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Proceedings Paper:
Paxman, J.R. and Nield, L. (2022) Editorial: Food and nutrition: pathways to a sustainable future. In: Proceedings of the Nutrition Society. Nutrition Society Summer Conference 2022, 12-15 Jul 2022, Sheffield, United Kingdom. Cambridge University Press (CUP), pp. 1-4. ISSN: 0029-6651. EISSN: 1475-2719.

https://doi.org/10.1017/s0029665122002865

This article has been published in a revised form in Proceedings of the Nutrition Society https://doi.org/10.1017/S0029665122002865. This version is free to view and download for private research and study only. Not for re-distribution, re-sale or use in derivative works. © The author(s).

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Proceedings of the Nutrition Society

CAMBRIDGE UNIVERSITY PRESS

Editorial: Food and Nutrition: Pathways to a Sustainable Future

Journal:	*Proceedings of the Nutrition Society*
Manuscript ID	PNS-22-0069.R1
Manuscript Type:	Editorial
Date Submitted by the Author:	n/a
Complete List of Authors:	Paxman, Jenny; Sheffield Hallam University, Service Sector Management Nield, Lucie; Sheffield Hallam University, Service Sector Management
Keywords:	sustainability, food systems, nutritional inequalities, planetary health, personalised nutrition
Abstract:	The world is waking up to the reality of climate change and the challenge of feeding 10 billion people in a healthy and sustainable way. For population and planetary health, food systems need to change. 'Food and Nutrition: Pathways to a Sustainable Future' was the first face-to-face Nutrition Society Summer Conference since 2018, bringing together leading contributors from across the globe to explore six pathways to a better tomorrow. Review papers from the conference symposia cut across disciplinary divides showcasing advances in scientific methods and our cumulative understanding of the impact of the food system on climate change. The depth, breadth and advancement of research presented demonstrates the power of collaborative research that can shape industry, individual and population recommendations and create a powerful shift towards the sustainable dietary patterns and systems that are so urgently required.

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Editorial: Food and Nutrition: Pathways to a Sustainable Future

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Acknowledgements
With thanks to Dr Liz Williams (University of Sheffield) and Dr Tony Lynn (Sheffield Hallam University) for their support in collating some of the material used to prepare this editorial, and to Dr Liz Williams (University of Sheffield) for proof-reading the manuscript.

Financial Support
This work received no specific grant from any funding agency, commercial or not-for-profit sectors.

Conflict of Interest
None.

Authorship
JP and LN jointly planned, wrote and edited the manuscript.

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Abstract

The world is waking up to the reality of climate change and the challenge of feeding 10 billion people in a healthy and sustainable way. For population and planetary health, food systems need to change. *'Food and Nutrition: Pathways to a Sustainable Future'* was the first face-to-face Nutrition Society Summer Conference since 2018, bringing together leading contributors from across the globe to explore six pathways to a better tomorrow. Review papers from the conference symposia cut across disciplinary divides showcasing advances in scientific methods and our cumulative understanding of the impact of the food system on climate change. The depth, breadth and advancement of research presented demonstrates the power of collaborative research that can shape industry, individual and population recommendations and create a powerful shift towards the sustainable dietary patterns and systems that are so urgently required.

Key terms: sustainability, food systems, nutritional inequalities, planetary health, personalised nutrition

A sustainable food future

The 2019 EAT-Lancet report presented a stark warning: "Food is the single strongest lever to optimize human health and environmental sustainability on Earth. However, food provision is currently threatening both people and planet."[1]. It was timely therefore, that the Nutrition Society Summer Conference 2022: *'Food and Nutrition: Pathways to a Sustainable Future'* aimed to propose innovative solutions to achieve an urgent and significant shift towards a more sustainable food and nutrition future.

The conference took place in Sheffield and was jointly hosted by Sheffield Hallam University, The University of Sheffield and Sheffield City Council between the 12-15th July 2022. This was the first in-person Nutrition Society Summer Conference since 2018, before FENS 2019, and the first to be hosted in Sheffield for 21 years. The conference welcomed 252 delegates from around the world, representing 13 countries: Australia, Canada, Chile, Ireland, Japan, Korea, New Zealand, Nigeria, Singapore, Spain, United Arab Emirates, UK, USA, and brought together global experts across a range of disciplines to share contemporary research to advance our understanding of this important issue. The conference was organised into six themes: *'Building ethical food systems', 'Eroding nutritional inequalities', 'Enabling activity: lessons from exercise science', 'Sustaining an ageing population', 'Understanding mechanisms for health'* and *'Navigating dietary trends'*.

The opening plenary was eloquently delivered by Professor Sir Charles Godfray and chaired by Nutrition Society CEO Mark Hollingsworth. Sir Godfray described the challenges of providing healthy, sustainable and equitable diets for all, in the context of climate change and a growing population. Despite declining fertility rates, the global population is expanding and is set to peak at 10.4 billion by 2100, due to increased longevity resulting in an ageing population. The food system alone has the potential to dangerously heat the world, even if every other industry is on target to meet the proposed climate change milestones. It contributes 30% of global greenhouse gas emissions, occupies 40% of available land an accounts for 70% of freshwater withdrawal, alongside having other environmentally detrimental impacts[2]. "We don't have the luxury of doing nothing", Sir Godfray reiterated, "we need to sustainably intensify our food production". He concluded that the combined effort of the food system needs to include modifying diets, sustainably increasing food production, reducing waste and improving food governance: powerfully stating "if we fail on food, we fail on everything".

The core scientific programme on day one began with Theme Highlights from *Nutrition in the Treatment, Management and Prevention of Disease* from Dr Athanasios Koutsos (University of Glasgow) who shared insights from the RISSCI Study highlighting the individual nature of

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the serum cholesterol response when replacing dietary saturated fat with unsaturated fat. From *Nutrition and Optimum Lifecourse* Kiu Sum (University of Westminster) characterised dietary challenges doctors face in the workplace, including creating the time, opportunity and culture to eat appropriately. Madeleine Thomas (University of Leeds) shared data supporting the positive impact supermarket voucher schemes can have in increasing intake of fruit and vegetables in the *Food Systems* theme. Within the *Novel Nutrition Research Methodologies and Technologies* theme, Tilly Potter (Rowett Institute, University of Aberdeen) brought *n*-of-1 studies to the fore explaining how this type of work can help us better understand and interpret nutritional science accounting for individual contributory factors: microbiome, genotype and key ecological factors.

International acclaim

Award winning research was recognised throughout the conference with Silver Medal Winner Dr Sarah Berry (King's College London) asking 'how meaningful is the mean?'. An entire industry has exploded to capture public enthusiasm for personalised nutrition but Sarah cautioned that *what* you eat, *who* you are and *how* you eat need to jointly inform personalised advice, which should still sit alongside population recommendations. Professor Amelia Lake's (Teesside University) Rank Prize Winning Lecture explored the foodscape, highlighting opportunities to improve population health via manipulation of food environments, reinforcing the notion that eating is a simple act but a complex behaviour necessitating multi-faceted solutions designed to influence food choice. This year's postgraduate symposium celebrated excellent work by Megan Flint (Sheffield Hallam University), Ezgi Ozen (University of Reading) and Lena Acolatse (Ulster University) on plant-based food products, SFA intake and body composition and child food portion sizes respectively, demonstrating that the future of nutrition science is in very safe hands. Dr Sara Jimenenz-Montilla (university of Granada) presented the British Journal of nutrition Paper of the Year[3], which showcased associations between intrauterine growth and inadequate postnatal nutrition and consequent neurodevelopmental outcomes in very-low-birth-weight infants.

Pathways to a sustainable food and nutrition future

Symposium 1 highlighted the complexity and challenge involved in *'Building ethical food systems'*. Professor Peter Jackson (University of Sheffield) emphasised the need to adopt a food systems approach which includes food security and sustainability, proffering that this is as much a sociocultural challenge as a technical one. Professor Emma Boyland (University of Liverpool) discussed the ethical issues associated with advertising to children in an ever-complex, multi-platform environment which focuses heavily on foods high in saturated fat, salt and sugar (HFSS) and the role of the food system in protecting our future generations. Dr Owen Fraser (President of AOAC Sub-Saharan African Section) described the complexity and nuance required to accurately interpret and understand the macro- and micro-nutrient composition of food in light of multiple available methodologies.

Symposium 2 *'Eroding nutritional inequalities'*, focused on population groups who are particularly vulnerable to nutritional inequalities: pregnant women (Dr Nicola Heslehurst, Newcastle University); young infants and families during the Covid-pandemic (Dr Christian Reynolds, City University); and users of food banks (Dr Rachel Loopstra, King's College London and University of Liverpool). Despite research and activity that has been injected into underserved communities such as these, food insecurity is prevalent and research needs to be translated into action and policy to ensure a joined up, whole-systems approach and prevent the cumulative inequalities.

In symposium 3, we heard from Dr Julia Zakrzewski-Fruer (University of Bedfordshire) who emphasised the importance of considering the interrelationship between diet and physical activity in paediatric settings with a focus on cardiometabolic risk reduction. Professor

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Stensel (Loughborough University) outlined the myriad of internal and external factors driving obesity, highlighting the role of physical activity on appetite control, summarising the evidence on the effectiveness of pharmacological interventions for obesity, before concluding with an overview of the role of physical activity in a sustainable future. Professor John Saxton (University of Hull) showcased the potential of the role of physical activity in patients with prostate cancer. Despite studies demonstrating that exercise interventions are feasible and beneficial for aerobic exercise capacity, muscular strength, and quality of life, further studies are required to understand the benefit on clinical end points such as progression free survival.

Dr Liz Williams (University of Sheffield) opened symposium 4, *'Sustaining an ageing population'* with a deep dive into sustainable protein for healthy ageing highlighting the risks of inadequate protein intakes in older age and discussing sustainable protein sources that might meet the demands of our expanding ageing population. Dr Crystal Haskell-Ramsay (Northumbria University) followed with a focus on sustaining cognitive function exploring data on cruciferous vegetables, blueberries, tart cherry, avocado, nuts, and reiterating the importance of dietary variety. Dr Aisling O'Halloran (Trinity College Dublin) then shifted the focus to specific micronutrients in older age reviewing what we can learn from the TILDA cohort.

Symposium 5 focused on *'Mechanisms for health'* with Professor Ian Givens (University of Reading) providing an overview and update of dairy products and their role in cardiometabolic disease with many debates still afloat in this field, particularly in relation to the difference between high and low-fat dairy sources and their impact on health. Professor Suzan Wopereis (The Netherlands Organization) provided a detailed overview of how phenotypic flexibility can be used to bridge the gap between current population health guidelines and personalised nutrition which was followed by a fascinating talk by Dr Shilpa Bhupathiraju (Harvard Medical School) who shared a detailed overview of the developing field of precision nutrition including how biomarkers can advance our understanding of plant-based diets. Metabolomics offer detail beyond dietary assessment, but this costly technology is not yet fit to replace more traditional methods.

In the second plenary lecture, Professor Kieran Tuohy (University of Leeds) discussed the mechanisms of action for improving health via manipulation of the dietary microbiome. Promising research was highlighted including the use of novel ingredients and techniques to optimise gut microbiota, and improve BMI, waist circumference and hepatic fat. Whilst there are encouraging data emerging from short term interventions, Professor Touhy reiterated the need for long-term interventions which study the dietary impact on the gut microbiome.

On the final day of the conference we heard of the challenges associated with *'Navigating dietary trends'* (symposium 6). Dr Carrie Ruxton (Nutrition Communications) opened by unpacking the anatomy of a message: general, segmented, and individual, and the tensions this can create for both practitioners and people. Dr Megan Blake (University of Sheffield) showcased the 'superpowers' of surplus food use, taking us way beyond distribution alone into social cooking, social eating, and more. "The benefits are more than nutritional" said Professor Ciarán Forde (Wageningen University and Research) as he described the complexity of ultra-processed foods, exploring why classification is complicating our understanding, reiterating that reformulation is a fact of life in modern food systems and that the right reformulate should be defended. "Processing", he said, "has an image problem": we have forgotten the role it can play in enabling our food systems to be *more* sustainable.

Input from industry

Quorn Foods' contributions throughout the conference raised the profile of mycoprotein research and, having enjoyed a delicious breakfast from the Quorn breakfast truck on day

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two, delegates could hear more of the science on day three. *The Quorn Foods Breakfast Symposium* was chaired by Barbara Bray MBE, with contributions from Dr Hannah Theobald (Quorn Foods), who shared insights into the history and nutritional qualities of, and production technologies associated with fungal proteins and Dr Emma Derbyshire, exploring the case for recognising fungal protein as a third protein food group. University of Exeter Professors Ben Wall and Francis Stephens went on to showcase how mycoprotein research is influencing sports nutrition from 'molecule to movement' and what collective effects mycoprotein can have on glycaemia, insulinaemia and lipidaemia in the context of overall cardiometabolic health.

Beyond the science

The scientific programme of the conference was accompanied by a varied social programme which aimed to be inclusive and focus on moving more and the sustainability theme of the conference. This programme of activities included guided walking and running routes around Sheffield and yoga provided by local activity coordinators and Sheffield Hallam University. On the evening of Day 1 there was a Greener, Fairer, Healthier showcase of local Sheffield organisations involved in sustainable food production where canapes were provided using food that would otherwise have been destined for landfill. A drinks reception kindly sponsored by IFIS was held on the second evening, presenting a Sheffield 'Conference Cocktail' enjoyed with music froma harpist. The much-anticipated conference dinner took place on Thursday evening in the grandiose Sheffield Cutlers' Hall which entailed eating, drinking, and dancing late into the night: a fitting way to celebrate the first face-to-face conference that many had attended post-lockdown.

In summary

Bringing the conference to a lively conclusion our panel discussion: *'Sustainable diets in turbulent times'* was elegantly chaired by Dr Christian Reynolds. Our panellists, Barbara Bray MBE, Kristin Bash (University of Sheffield) and Professor Peter Jackson (University of Sheffield) pitched their respective takes on next steps for a sustainable food and nutrition future. We heard about the need for us to adjust the lens, to take a full ecological perspective on the multiplicity of challenges: from the complex political landscape to post-Brexit Britain, from power asymmetry in food systems to food governance and regulation. There is not one answer but by working with, and improving on, the science and evidence we have globally, genuine change can happen, for everyone.

'Pathways to a sustainable future' celebrated genuine advances in nutritional science and consistent and passionate acceptance of climate change as everyone's responsibility, and a problem which is affecting us all. We know that "an immense challenge facing humanity is to provide a growing world population with healthy diets from sustainable food systems"[1]. To that end, we heard how novel methodologies, technologies and innovation applied across the whole food system were keys to a better future and how, to achieve anything, we need to embrace the realities of working across all relevant disciplines. We explored sustainability in its broadest sense: in order to live healthily for longer and in a way that does not further challenge our already overstretched planet. The review papers from this conference, we hope, provide a compelling argument that the time for change is now.

Jenny Paxman, Sheffield Hallam University
Lucie Nield, Sheffield Hallam University

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