitor microbial activity and help infer the overall ecosystem health of the water.

Professor Darren Reynolds of UWE is leading the UK consortium of the research project. "Our initial scoping studies showed a good correlation between the level of tryptophan measured with a fluorimeter compared with biological water quality indicators like thermotolerant faecal coliform (TTC) bacteria and E. coli measured in lab tests," he says. "We are confident about building on these findings to develop a method for potentially monitoring freshwater ecosystem health."

A method for inferring how well our aquatic freshwater ecosystems are functioning is needed if we are to better manage the freshwater needed for human life, as well as identify the presence of pathogenic bacteria that could require extra water treatment. There is no doubt that managing our water resources is a global issue, and many new technologies are enabling us to do so more effectively than ever before. <sup>1</sup>

"When ARC-boats are used, data can be collected by two people 15 times more efficiently than by a manned boat"

**ROSA RICHARDS** is an independent environmental consultant specialising in water policy and monitoring, a freelance science writer and programme manager of the Sensors for Water Interest Group (SWIG).



Air pollution

It is hard to keep cool about the pace of progress in reducing carbon pollution and ensuring a stable climate. Scientific advice is loud and clear; protestors convey the sense of frustration that many of us feel; climatic disasters happen with greater frequency and intensity than ever before. Change is happening – it is just not fast, or consistent, enough.

A significant opportunity to reduce pollution lies in the cooling sector. Described as a 'blind spot' by the International Energy Agency, the sector is responsible for a double whammy in pollution terms. Cooling technology uses super-polluting F-gases that can be a thousand times more warming than CO<sub>2</sub>. At the same time, it utilises huge amounts of mostly fossil fuel energy – too often in an inefficient manner.

As the earth heats up, urban areas swell, disposable incomes rise and populations grow, especially in hot climates, the demand for cooling is booming. In 2018, total new solar capacity in the world (estimated at 100GW) was effectively cancelled out by total new demand for cooling (which exceeded 100GW). The number of air conditioners will grow from 1.6bn today to 5.6bn by 2050. This will use the combined current electricity capacity of the US, EU and Japan.

If this demand is met in an unsustainable way, the world's carbon budget will be blown. The good news is that efficient air conditioners and refrigerators with low global warming potential already exist. What's more, all countries in the world have agreed, through the Kigali Amendment to the Montreal Protocol, to regulate super-polluting F-gases. This could prevent up to 0.5°C of global warming by the end of the century. All parties to the Protocol have opened up the opportunity to link this critical transformation to improvements in cooling efficiency – potentially doubling the climate benefits.

### Boosting efficiency

A big improvement in the energy efficiency of cooling could save nearly \$3trn in energy costs


"Cooling technology uses super-polluting F-gases that can be a thousand times more warming than CO<sub>2</sub>"

# Cold comfort

To slow the pace of global warming, we'll first need to fix our air conditioning and cooling systems, says **Dan Hamza-Goodacre**

by 2050, making cooling more affordable for the billions who need it every day. Cooling contributes significantly to the UN's Sustainable Development Goals – we need it for vaccines and medicine, to keep working conditions productive, to create comfortable shelter, to maintain the nutrition, safety and taste of our food and drink, to allow children to concentrate when studying, and more.

Progress to improve efficiency is also under way. Through the Kigali Cooling Efficiency Program, a philanthropic collaboration set up in 2017, policymakers in 27 countries are writing national cooling plans. Work is being done for more than 20 new national Minimum Energy Performance Standards (MEPS) to be proposed in the next few years for air conditioners and fridges. Banks are mobilising capital for cooling, and companies are creating cleaner, more efficient products.

However, there is no room for complacency. MEPS need to be commensurate with the climate challenge and deliver cost savings to consumers in the form of lower energy bills. They also need to be enforced. Cooling solutions need to be affordable and appropriate – not everyone needs an air conditioner. Good building design, appropriate behaviour and urban planning can go a long way to meeting thermal comfort needs. Without more thoughtful approaches, the 1.1bn people that Sustainable Energy for All estimates lack access to cooling, will continue to suffer. 

**DAN HAMZA-GOODACRE, FIEMA CENv**  
is executive director of the Kigali Cooling Efficiency Program.

## TIME FOR ACTION

Why we need to improve our cooling systems

100GW

In 2018, total new solar capacity in the world (estimated at 100GW) was effectively cancelled out by total new demand for cooling (which exceeded 100GW)

0.5°C

The Kigali Amendment to the Montreal Protocol could prevent up to 0.5°C of global warming by the end of the century

5.6bn

The number of air conditioners in the world will grow from 1.6bn today to 5.6bn by 2050

27

Policymakers in 27 countries are writing national cooling plans through the Kigali Cooling Efficiency Program

\$3trn

An improvement in the energy efficiency of cooling could save \$3trn in energy costs by 2050



# Forcing the issue

High-profile activist-led campaigns are demonstrating the increasing ability of NGOs to compel global policy change. **Robert Blood** explains what this means for investors

**T**his Easter's blockades of central London bridges and road junctions by climate activists are a salient reminder that there is still fire in the belly of the UK's environmental movement. While disrupting city centres gets the attention of the media, activists' rising public and private pressure on financial institutions has been less noticed. This has triggered a radical shift in investment funds' attitudes towards fossil fuels.

Only last year, Legal & General pulled its Future World index funds out of one of the world's largest investors, Japan Post Holdings (JPH), citing "persistent inaction" to address climate risk. Many of Europe's biggest banks and insurers have announced new or strengthened anti-coal policies during the past 24 months – as have several major banks in the US, despite (or because of) their government's hostility to the issue.

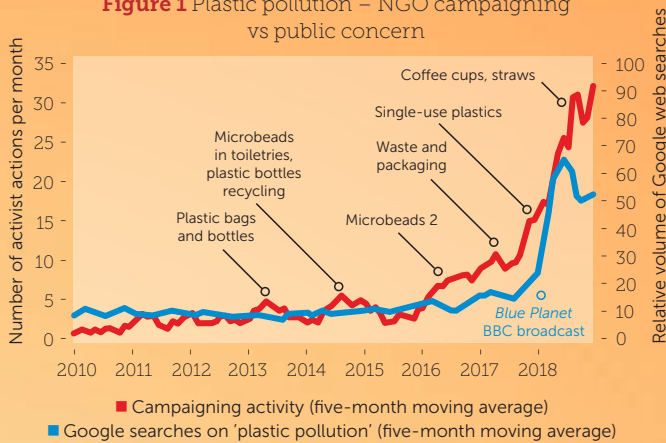
## Applying pressure

High-profile, often embarrassing campaigns by determined environmental activists do work. This is not a new discovery. The model for the climate divestment campaign is the US campus campaign against South Africa in the mid-1980s. Designed to undermine the apartheid regime economically, it made South Africa a pariah state for US firms for nearly a decade, and triggered several anti-South Africa investment laws in Congress.

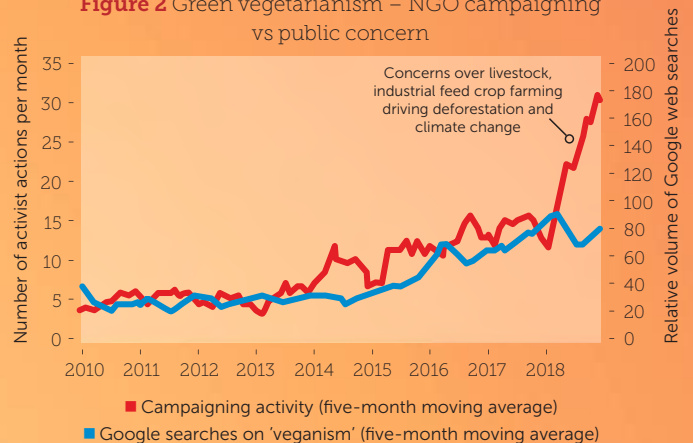
The influence of activist groups goes well beyond climate change. That ESG-directed investing has moved from fringe to mainstream is largely down to NGOs, particularly since the 2008 financial crash. Post-crash financial institutions realised they had to show visible change to answer charges that they were out of touch with society's needs. Engaging with activists allowed banks and investors to show they were listening, and chimed with the needs of 'sensitive' clients such as pension funds, which were under pressure from employees and labour unions to consider the social and environmental impact of their investments.

But with activists expecting action on concerns as diverse as indigenous rights and sustainability, circular economies, supply chain labour standards and animal

**Figure 1** Plastic pollution – NGO campaigning vs public concern



**Figure 2** Green vegetarianism – NGO campaigning vs public concern



rights, how should funds prioritise their policy development?

As it happens, the activist groups' own campaigns provide a handy 'early warning system' that helps predict which issues will catch fire with the public and stakeholders.

## In the spotlight

Take plastics. Three years ago, plastic pollution was a rumbling issue. Experts were aware of the problem but there was little public interest except regarding plastic carrier bag littering. This started to change with NGO pressure over plastic microbeads in toiletries, and the issue exploded in early 2018. David Attenborough's programme *Blue Planet* was a factor here – but so was a massive increase in NGO campaigning on single-use plastics in the months before, which had already begun to put major corporations and politicians on the spot.

As *Figure 1* shows, this almost overnight change in public sentiment correlates with

"That ESG-directed investing has moved from fringe to mainstream is largely down to NGOs"

the earlier uptick in activist campaigning, which SIGWATCH tracks through logging major campaigning actions, tagged to the key issues. With a series of well-focused and increasingly insistent campaigns, NGOs effectively forced the plastics issue into the public consciousness (as measured by the relative volume of Google searches).

We can see a similar correlation with shale gas (fracking) in the US, and currently, with 'green vegetarianism' – vegetarianism and veganism inspired by environmental concern (see *Figure 2*). We are probably only in the early stages of the issue cycle, but the same 12 to 18-month lead of rising campaigning over public response is already visible.

We know NGOs 'make the weather' on ESG. The predictive power of their campaigning reveals that their impact is no accident. Rather, it is a result of creating overwhelming public attention that almost inevitably drives a public response; through cooperative financial institutions, this influence is being translated into tangible economic choices. Armed with knowledge about where activists are going, investors have the opportunity to ride this wave, rather than be dragged down by the undertow. <sup>1</sup>

**ROBERT BLOOD** is founder and managing director of SIGWATCH, a data gatherer and consultancy specialising in NGO campaigning.



# Food for thought

The Lancet Commission on Obesity's recent reports call for restraints on the power of 'Big Food' and a revolution in agricultural and dietary habits, as **Elisabeth Jeffries** explains



**L**arge food producers are potentially as harmful to health as tobacco companies, according to recently published investigations produced by the Lancet Commission on Obesity, an international group of scientists, researchers and doctors. The studies – *The Global Syndemic of Obesity, Undernutrition, and Climate Change* and *Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems* – could have far-reaching effects on agricultural and environmental policies if their recommendations were implemented. They attack the food production industry and call for a radical change to diets.

Unsurprisingly, the experts promote healthy food. They also state that food items such as energy-dense snacks, confectionery and sugary drinks share commonalities with tobacco through the "damage they induce and behaviours of the corporations that profit from them".

## Global food treaties

In *The Global Syndemic of Obesity, Undernutrition, and Climate Change*,

the Lancet Commission calls for a global 'Framework Convention on Food Systems'. This would act in a similar way to the World Health Organization Framework Convention on Tobacco Control, which came into effect in 2005. That supranational agreement, which excludes tobacco companies from negotiations, seeks to protect people from the consequences of tobacco consumption and exposure to tobacco smoke.

The food treaty would limit the political influence of 'Big Food' in the same way. It would reduce what the Lancet Commission calls the "power asymmetries" created by Big Food and ensure comprehensive action. The Commission suggests that the creation of such a treaty would protect the health of populations by restricting lobbying among food companies.

"Food companies should not have access to the forum where policy decisions are made," says Tim Lobstein, an author of the report and policy director for the World Obesity Federation – a worldwide membership organisation that represents health professionals and patients. "Their ability to influence decision-making is

distorting food supply while smaller food producers are not present."

## Big Food influence

Health professionals investigating major food manufacturers have found evidence of behind-the-scenes lobbying that they believe obstructs regulatory or trade measures promoting healthy eating.

"The most obvious examples in recent years have been the huge investment that sugary drinks companies, chiefly Coca Cola and Pepsi, and the business associations they fund, have made in trying to prevent taxes on sugary drinks wherever they raise their head," says commission co-chair Professor Boyd Swinburn of the University of Auckland, New Zealand. Activities he cites generally include direct bribes to politicians as well as more subtle activities such as sports events sponsorships, science funding to show the benefits of exercise, the formation of false grassroots groups and payment of existing groups to oppose taxes and other fiscal or trade instruments.



### Laggard advantages

For commercial reasons, food companies are not motivated to produce healthy food and drink. "High fat and salt content are cheap, palatable and easy to sell to children, so promotional restrictions affect margins and raise costs," says Jane Landon, health specialist at Eating Better, an advocacy alliance of more than 50 organisations. "They don't want to reformulate so as not to get ahead of public taste. Until laggards catch up, the leading companies are at competitive disadvantage."

Products with a long shelf life, such as crisps, offer higher margins and profitability than, for example, a bag of potatoes. The high profits give companies the funding to advertise them, creating a feedback loop of consumption and profit. "If society sets up the food system as it does, with only profit as the driver and with zero consequences for a company that creates health and environmental damage, then we get the inevitable outcomes from the food system that we see," says Swinburn.

### Transforming food systems

*Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems* proposes a vision for sustainable food production and accompanying policies. Recognising that many parts of the world are inadequately nourished, and environmental processes are pushed beyond safe boundaries by food production, this report urges a global transformation of the food system.

To rectify the problem and introduce widespread healthy eating and sustainable

## "Big Food's ability to influence decision-making is distorting food supply"

agriculture, the authors recommend a diet of vegetables, fruits, whole grains, legumes, nuts, unsaturated oils and a low to moderate amount of seafood and poultry. A healthy diet would exclude or contain a low quantity of red meat, processed meat, added sugar, refined grains and starchy vegetables.

### Farming overhaul

Moving to healthier foods would require a major shift in agricultural systems and incentives, amounting to an "agricultural revolution that is based on sustainable intensification and driven by sustainability and system innovation". For example, the study indicates it would require at least a 75% reduction in yield gaps for farmers. This is the difference between a crop's maximum potential yield and its real yield. On average, soy and wheat produce less than 50% of their maximum potential yield.

It would also mean global redistribution of nitrogen and phosphorus fertiliser use, phosphorus recycling, and radical improvements to the efficiency of fertiliser and water use. A rapid implementation of agricultural mitigation options to reduce greenhouse gas emissions, adoption of land management practices that shift

agriculture from a carbon source to sink, and a fundamental shift in production priorities would also be needed. Finally, the vision incorporates climate mitigation options, including changes in crop and feed management and enhanced crop diversity and biodiversity within agricultural systems.

### Price hikes and subsidies

The EU Common Agricultural Policy would have to be abolished. "What does the US Farm Bill or the EU Common Agricultural Policy privilege with its subsidies? It isn't the fruit and vegetables or nuts and legumes which we need for a healthy sustainable diet," points out Boyd Swinburn. Instead, these policies encourage monoculture cropping (mainly for animal feed or commodities to create highly processed foods) or beef and dairy farming.

As a result, food prices would probably rise, because they need to fully reflect the true cost of food. Subsidies on fertilisers, water, fuels, electricity and pesticides need to be critically reviewed and possibly removed, while prices should reflect environmental and societal health costs of food supply and consumption, through the introduction of taxes. This would mean the application of social protection or safety nets for more vulnerable populations.

Unsurprisingly, responding to the report, many agricultural organisations defend meat production in particular. The National Farmers Union, for instance, draws attention to scientific findings that show red meat plays a "vital role" in a balanced diet. "It is overly simplistic to target one food group for a significant reduction in consumption and it ignores its medically accepted role as a key part of a healthy, balanced diet," the organisation says. It also describes the British livestock industry as one of the most efficient in the world, with 65% of UK farmland highly suitable for grass production over other crops. "The UK is well placed to produce food from sustainable livestock grazing systems. Grassland is a very good store of carbon, helping to mitigate the effects of climate change." <sup>1</sup>

**ELISABETH JEFFRIES** is a freelance journalist.

## A WHOLESALE SHIFT

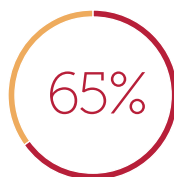
Our current agricultural system makes sustainable and healthy diets harder to achieve; sweeping changes are required in order to make it fit for purpose



reduction in yield gaps is required to deliver a move to healthier food



Soy and wheat produce less than 50% of their potential yield



of UK farmland is suitable for grass production over other crops

# Over the limit

**Dr Ian Ross** and **James Lemon** examine the regulations and guidance attempting to deal with poly- and perfluoroalkyl pollution

regulatory changes are diminishing acceptable daily exposure levels for the general population, known as Tolerable Daily Intakes (TDIs). In May 2016, based on new TDIs, the United States Environmental Protection Agency (USEPA) issued an updated

**P**oly- and perfluoroalkyl substances (PFAS) are a broad group of several thousand manmade chemicals that were first developed in the 1940s. The properties of these chemicals include thermal stability and the ability to repel both oil and water, meaning they have been widely used in industrial and consumer applications such as textiles coatings and firefighting foams.

The widespread use of PFAS during the past 70 years has led to large-scale releases into the environment from sources such as firefighting training areas, wastewater treatment plants, metal plating operations and landfill sites. Once released, PFAS are extremely persistent and show significant bioaccumulation in humans. They are mobile in water and can create large plumes in surface and groundwaters, which can impact drinking water supply wells, food and beverage manufacture, and crop irrigation.

## Regulatory change

PFAS are classed as emerging contaminants, and prior regulatory focus has been on two individual compounds: perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). However, an expanding range of other PFAS, such as perfluorohexane sulfonic acid (PFHxS) are now being regulated in some countries.


The international response was 2009's Stockholm Convention on Persistent Organic Pollutants, which led to restrictions on PFOS production. PFOA and PFHxS are also under review for inclusion. However, this does not address the fact that these pollutants have already been released into the environment, and only one PFAS of thousands has been officially restricted. Source areas, such as firefighting training areas, are likely to leach PFAS for decades.

An increasing understanding of PFAS' toxicity and persistency, and a recognition that a major route of public exposure is via contaminated drinking water, has led to regulators globally reviewing national drinking water standards. Underlying the

long-term exposure health advisory limit for drinking water of 70ng/L (parts per trillion) for PFOS and PFOA combined. Australia matched this for PFOS in April 2017, and included additional PFAS.

Public concern regarding these substances has rapidly increased. In 2016, the detection of PFAS in drinking water in the US, combined with the revised USEPA assessments, led to 6.5 million people's drinking water being considered unsafe to drink. Patrick Breyse, director of the Center for Disease Control and Prevention's National Centre for Environmental Health, described PFAS as "one of the most seminal public health challenges for the next decades".

In the UK, Drinking Water Inspectorate (DWI) guidance sets a multi-tiered approach that restricts PFOS and PFOA concentrations to 1,000ng/L and 5,000ng/L respectively, with a trigger to consult and monitor at 300ng/L. These triggers are based on TDIs set by the European Food Safety Agency (EFSA) in 2008. However, in December 2018, EFSA published revised tolerable weekly intake (TWI) levels for PFOS and PFOA. These new TWIs represents a 99.9% decrease for PFOA and a 99% decrease for PFOS compared to the 2008 TDIs. If the DWI reviews its standards in light of the new EFSA TWIs, it could generate UK drinking water criteria of 12.6ng/L for PFOS and 5.6ng/L for PFOA.

Limited publicly available information suggests PFAS are distributed widely in UK groundwaters, surface waters and some drinking water, and there may be human exposure in the UK that is above drinking water standards. Given the public concerns and regulations seen in multiple countries in recent years, and the new EFSA TWIs, further research and resources in the UK should be focused on this potentially emerging public health concern. 

**DR IAN ROSS** and **JAMES LEMON**, **CENv MIEMA** are senior technical director and principal consultant at design and consultancy firm Arcadis.



**A**s the UK looks for ways to reduce its greenhouse gas emissions, there is a growing focus on the role of agriculture and food production as key contributors of emissions. Beef production has come in for particular scrutiny, and many are now calling for a reduction in the amount of beef in our diets – or its complete removal.

Characterised by small-to-medium farm enterprises that work independently of each other, the UK cattle and sheep industry provides 1.1m tonnes of red meat to the human supply chain annually, with a farm gate value of £3bn. Uniting all beef farmers to drive industry-level change poses a significant challenge, but will be necessary to reduce beef production-related emissions to a sustainable level.

### Beefing up efficiency

On the farm, increasing fertility, lowering mortality rates and improving live weight gain would make systems more efficient, meaning more kilograms of meat could be produced using the same, or lower, levels of input. This would minimise the emissions produced while maintaining a living for the farmer.

Understanding emissions levels from different feeding systems is important, allowing farmers to make informed choices about their animal feeding regime. For instance, reconsidering the proportion of feed

produced on farm (such as moving to a grass or

forage-based system), the type of feeds imported (avoiding those with embedded land-use change emissions, such as soy) and the nutritional content of feeds (such as adjusting protein content to reduce nitrogen loss in excreta) could all help to reduce a farm's overall emissions.

By increasing the carbon stored in their land, beef farmers can further reduce greenhouse gas emissions. To ensure that stored carbon

increases annually, rather than remaining at an equilibrium, farmers need to actively increase the carbon stored

With beef increasingly in the firing line over its emissions, **Sarah Wynn** suggests actions farmers could take to make production more sustainable

on the farm on an annual basis. This could be done through the planting of trees and hedges. There is some potential to increase carbon in soils, although this is a long-term process and only provides small incremental benefits each year.

Incentivising business and land management practices with a specific focus on reducing greenhouse gas emissions is still an emerging area for the UK beef sector. Worldwide, there is a high demand for beef, but as with all food sources, there are opportunities to ensure that the end products come at a lower environmental price.

For there to be a reasonably rapid reduction in emissions output

from beef producers, the mechanisms from the marketplace and policymakers need to be clear: they should be accessible to farmers, and transparent in terms of what is being bought and sold.

The UK beef sector needs to show it is being proactive when it comes to reducing emissions from production and capturing carbon in the land bank. While there are challenges to overcome, if the producers, via their representatives, can meet these challenges, they may create market opportunities for this high-value protein product grown across the UK. By being proactive and leading the way on greenhouse gas emissions, the industry can send a strong message to consumers and influence its own marketplace. **■**

**SARAH WYNN** is managing director of sustainable food and farming at ADAS, an RSK company.





# A bug's life



Could insects be the sustainable protein source the world is waiting for?

**David Burrows** investigates

**I**t's 2025 and you're popping out for lunch, excited because it's Friday and that means the cricket Caesar salad is on the menu. Hopefully it's not sold out – again. However, you have a plan B: the mushroom soup with ants' eggs. And a plan C: the mealworm arancini is to die for.

Read the hype about insects and it seems inevitable that this is where we are headed. Current consumption levels of traditional livestock protein are unsustainable, after all, so leave the lamb and bring on the bugs – the sustainable, healthy and ethical alternative. Or at least that's how this alternative protein source has been pitched, making it the hipster food *du jour*.

Last November, Sainsbury's became the first UK supermarket to stock edible insect products (Eat Grub's Smoky BBQ Crunchy Roasted Crickets). In May, insects appeared for the first time on the regular daily menu at a takeaway food chain (Eat Grub's roasted crickets again, across Abokado's London outlets). The concept might be "quirky", Abokado managing director Kara Alderin told *The Guardian*, but crickets are "packed with flavour and protein" and represent "the way forward in healthy, sustainable snacking".

Are insects a quick fix to our unsustainable levels of traditional animal consumption, though? Or should we just eat more plants?

## Untapped potential

According to the UN Food and Agriculture Organisation (FAO), insects form part of the traditional diets of at least two billion people. "People throughout the world have been eating insects as a regular part of their diets for millennia," the FAO noted in 2013, but there is "huge potential that has essentially not been tapped yet" – mostly in the West. The FAO has just published a book, *Edible Insects: Future prospects for food and feed security*, in which the

opportunities are unpicked – arguably the point from which the current hype evolved.

Insects, the FAO writes, offer environmental benefits, including their high feed-conversion efficiency (an animal's capacity to convert feed mass into increased body mass, represented as a kilo of feed per kilo of weight gain) and their relatively light greenhouse gas footprint. They also require little water and can be reared on organic side streams (including, in some countries outside the EU, animal waste), reducing environmental contamination while adding value to waste. "The production of greenhouse gases by insect farming would likely be lower than that of livestock," the FAO said. "For example, pigs produce 10 to 100 times more greenhouse gases per kilogram than mealworms."

## Overstated claims?

However, it's not as simple as 'beef bad, grubs good'. Take the research published in the journal *Plos One* in 2015, in which University of California researchers measured the biomass output and feed conversion ratios of house crickets reared on different diets. "I think the sustainability claims on this topic have been overstated given the current state of knowledge," Mark Lundy, the study's lead author, told *Time*. He concluded that feeding crickets the same as chickens showed "little improvement" in terms of protein conversion efficiency. Feeding the crickets food waste showed promise, and it's possible that other species, such as black soldier fly, could be better suited to that kind of feed. "I am impressed by the amount of innovation that has sprung up around insect cultivation and cuisine in the last few years," Lundy said. "However, I also think we need to be clear-eyed about what the sustainability gains are and aren't."

Other life-cycle analyses show insects as the clear winner. A team led by the University of Edinburgh, for example, has calculated that replacing half the meat eaten worldwide with

crickets and mealworms would cut farmland use by a third, substantially reducing emissions of greenhouse gases. However, they noted, more research is needed on the technologies and production systems, and the feed used. Last year, the UK government gave £571,166 to Entomix, a Cambridge firm that is rearing black soldier fly larvae on different 'recipes'. It's even investigating microbial fermentation technology, a technique that reportedly enhances the nutritional quality of the feed with knock-on benefits in terms of animal welfare and reduced antibiotic use.

### Comparing feedstocks

This is where it gets interesting – it's not just about what we eat, but what the insects eat, too. "It's so important to look at the nutritional and environmental benefits of different feeds," says Alejandro Parodi, a PhD student at Wageningen University in the Netherlands. Parodi is rearing black soldier fly larvae on a range of feedstocks and then comparing the environmental impact with sending the waste for composting or to an anaerobic digestion plant. A handful of companies are hopeful of establishing industrial-scale insect farming systems, but their feedstocks remain a secret. "Insects are the apex of the recycling world. All we are trying to do is mimic that," said Keiran Whitaker, CEO and founder of Entocycle, the UK's first insect production facility, in a recent interview with *The Grocer*. By 2021, he wants six large-scale commercial farms. "Five years ago, when I said humans will be eating insects, people looked at me like I was crazy," Whitaker said.

Still, to think insects will become a staple part of our diets remains ridiculous. In a UK poll conducted by Mintel in February 2018, only 11% of respondents were interested, with 37% calling it 'disgusting'. But what about feeding them to our pets, or farmed fish and other livestock? This is where the real market could be, especially given recent changes to animal feed regulations.

In July 2017, the European Commission opened the aquaculture feed market to insect-derived protein. This reduces reliance on fishmeal and soy (a commodity linked to deforestation). Last year, the world's first insect-fed salmon – 'Friendly Salmon' – was launched, and positive talks have taken place to extend the market to pigs and poultry. This will be more complicated, but as Dennis


Oonincx, an animal nutrition expert at Wageningen University, explains, insects make "perfect sense" as poultry feed, as they are part of the birds' natural diet. However, there are topics that require "good science to show whether they are or are not beneficial", he told me, and "sustainability is one of those topics".

### Knowledge gaps

Another is welfare. The FAO said insects present "few animal welfare issues, although the extent to which insects experience pain is largely unknown".

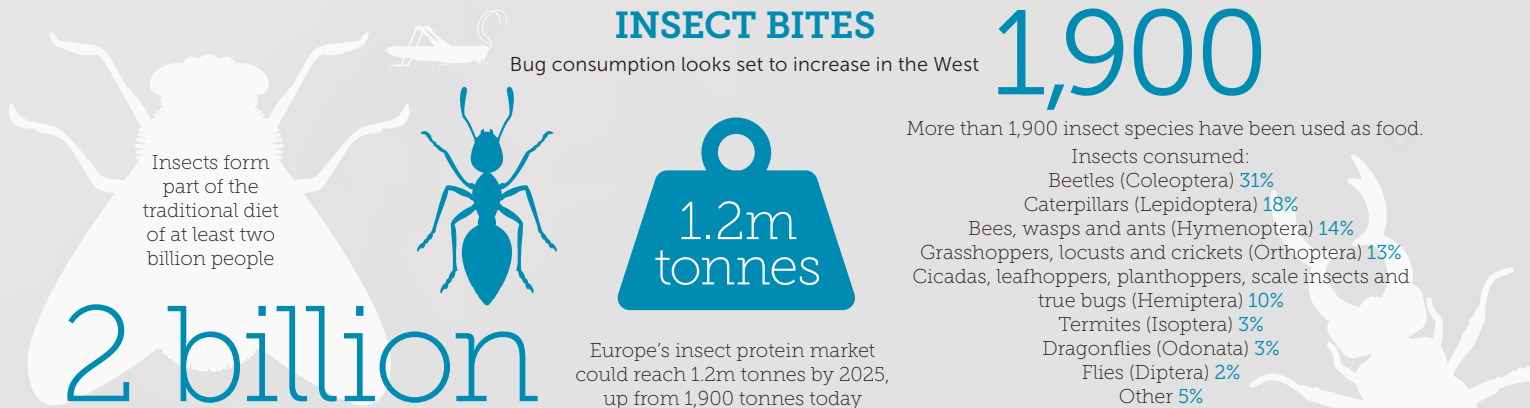
So, are insects sentient? Phil Brooke from Compassion in World Farming tried to answer this in his chapter for the book *Farming, Food and Nature: Respecting Animals, People and the Environment*. He found some evidence for this, but in the meantime, insects must be "given the benefit of the doubt".

What is often forgotten is that the insects in the diets of the two billion people who already eat them are harvested in the wild; we know little about farming them on an industrial scale. There are no European rules on insect welfare. The International Platform of Insects for Food and Feed (IPIFF) has guidelines, but with this sector set to balloon, the lack of data has to be a concern.

IPIFF estimates that 1,900 tonnes of insect protein were produced in Europe in 2018; by next year this could be 194,400 tonnes, and more than 1.2m tonnes come 2025. It's too early to say whether insects represent a truly sustainable protein source, and there is much to learn. As Brooke put it: "It would probably be more efficient to eat a black soldier fly burger than a pork chop or a chicken breast. However, it would be more efficient still to eat the cereals or soya [on which the flies are fed] directly." 

DAVID BURROWS is a freelance journalist.

"It would probably be more efficient to eat a black soldier fly burger than a pork chop"





# An agricultural

# REVOLUTION

**Rick Gould** examines the damage caused by ammonia emissions from farming – and how the government plans to bring these emissions down

**T**he government's Clean Air Strategy (CAS) names ammonia as one of five key pollutants targeted for significant emissions reductions by 2030 (the others are oxides of nitrogen, sulphur dioxide, respirable particulate matter and volatile organic compounds). While road transport, power generation from fossil fuels and industrial activities are the main sources of emissions when it comes to these other four pollutants, agriculture is the dominant source of ammonia release.

The government plans to use a combination of guidance, new legislation

and economic support for techniques to reduce ammonia emissions. It has committed to reduce ammonia emissions by 16%, based on 2005 levels. Overall mass ammonia emissions are lower than the emissions of other gaseous pollutants, but the emitted levels have not fallen as quickly. Moreover, the nitrogen in ammonia can have a significant impact on habitats, especially those that thrive in low-nitrogen soils, such as some types of woodland, bogs and moorlands.

A wealth of scientific evidence shows a clear connection between nitrogen deposition and impacts on ecosystems, such as changes in soil chemistry and

a loss of species richness. The nitrogen deposition initially affects plants; this, in turn, means a loss of habitats for animals such as insects and birds.

During the past few decades, scientists have developed metrics to characterise the impact of air pollution on ecosystems. One of these is the concept of the 'critical load'; in the case of ammonia, this is the degree of tolerance a habitat has for deposited nitrogen. Well over half the habitats in the UK have exceeded their critical loads for nitrogen: in 2017, for example, Defra reported that, while the proportion of habitats above the critical loads has fallen, at least 62% of habitats exceed their critical loads. When it came to very sensitive habitats, such as calcareous grassland and many types of woodland, Defra reported exceedances of between 80% and 100%.

Under the Habitats Directive, environmental regulators in the European



# Agriculture



🔵 Poultry farming is responsible for 15% of the UK's agricultural ammonia emissions

➡ Covered slurry storage tanks help to reduce emissions



🔵 Defra is working with the agricultural sector to develop ammonia guidance

🔵 Dairy and beef farming contribute almost 50% of the UK's agricultural ammonia emissions



Union must prevent further damage to specific categories of habitat and restore them to a good ecological state. This means reducing ammonia emissions. What are the main sources, and how can they be controlled?

"While larger farms are able to absorb the costs of controls for ammonia emissions, most UK farms are small-to-medium-sized businesses"

## Lessons from abroad

According to Defra, 88% of the UK's ammonia emissions are from agricultural activities, with manure spreading, fertiliser application and livestock housing accounting for three quarters of these emissions. These proportions are typical for the EU. Dairy and beef farming contribute almost half of ammonia emissions, while poultry and pig farming contribute 15% and 7% respectively.

Within Europe, the regulators and agricultural sectors in the Netherlands and Denmark were the first to tackle the challenge of agricultural ammonia emissions; between 1990 and 2016, they succeeded in reducing such emissions by 64% and 40% respectively. This was achieved through a combination of managerial, economic, technical and legislative measures – for example,

covering all slurry stores and specifying that all new animal housings must have the means to contain and reduce emissions of ammonia. Altering the ways in which farmers apply fertilisers and manure to fields, as well as changing animal feed formulations, can also significantly reduce emissions.

Both the Netherlands and Denmark have used legislative measures, too; these include permits for all but the smallest farms, with a requirement for fertiliser management plans and a limit on the amount of fertiliser that can be used. Recognising the costs of making such changes, they have, for example, developed incentive schemes or provided grants for some of the techniques that reduce emissions.

## AMMONIA EMISSIONS – THE FACTS

- Ammonia can react with other gases in the atmosphere to form fine particulate matter, after which it can travel long distances
- Ammonia can have a large impact locally, and particularly on habitats sensitive to nitrogen. Well over half of the habitats in the UK are overloaded with nitrogen due to air pollution, especially from ammonia
- In the EU, agriculture contributes about 90% of the total emissions of ammonia, with road transport and industry contributing the rest
- Dairy and beef farming contribute almost 50% of the UK's agricultural emissions of ammonia; poultry farming contributes 15% and pig farming about 7%. Currently, only the largest pig and poultry farms are directly regulated for ammonia pollution
- Intensive farms with capacities for 40,000 chickens, 2,000 turkeys or 750 breeding sows need a Part A environmental permit from a national environmental regulator, and applying Best Available Techniques reduces emissions by approximately 30%
- There are around 1,300 such farms, and they contribute about 5% to the total agricultural emissions of ammonia

## The UK's plans

The government aims to replicate the successes of the Netherlands and Denmark using a similar approach. Defra has already worked with the agricultural sector to develop guidance, publishing the Code of Good Agricultural Practice (COGAP) for Reducing Ammonia Emissions in 2018.

The national environmental regulators regulate the largest intensive ➡

farms under the Industrial Emissions Directive and require controls to reduce ammonia emissions. However, the scope of this Directive only includes the largest pig and poultry farms. In England, for example, these farms contribute about 5% of the total emissions, meaning that most farms are currently unregulated. The government intends to include the dairy and beef sectors within the environmental permitting regime, as well as continuing to work with the agricultural sector to apply managerial, technical and economic measures to reduce emissions.

Meanwhile, the National Farmers Union (NFU), despite being broadly positive about the need to reduce ammonia emissions, is opposed to an extension of the permit regime to cover farms outside the scope of the IED. Instead, the NFU has proposed alternatives such as incentive schemes, which have been successful in Denmark for smaller farms. However, any alternative to permitting would have to be at least as effective at reducing emissions.

The NFU has stated that environmental permitting would impose extra administrative burdens on many farms, as well as large costs for permit applications and the equipment to reduce emissions. This is the heart of the issue – who should pay for the costs of reducing ammonia emissions? While larger farms are able to absorb the costs of controls for ammonia emissions, most UK farms are small-to-medium-sized businesses and may be less able to do so – hence the government's intention to provide economic support.

## Tackling the supply chains

According to the European Commission (EC), farmers throughout Europe –

## "The nitrogen in ammonia can have a significant impact on habitats that thrive in low-nitrogen soils"

especially smaller ones – are often squeezed by powerful buyers in the food supply chain, with supermarkets at the top and several intermediaries between them. Supermarkets account for well over half of the retail food market in Europe, and the EC has reported numerous unfair practices among larger buyers in supply chains, meaning that, in the EC's view, primary food producers often get a raw deal. Globalisation and intense competition among supermarkets drives down prices, and the EC cites examples in which these price cuts are passed down the supply chains to farmers.

However, in March, the European Parliament voted to adopt a Directive on combating unfair trading practices in food supply chain business-to-business relationships. While member states may have their own laws and codes of practice against unfair practices, the Directive harmonises and strengthens these. If the UK adopts this Directive, farmers and other smaller food producers will have the legal right to challenge the unfair practices that result in poor returns on food production. More importantly, as sustainability embodies economic and social aspects as well as environmental management, this raises the question as to whether the cost of controlling ammonia emissions should be borne by farmers alone, or by everyone who benefits from the food supply-chain, including consumers? 

**RICK GOULD, MIEMA CEnv** is a technical advisor at the Environment Agency. He is writing in a personal capacity.

## Reducing agricultural ammonia emissions

<b>Animal housings</b>	Designing slurry pits with reduced contact with the air and emptying them more frequently. Washing housings and collection points more often. Emissions controls on ventilation systems.
<b>Slurry storage</b>	Covered storage tanks, floating covers on lagoons and covering manure heaps with sheeting.
<b>Slurry spreading</b>	Using injectors, band spreaders with trailing hoses and spreading in cool, humid and still conditions.
<b>Animal nutrition</b>	Optimising the protein content of feeds can reduce production and emissions of ammonia from slurry.
<b>Tree shelter-belts</b>	Scientific evidence shows that trees can be effective absorbers of ammonia from animal housings, without being adversely affected.







# Feeding the future

**Lewis Charters** examines how industrialised agriculture is affecting the planet – and our food security

Since the dawn of the agricultural revolution around 12,000 years ago, humans have relied upon the domestication of a relatively small number of species to sustain ourselves. As a result, the amount of livestock kept by humans has increased exponentially, and people and livestock currently account for around 96% of mammalian biomass on the planet; domestic poultry, meanwhile, accounts for nearly 70% of the entire bird population – only 30% are still considered wild.

The domestication of these plants and animals have allowed human populations to grow. As humans produced more food, we bore more children – and so more land had to be converted in order to feed these extra mouths. Our ancestors set in motion a series of events that affect us to this day.

## The cost of success

The industrialisation of agriculture has undoubtedly enabled humans to become the most successful species on the planet. However, it has also contributed to many of the planet's biggest sustainability challenges. For instance, rising demand for agricultural commodities such as beef, soya, palm oil, timber, leather, coffee and rubber are causing unprecedented levels of deforestation across the tropics – and the effects of deforestation are more widespread and far reaching than the initial clearance of the tropical forest itself.

The clearance and fragmentation of tropical forests from South America to Africa and south-east Asia is leading to greater human-wildlife conflict, poaching and illegal logging. Deforestation is also a major cause of food insecurity in said regions, as forest clearance leads to soil degradation and interferes with the gaseous exchanges that occur between land and atmosphere. These problems contribute to drought, flooding and variable rainfall patterns, which can lead to crop failures. The release of carbon dioxide also exacerbates climate change.

*"We are divorced from the impacts that our food systems have on the natural world"*

People have never been so disconnected from how and where their food is produced. We are divorced from the catastrophic impacts that our food systems have on the natural world. In addition, our over-reliance on certain monocultures may be putting our global supply chains at greater risk from pests, diseases and future climate change. Despite representing 0.01% of all living things, humanity has caused

the decline of up to 83% of the planet's wild mammals, and up to 50% of plants.

## Addressing inequalities

People ask: 'how we are going to feed the world's growing population, given that there are predicted to be nine billion of us by 2050?' For many, the answer is simple: produce more food. However, perhaps we should first focus on addressing the inequalities within the food system, such as unequal distribution of food between global north and south, the over-consumption of resource-intensive foods like meat and dairy, and the vast amounts of food waste that we produce every year.

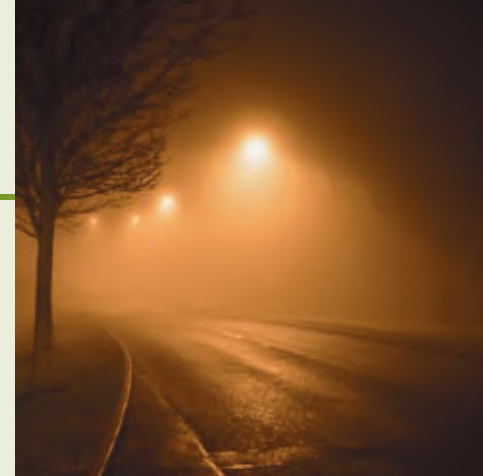
This is where the IEMA Futures generation comes in; we must usher in a new era of sustainable agriculture. New and innovative ways of thinking have never been so important. Sustainability professionals around the world are helping to tackle many of the problems within the agricultural sector, from government policy to business supply chains and civil society. The time has come to rethink how we produce and consume our food, in order to ensure harmony between our pursuit of greater food security and the preservation of the natural world. 🌱

**LEWIS CHARTERS** is a member of IEMA Futures, and is studying for an MSc in climate change and environmental policy at the University of Leeds.



# CONNECT

SOCIAL AND COMMUNITY NEWS FROM IEMA



## IMPACT ASSESSMENT

### EIA Quality Mark – encouraging assessment excellence

Quality Mark registrants contribute articles discussing environmental impact assessment best practice, and how it relates to a variety of topics

Quality Mark is an IEMA voluntary scheme allowing organisations that lead the co-ordination of statutory EIAs in the UK to make a commitment to excellence in their EIA activities, and to have this commitment independently reviewed.

Registrants to the EIA Quality Mark scheme are not only committed to delivering high quality assessments and reports for their clients, but also actively work to improve practice. One of the ways they do this is through contributing short, thought-provoking articles about different aspects of EIA practice, which aim to stimulate discussion and debate.

The growing library of articles acts to:

- Set out advice on core stages in the EIA process
- Explore longstanding challenges that need to be debated to be advanced
- Discuss new issues faced by practitioners
- Set out concerns on difficulties that hold back effective EIA.

Here, we share four interesting examples of contributions to our Quality Mark series, covering topics that range from the monitoring of water resources to the impact of light spill on wildlife.

More EIA Quality Mark articles can be found at [bit.ly/2gAw9gF](https://bit.ly/2gAw9gF). For more details on the scheme, visit [bit.ly/2VHxWqP](https://bit.ly/2VHxWqP)

## LIGHT POLLUTION

### Mitigating the impacts of artificial lighting on wildlife

Light spill from development can have significant impacts on light-sensitive species such as invertebrates, bats and birds. Steve Maguire and Alison Carroll at Nicholas Pearson Associates report.

➤ [bit.ly/NPLightWildlife](https://bit.ly/NPLightWildlife)



## PLANNING

### From consent to construction

This phase of a project brings with it a different set of tasks and challenges.

Derek Duckett of Xodus Group provides six tips to help projects successfully navigate this often-complex path.

➤ [bit.ly/XodusCoC](https://bit.ly/XodusCoC)

## METHODOLOGY

### The use of life-cycle analysis in environmental impact assessment

Kate von Pokorny of Arcadis Consulting (UK) Limited explores the idea that life-cycle analysis can help fill in any gaps found in the environmental impact assessment process.

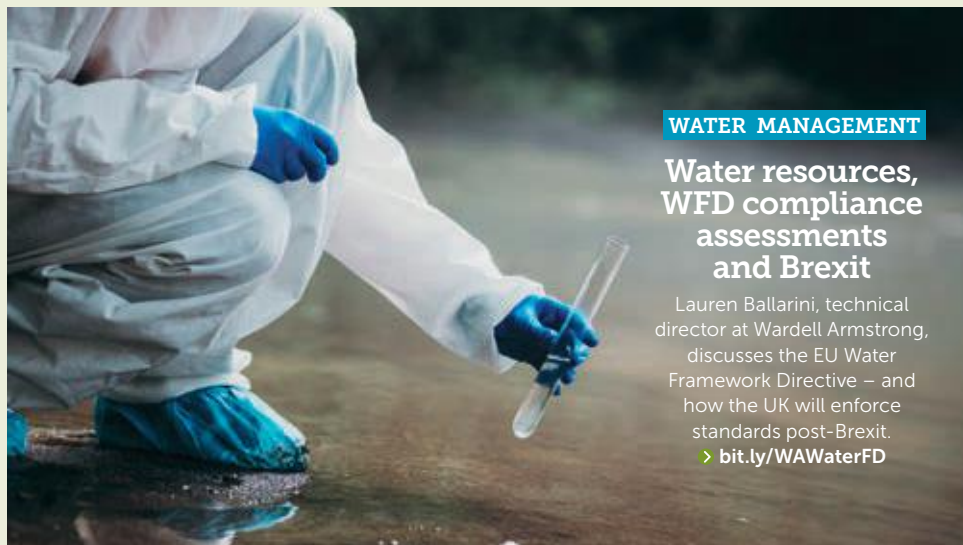
➤ [bit.ly/LCA\\_EIA](https://bit.ly/LCA_EIA)

## WATER MANAGEMENT

### Water resources, WFD compliance assessments and Brexit

Lauren Ballarini, technical director at Wardell Armstrong, discusses the EU Water Framework Directive – and how the UK will enforce standards post-Brexit.

➤ [bit.ly/WAWaterFD](https://bit.ly/WAWaterFD)



PHOTOGRAPHY: ISTOCK/SHUTTERSTOCK



## WHAT'S ON THIS MONTH

[iema.net/events](http://iema.net/events)

### WEBINAR

#### IEMA World Environment Day webinar

📅 5 June 2019

To celebrate WED we'll be sharing and exchanging information around what we can all do to address the issue of air pollution, joined by leading figures in air quality development.

👉 To register: [bit.ly/2VTTiAt](http://bit.ly/2VTTiAt)

### EVENT

#### Glasgow World Environment Day

📅 5 June 2019

The Scotland West Region will discuss local environmental projects with a focus on air quality, plus a follow-up on World Environment Day 2018, discussing plastic pollution. Stephen Thomson, head of air quality at Transport Scotland, will present the work being done on air quality through the Glasgow Low Emission Zone.

👉 To register: [bit.ly/2PWcuZ3](http://bit.ly/2PWcuZ3)

### CONFERENCE

#### Durham: Footprint Conference 2019

📅 13-14 June 2019

This two-day conference, run by Durham University students, will explore the risk that climate change poses. Speakers will cover a variety of perspectives, from visual representation and political implications to sustainable fashion and food waste.

👉 To register: [bit.ly/Footprint2019](http://bit.ly/Footprint2019)

### SITE VISIT

#### Sustainability at Roath Park Conservatory

📅 19 June 2019

The IEMA Wales Network's visit to Cardiff's Roath Park Conservatory will be an interactive event led by park warden David Jones and IEMA Fellow Jayne Rogers.

We will broaden your thinking on the social, environmental, and economic challenges presented, and how sustainability applies to any organisation.

👉 To register: [bit.ly/RoathPark](http://bit.ly/RoathPark)

### EVENT

#### Low Carbon Britain – Shaping Our Future

📅 20 June 2019

This event aims to calculate the carbon required to maintain a city in the UK, discussing the opportunities for creating low-carbon cities with a focus on Manchester and its 'zero carbon by 2038' pledge.

👉 To register: [bit.ly/LOWCarbonBritain](http://bit.ly/LOWCarbonBritain)

## QUOTE UNQUOTE

Chemical management is some way from becoming mainstream across the global fashion supply chain  
@IEMA\_Transform great article @iemanet @DRKMCDONNELL

Replying to @DrKMcDonnell @IEMA\_Transform Superb cover design @MSLUPIN



IEMA Policy & Engagement Lead Nick Blyth and Green Party Leader Natalie Bennett engaging the audience in discussion at the Sustainability Leaders Forum in London.  
@IEMANET

IEMA CEO Tim Balcon discussing the shift in Climate Change conversations and the action needed to make change happen.  
@IEMANET



Hearing @iemanet #fellows that onshore wind now cheapest power. Not just cheapest #renewables. Government policy damaging companies who need power by blocking its construction.  
#iemafellows @NATALIEBEN

I can't cope much longer with the conflict between reading about our planetary damage, then reading the business media summary I still get from my old life. It's like there is a parallel universe. But as we know there isn't even a parallel planet. Anyone else struggling?  
@SUE\_GARRARD

Replying to @Sue\_Garrard IEMA are running event related to that very topic in next week or so @iemanet @TimBalconIEMA @SARAHHILLPRATT

Tim Balcon Retweeted Sarah Pratt Quite right Sarah it seems we have a few events for our members on this issue. <https://www.iema.net/events>  
@TIMBALCONIEMA



## Why did you become an environment/sustainability professional?

I wanted to make a positive difference in the world, and leave it in a slightly better state at the end of my career than it was in at the beginning.

## What was your first job in this field?

I was a researcher and personal assistant to **Dale Vince**, the founder of green energy provider Ecotricity.

## How did you get your first role?

Through a recruitment agency. They needed someone at graduate level with a general understanding of sustainability and renewable energy who was willing to work on a random and unpredictable range of issues.

## What does your current role involve?

Day-to-day, my main responsibility is ensuring that all of Green Investment Group's (GIG) investments meet our 'green objective', so contribute positively to one of our 'green purposes'. As the sustainable finance agenda gains traction, we're also increasingly looking to provide green advisory services to other investors, fund managers and governments. I also spend a fair amount of time ensuring that GIG remains a thought leader on emerging issues such as disclosure and standardisation, where I'm working with the British Standards Institution to contribute to developing green finance standards.

## How has your role changed/progressed over the past few years?

I joined when the Green Investment Bank was just being set up – we spent the first few years setting up and working out the processes we would apply to investments. Having refined that approach, our focus is on working out how we can best apply that knowledge and experience to benefit the wider global expansion of clean technologies and green infrastructure.

## What's the best part of your work?

The interesting conversations I get to have about the hot topics of the



CAREER PROFILE

# Adrian Barnes

FIEMA CEnv

Green investment ratings manager at the Green Investment Group

sustainability agenda with professionals and stakeholders across a range of fields: investors, project developers, technical consultants, NGOs, regulators, lawyers and civil servants, to name just a few.

## What's the hardest part of your job?

Making sure I prioritise the day-to-day work on projects and investments – reviewing technical reports, contractual agreements, project modelling – over the interesting discussions with colleagues and external contacts about the direction of our industry.

## What was the last development event you attended?

A few weeks ago I was at the IEMA Sustainability Leaders' Forum in London.

## What did you bring back to your job?

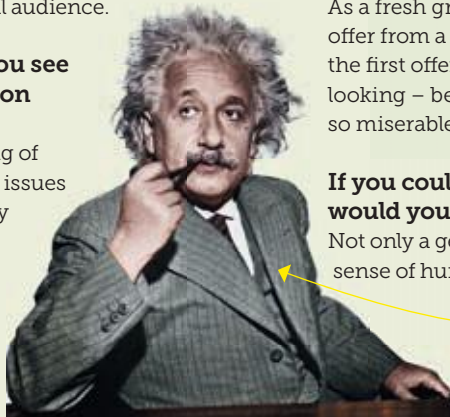
It was a great opportunity to exchange ideas with a lot of the leading thinkers on sustainable finance.

## What is/are the most important skill(s) for your job?

The ability to communicate complex technical messages about sustainability issues to a non-technical audience.

## Where do you see the profession going?

An understanding of sustainability issues is increasingly important for professionals



Visit [www.iema-transform.net](http://www.iema-transform.net) for more member profiles

in all fields. Our profession has an opportunity to influence thinking about the development of our economy and society more than ever before.

## Where would you like to be in five years' time?

The field of sustainable finance is pretty exciting right now. I'm looking forward to building GIG as a globally established leader in green and sustainable investment, underpinned by a rigorous approach to green assessment.

## What advice would you give to someone entering the profession?

Be flexible and ready to try something that may not look exactly like what you were hoping for, but has potential to be shaped into something interesting. I know a number of environmental professionals who started out in roles that were not strictly environmentally-focused, but used their position as an established and trusted colleague in an organisation to mould their role or move across to what really interested them.

## How do you use the IEMA Skills Map?

To identify important skills for my development that I wouldn't normally focus on in my job, for example keeping abreast of policy and legislation.

## If you had to describe yourself in three words, what would they be?

Principled, considered, flexible.

## What motivates you?

Knowing that I can be proud to tell my children what I do.

## What would be your personal motto?

If you really know what you're talking about, your expertise will shine through – you don't need to force it when trying to make a good impression.

## Greatest risk you have ever taken?

As a fresh graduate, I turned down a job offer from a London-based consultancy – the first offer I'd had in several months of looking – because everyone there looked so miserable. Best decision I ever made!

## If you could go back in history, who would you like to meet?

**Albert Einstein**. Not only a genius, by all accounts he had a sense of humour. 🧐

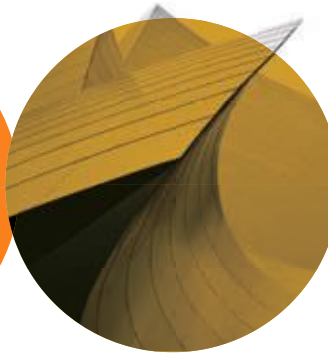


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Shortlist announced 15 July 2019

If undelivered please return to:  
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# Upskill your Workforce

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