

# EGEA CONFERENCE BOOK OF ABSTRACTS



**EGEA** edition 9  
International conference

20-22 SEPTEMBER 2023 - BARCELONA

DIET, FRUIT AND VEGETABLES AND ONE HEALTH:  
WHAT CONTRIBUTIONS?

Co-chairs: **Joël DORE & Elio RIBOLI**

Scientific Committee: **Emma BOYLAND, Jean-Pierre CRAVEDI, Joël DORE, Frans FOLKVORD, Jean-Michel LECERF, Françoise LESCOURET, Alain PEETERS, Christian REYNOLDS, Elio RIBOLI**

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## EDITORIAL



C'est un honneur pour moi d'introduire le dossier du participant de la 9<sup>ème</sup> édition de la conférence EGEA, un événement qui dressera l'état des connaissances relatives au rôle des fruits et légumes pour la société et l'environnement.

Cette conférence arrive à un moment clé à plusieurs titres. De nombreux gouvernements s'engagent, en effet, dans des stratégies en faveur de la durabilité : santé, biodiversité, alimentation. L'approche "One Health", en plein essor, marque quant à elle une révolution. Elle permet de sortir de la traditionnelle approche disciplinaire et implique tous les acteurs concernés dans une démarche transversale et holistique.

Cette édition de la conférence EGEA est également la première qui se tient depuis la pandémie de Covid-19 durant laquelle les consommateurs ont plus que jamais pris conscience de l'importance des produits frais pour leur santé, en intégrant notamment davantage de fruits et les légumes dans leur assiette. Cet événement sera ainsi l'opportunité de souligner le rôle des fruits et légumes dans une alimentation saine et durable. Enfin, face à la «végétalisation» des habitudes et régimes alimentaires, il est très opportun que les communautés scientifiques examinent la résilience et la durabilité des systèmes alimentaires, en particulier celui des fruits et légumes.

Notre société est de plus en plus consciente du rôle d'une alimentation de qualité pour entretenir la santé, prévenir les maladies et, ainsi, préserver la qualité et l'espérance de vie des populations. La nutrition est, en effet, un déterminant clé de la santé, et les fruits et légumes jouent un rôle central. Une telle conférence scientifique internationale est centrale pour mettre en lumière l'ensemble de ces aspects. En rassemblant l'ensemble des parties prenantes de la santé des populations, qu'ils soient scientifiques, professionnels de santé, producteurs, grossistes, distributeurs, restaurateurs et décideurs politiques, cette conférence apporte des connaissances multidisciplinaires et un éclairage sur les stratégies à construire. C'est l'ambition de l'approche « One Health ».

Les travaux présentés lors de la conférence EGEA, basés sur des faits et des résultats scientifiques, doivent contribuer à l'orientation des politiques publiques en faveur d'une agriculture plus durable, mais aussi plus nutritive, sûre et de qualité.

C'est un enjeu de politique publique dont la France a notamment pleinement pris la mesure en cherchant, à travers la mise en place d'un plan de souveraineté sur le secteur des fruits et légumes, à développer davantage sa production nationale autant sur la qualité que sur la quantité, et toujours dans un objectif de poursuite de la transition écologique et de promotion des végétaux dans les assiettes des consommateurs français. Cette action est d'autant plus renforcée par les différents projets que nous menons en faveur d'une meilleure éducation et d'une meilleure information sur l'alimentation et la consommation de fruits et de légumes. La France espère donc se montrer exemplaire et comme un véritable modèle pour les autres pays dans l'application de ce type d'actions publiques.

En conclusion, il est aujourd'hui plus nécessaire que jamais d'élaborer un cadre solide pour répondre à l'enjeu d'une alimentation saine et durable, soutenir les efforts des États membres de l'UE dans l'atteinte des objectifs de développement durable des Nations unies et la promotion des modes de vie sains. Cet enjeu crucial demande l'implication de tous et de chacun afin de, collectivement, travailler, discuter, coopérer, échanger les meilleures pratiques, tirer les leçons des réussites comme des erreurs, et parvenir à des changements durables. Une alimentation saine est l'un des meilleurs investissements que nous puissions faire ensemble pour nos générations futures. >>

**Marc FESNEAU**

*Ministre de l'Agriculture et  
de la Souveraineté alimentaire, France*







## EDITORIAL



It is an honour to introduce the present booklet of EGEA conference which sums up the latest state of the scientific research on the role of fruit and vegetables for the society and environment. The 9th EGEA's international conference is organized in a timely manner. On the one hand, it comes as most of the governments are well in progress to implement strategies in favour to sustainability: health, biodiversity, food, etc. On the other hand, it is also pertinent that the EGEA conference is focusing on the "One health approach" which revolutionizes the traditional disciplinary method and involves all relevant actors to adopt a transversal and holistic perspective on their practice and knowledge.

EGEA 2023 is also the first edition after the COVID-19 pandemic, during which, European consumers were more convinced than ever before of the health benefits of fresh produce, making fruit and vegetables essential in their diet. This conference is the opportunity to discuss the crucial role of fruit and vegetables for human health and sustainability.

Finally, it is also very opportune that EGEA conference invites the scientific communities to jointly examine and address the contribution of healthy diets to One Health. It is also of great value that the scientific communities look at the resilience and sustainability of food systems, and specifically fruit and vegetables system, as consumers "vegetalize" their habits and diets.

Our society is increasingly aware of the crucial role of a good nutrition in maintaining good health, preventing diseases, and hence keeping Europeans healthier. Indeed, nutrition is one of the most important health determinants. A balanced, nutritious diet helps to prevent several chronic diseases, extend life expectancy and improve people's overall quality of life at every age.

Such a unique international scientific conference is influential as it highlights the role of fruit and vegetables in daily nutrition and health. By bringing together scientists, medical professionals, producers, wholesalers and retailers, foodservice and policy makers, EGEA conference provides multidisciplinary knowledge and helps to build strategies. This is well in line with the "One health" approach.

Research undertaken by EGEA conference towards evidence and science-based findings is valuable for policy making. EGEA plays an important role driving policy towards more sustainable agriculture and shaping diet to be more nutritious, sustainable, safer, and healthier.

We all need to work and collaborate to enhance the nutritional quality of food by providing healthier food options, easily available and affordable. Recommendations of EGEA can contribute to assist decision makers at EU level and national governmental organisations to introduce, apply and enhance healthy and sustainable diet with a diversity of tools, such as prevention, labelling, taxation, marketing, education, and focusing in particular on the most deprived population and children.

In conclusion, it is today more important than ever before to develop a robust framework to address the issue of healthy nutrition and support the EU Member States' efforts to reach the UN Sustainable Development Goals and promote healthy lifestyles. We know that this is a formidable task that requires everyone to work together, discuss, cooperate, exchange best practices, learn from successes and mistakes alike, and achieve sustainable changes. Healthy nutrition is one of the best investments we can make together for our future generations. 

**Marc FESNEAU**

*Minister of Agriculture  
and Food Sovereignty, France*





## PREFACE



As the president of Aprifel, I am very pleased to welcome you to the 9<sup>th</sup> Edition of EGEA Conference.

Created in 2003, the EGEA Conferences are unique international scientific events and a platform for the scientific community to share and discuss their **ideas and work on healthy and sustainable diet rich in fruit and vegetables**. Multidisciplinarity, scientific excellence and requirement have always cadenced the editions and conclusions of the EGEA conferences. Through these conferences, Aprifel aims to **provide concrete, evidence-based recommendations** for **changes in practices**.

**Co-chaired by Pr. Elio Riboli and Dr Joël Doré**, the 9<sup>th</sup> edition will be a unique opportunity to celebrate the 20<sup>th</sup> anniversary of these conferences, and still an important place to **highlight the role of fruit and vegetables in a healthy and sustainable food system**. The theme proposed by the EGEA scientific committee is: «*One Health with Fruit and Veg*» – an approach based on the concept that human's health, animals' health, and our shared environment are interconnected.

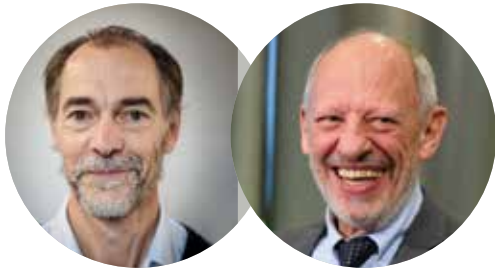
This theme is very important for Aprifel: sharing with the scientific community the determinants of a healthy and sustainable diet with fruits and vegetables and **prioritizing the actions to be implemented for individuals, society and the planet** are at the core of Aprifel's daily work. 4 sessions, more than 20 speakers, oral presentations, and posters will contribute to achieve the objectives of the 9<sup>th</sup> edition: **to build a sustainable food system with Fruit and Veg**.

I have no doubt that EGEA will highlight the role of fruit & vegetables in One Health by promoting food safety along the food value chain, preventing human diseases and increasing the efficiency of agricultural health systems. I am certain that many answers will be provided by the community during the conference. All those answers will help Aprifel provide concrete, evidence-based recommendations for changes in practices. I wish you fruitful debates.



**Christel TEYSSÈDRE**  
President of Aprifel, France





## WELCOME NOTE FROM EGEA CO-CHAIRS



As the co-chairs of the conference, we are delighted to host the **9<sup>th</sup> edition of EGEA**. This edition celebrates the 20<sup>th</sup> anniversary of the first EGEA conference that took place in 2003.

The potential impact that different systems of food production, food distribution and ultimately different diets can have on the environment is becoming better investigated and understood at the agricultural, environmental and population health level. It is also attracting growing attention at the level of governments, policy makers and international organizations.

It is estimated that the current food production and distribution system is responsible for 20 to 35% of greenhouse gas emissions and is a major factor in land conversion, deforestation and biodiversity loss. **This highlights that a transition to greater environmental sustainability is urgent and essential.** An evolution of our diets to support a more environmentally responsible food system is likely to require a «**vegetalisation**» of food availabilities and food choices. **Current evidence points to the importance of moving toward a substantial increase in the consumption of fruits, vegetables, cereals and other plant foods.** However, this transition is very challenging and different dimensions must be taken into account to achieve it while trying to have the most positive impact at different levels, namely **human and environmental health, as well as the social, cultural and economic dimensions of our societies.**



# EGEA<sup>edition 9</sup>

## International conference

### Review and evaluate how fruit & vegetables may contribute to One Health

This 9<sup>th</sup> edition will therefore be dedicated to the theme «**Diet, fruit & vegetables and One Health: what contributions?**». The objective of the conference will be to review, discuss and summarize, through evidence emerging from different components of medical and environmental research, how fruit and vegetables may contribute to **One Health (human and environmental health, while addressing consumer's behaviour, food security and social impacts).**

### Engage a dialogue between scientific communities and stakeholders.

In order to achieve the objective of the 9<sup>th</sup> edition of EGEA, our aim will be to **bring together and engage a dialogue between scientific communities of inter- and multidisciplinary network of different stakeholders** (researchers, professionals from the fruit and vegetables sector, policymakers, wholesalers, retail, foodservice, healthcare, educational experts, etc.) to ultimately **identify solutions and recommendations** to include fruit and vegetables in a One Health systemic and holistic approach. Our goal is to formulate solutions and recommendations that will take into account challenges, needs, barriers and motivations of all stakeholders.

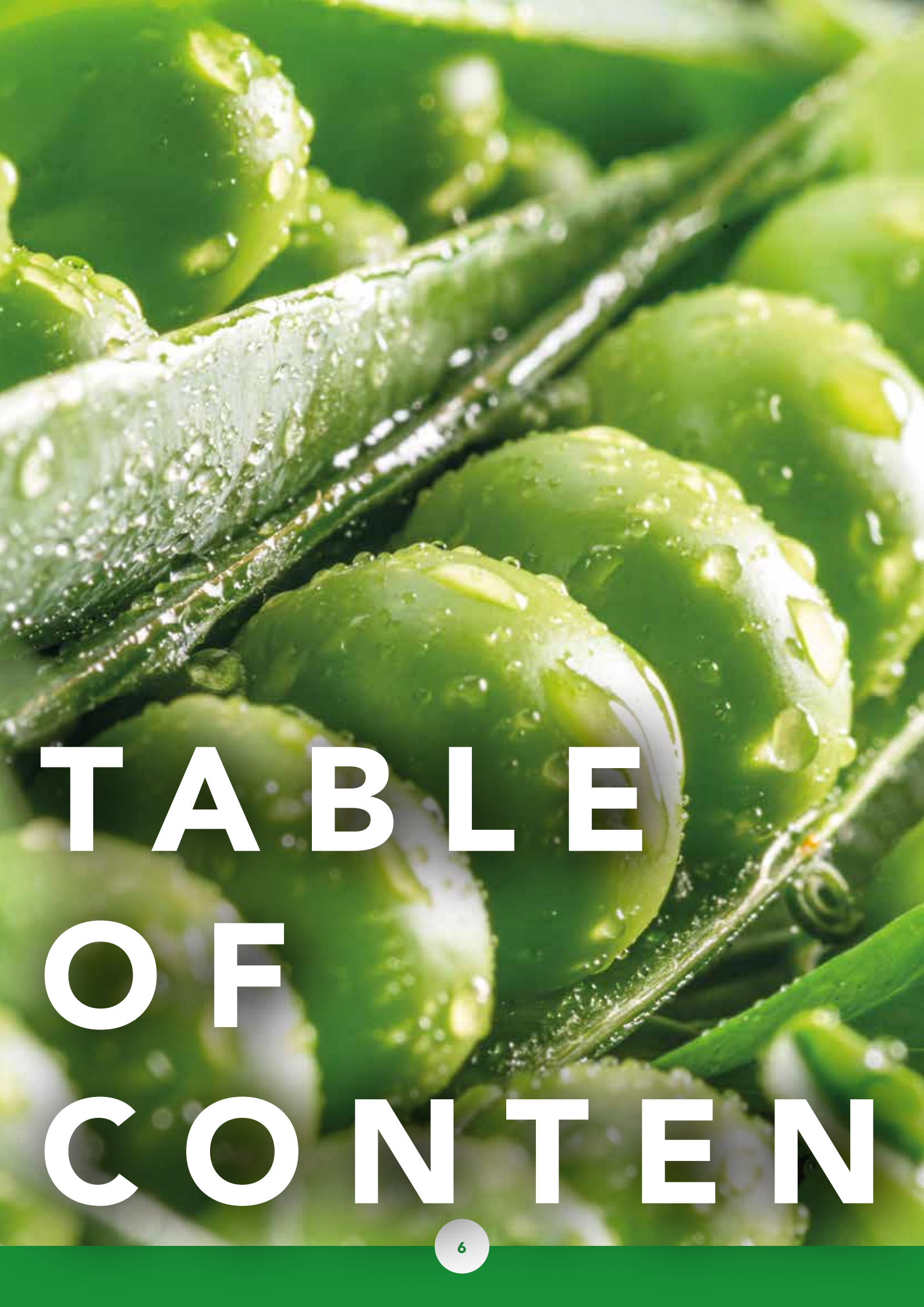
We are pleased to welcome you to this 3-day conference journey and **take active part in this important synthesis and debate.** »

**Joël DORÉ**

*Institut National de la Recherche  
Agronomique et de l'Environnement,  
France*

**Elio RIBOLI**

*School of Public Health,  
Imperial College London,  
United Kingdom*



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# T S



CHAired BY

**Joël DORÉ****INRAE Micalis Institute «Food and Gut Microbiology for Human Health», France**

- Joël is Research Director at INRAE Micalis Institute «Food and Gut Microbiology for Human Health» and Scientific Director of MetaGenoPolis, offering unique expertise in quantitative and functional metagenomics.
- Gut microbial ecologist by training, Joël pioneered intestinal metagenomics towards food-microbe-host interactions as well as diagnostic applications.
- With more than 38 years of academic research and more than 250 publications (H Index 69), Joël aims to provide a better understanding of man-microbes symbiosis towards personalized preventive nutrition and precision medicine.
- Joël is laureate of the ERC-Advanced Homo.symbiosus and coordinator of EU program Human Microbiome Action.
- He is co-founder and scientific advisor of Maat Pharma, a startup company dedicated to provide safe and standardized microbiotherapy solutions for the reconstruction of host-microbes symbiosis in the context of cancer therapy. He is also cofounder of Novobime and GMT bio. Member of the BoD of GMfH, he supports the [www.gutmicrobiotaforhealth.com](http://www.gutmicrobiotaforhealth.com) scientific web-platform.

**RECENT PUBLICATIONS**

1. Dao MC, et al. A Data Integration Multi-Omics Approach to Study Calorie Restriction-Induced Changes in Insulin Sensitivity. *Front Physiol.* 2019;9:1958.
2. Mohamed AB, et al. A mix of dietary fermentable fibers improves lipids handling by the liver of overfed minipigs. *J Nutr Biochem.* 2019;65:72-82.
3. Malard F, et al. Introduction to host microbiome symbiosis in health and disease. *Mucosal Immunology.* 2020;14:547-554.
4. Tap J, et al. Diet and gut microbiome interactions of relevance for symptoms in irritable bowel syndrome. *Microbiome* 2021 ; 9(74).
5. Ranaivo, H., et al. Increasing the diversity of dietary fibers in a daily-consumed bread modifies gut microbiota and metabolic profile in subjects at cardiometabolic risk. *Gut microbes.* 2022;14(1): 2044722.



CHAired BY

**Elio RIBOLI****School of Public Health, Imperial College London, United Kingdom**

- Elio Riboli is Professor of Cancer Epidemiology and Prevention at Imperial College, London.
- He has conducted important research on the effects of alcohol, tobacco, diet and environmental exposures in the aetiology of cancers of the respiratory and gastro-intestinal tracts.
- Around 1995, he initiated, and has since been coordinating the European Prospective Investigation into Cancer (EPIC) that included over half-a-million participants in 10 European Countries.
- Recognizing the scientific potential of storing DNA and blood samples from study participants, he established the first dedicated large-scale population biobanks based at the International Agency for Research on Cancer of WHO, in Lyon. This vision has provided an international resource for investigation of the role of diet, nutrition, metabolic, inflammatory and genetic factors in the aetiology of cancer and other chronic diseases.
- Recently, he has led research showing the deleterious effects of abdominal obesity and insulin resistance in the causation of several cancers and in increasing all-cause mortality in adult age.

**RECENT PUBLICATIONS**

1. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet.* 2021;398(10304):957-980.
2. Bull CJ, et al. Adiposity, metabolites, and colorectal cancer risk: Mendelian randomization study. *BMC Med.* 2020;18(1):396.
3. Papadimitriou N, et al. Physical activity and risks of breast and colorectal cancer: a Mendelian randomisation analysis. *Nat Commun.* 2020;11(1):597.
4. Freisling H, et al. Lifestyle factors and risk of multimorbidity of cancer and cardiometabolic diseases: a multinational cohort study. *BMC Med.* 2020;18(1):5.
5. Tsilidis KK, et al. Genetically predicted circulating concentrations of micronutrients and risk of colorectal cancer among individuals of European descent: a Mendelian randomization study. *Am J Clin Nutr.* 2021;113(6):1490-1502.





## Emma BOYLAND

**University of Liverpool, United Kingdom**

- Emma Boyland is a Professor of Food Marketing and Child Health based in the Department of Psychology at the University of Liverpool, where she leads the Appetite and Obesity Research group.
- Her work principally focuses on the food environment, characterising the foods and beverages available, how they are marketed, how marketing impacts on eating behaviours (particularly in children), and how this evidence can be used to inform policy in the UK and internationally.
- Emma has authored over 100 peer-reviewed journal articles, 11 book chapters, seven WHO Europe reports and three UNICEF reports on food marketing. She has recently completed three WHO commissioned reviews on the impact of food marketing on eating behaviour and health and the effectiveness of food marketing policies to inform updated WHO global guidelines.
- She sits on the WHO Global Steering Committee for digital food marketing and is an expert advisor to both WHO Europe and UNICEF, leading food marketing monitoring studies across Europe, Latin America, and the East Asia-Pacific region. She is a member of the leadership group for the International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support (INFORMAS) food promotion module.

### RECENT PUBLICATIONS

1. Boyland E. Is it ethical to advertise unhealthy foods to children? *Proc Nutr Soc.* 2023 Jan 6:1-15.
2. Boyland E, et al. Systematic review of the effect of policies to restrict the marketing of foods and non-alcoholic beverages to which children are exposed. *Obes Rev.* 2022 Aug;23(8):e13447.
3. Boyland E, et al. Association of Food and Nonalcoholic Beverage Marketing With Children and Adolescents' Eating Behaviors and Health: A Systematic Review and Meta-analysis. *JAMA Pediatrics.* 2022;176(7):e221037.
4. Packer J, et al. Advertising and Young People's Critical Reasoning Abilities: Systematic Review and Meta-analysis. *Pediatrics.* 2022 Dec 1;150(6):e2022057780.
5. Forde H, et al. Exploring the potential impact of the proposed UK TV and online food advertising regulations: a concept mapping study. *BMJ Open* 2022;12:e060302.



## Jean-Pierre CRAVEDI

**French National Research Institute for Agriculture, Food and Environment (INRAE), France**

### RECENT PUBLICATIONS

1. Lecerf JM, et al. Comparison of pesticide residue and specific nutrient levels in peeled and unpeeled apples. *J Sci Food Agric.* 2023;103(2):496-505.
2. Rebouillat P, et al. Prospective association between dietary pesticide exposure profiles and type 2 diabetes risk in the NutriNet-Santé cohort. *Environ Health.* 2022;21(1):57.
3. Kesse-Guyot E, et al. Key Findings of the French BioNutriNet Project on Organic Food-Based Diets: Description, Determinants, and Relationships to Health and the Environment. *Adv Nutr.* 2022;13(1):208-224.
4. Bonvallot N, et al. Suspect screening and targeted analyses: Two complementary approaches to characterize human exposure to pesticides. *Sci Total Environ.* 2021;786:147499.
5. Baudry J, et al. Estimated dietary exposure to pesticide residues based on organic and conventional data in omnivores, pesco-vegetarians, vegetarians and vegans. *Food Chem Toxicol.* 2021;153:112179.

- Jean-Pierre Cravedi (PhD, University of Toulouse) is a toxicologist and is director of research at the French National Research Institute for Agriculture, Food and Environment (INRAE).
- He was until 2019 deputy head of the Human Nutrition Division at INRAE. He is retired since September 2020.
- During his scientific career, he led or was involved in various French or international research projects concerning the fate and effects of many chemical pollutants and food contaminants. He conducted several research projects on endocrine disruptors and genotoxicants.
- Over the last 10 years, his projects have focused on the impact on human health of chemical substances present in low doses and in mixtures in food, including pesticide residues. He has published more than 300 articles in international peer-reviewed journals and has contributed to more than 150 expert reports on the risk assessment of chemical substances.
- Jean-Pierre Cravedi has been a member of various scientific boards at INRAE and ANSES and was a member of the panels on food chain contaminants and on food contact materials, enzymes, processing aids and flavourings at EFSA from 2003 to 2018. He contributed to several working groups on food contaminants in national and international risk assessment agencies.



## Frans FOLKVORD

**Tilburg School of Humanities and Digital Sciences, the Netherlands**

- Frans Folkvord currently works at Tilburg University as an associate professor and director and co-founder of PredictBy, a research and consultancy company in Barcelona and closely associated with Universidad Oberta Catalunya.
- Next to a master's degree in psychology and Sociology, he has obtained a PhD in Social Science (cum laude) on children's reactivity to embedded food cues in advergames.
- Frans has published over 50 articles in highly ranked journals, three books and several book chapters, in which he examined mainly the effects of (digital) food marketing on children's eating behavior. As a result, he developed an empirical-driven theoretical framework that describes the underlying mechanism of unhealthy food marketing on the intake of energy-dense snacks that create overweight and obesity.
- He was the editor of the most recent textbook on the psychology of food marketing, in which he describes the potential effectiveness of the promotion of healthier foods.
- Frans Folkvord is actively working as an expert on different projects for the European Commission focusing on food marketing and consumer behavior.

### RECENT PUBLICATIONS

1. Theben A, et al. *Playing with fruit: An experimental study to test the effectiveness of an online memory advergme to promote children's fruit consumption.* *Appetite.* 2022;173:105936.
2. Donini LM, et al. *Front-of-pack labels: «Directive» versus «informative» approaches.* *Nutrition.* 2023;105:111861.
3. van der Waal NE, et al. *Can Product Information Steer towards Sustainable and Healthy Food Choices? A Pilot Study in an Online Supermarket.* *Int J Environ Res Public Health.* 2022;19(3):1107.
4. Pabian S, et al. *«Meating halfway»: Exploring the attitudes of meat eaters, veg\*ns, and occasional meat eaters toward those who eat meat and those who do not eat meat.* *J Soc Psychol.* 2022;1-17.
5. Folkvord F, et al. *The Effect of a Serious Health Game on Children's Eating Behavior: Cluster-Randomized Controlled Trial.* *JMIR Serious Games.* 2021;9(3):e23050.



## Jean-Michel LECERF

**Institut Pasteur de Lille, France**

- Jean Michel Lecerf is a physician and his practice has been dedicated to nutrition since the beginning of his career, carried out in Lille both in hospitals and at the Institut Pasteur de Lille where he founded in 1982 a nutrition department renowned for its clinical research activities and for its communication actions.
- Jean-Michel is a renowned expert, member of numerous scientific societies: public (national agencies) and private (food industries) scientific committees. He is member of the Académie d'Agriculture de France.
- He has devoted his clinical research activity to lipid metabolism and has published numerous works on this theme.
- Jean-Michel is also very active in teaching and communicating with health professionals as well as patients and consumers. He has written more than 975 medical and scientific papers (300 with peer-review) and presented nearly 500 oral communications, making him one of the best-known clinical nutritionists in France today.
- He has published 22 books on nutrition, metabolism, lipidology, obesity.

### RECENT PUBLICATIONS

1. Biver E, et al. *Dietary Recommendations in the Prevention and Treatment of Osteoporosis.* *Joint Bone Spine.* 2022 Dec 22:105521.
2. Lecerf JM, et al. *Comparison of pesticide residue and specific nutrient levels in peeled and unpeeled apples.* *J Sci Food Agric.* 2023 Jan 30;103(2):496-505.
3. Ghaleb Y, et al. *Whole Exome/Genome Sequencing Joint Analysis of a Family with Oligogenic Familial Hypercholesterolemia.* *Metabolites.* 2022 Mar 18;12(3):262.
4. Herrou J, et al. *Do vegans have a higher fracture risk?* *Joint Bone Spine.* 2022 Jul;89(4):105349.
5. Lecerf JM, Cani P. *Nutrition et microbiote dans le diabète de type 2 : de la symbiose à la dysfonction métabolique.* *Med Mal Metab* 2022, 16.





## Françoise LESCOURRET

**French National Research Institute for Agriculture, Food and Environment (INRAE), France**

- Françoise Lescourret is a research director in the Research Division «AgroEcoSystem» at INRAE. She is a modeler in agro-ecology, in the field of horticulture, with a goal to contribute to model-based design of ecological horticultural systems.
- Françoise worked mainly and jointly on the dynamics of fruit quality traits and on fruit-plant-pest-beneficial interactions, and on their control by cultural practices. She has collaborated on related topics such as growers' practices and pest ecology. She is currently developing modelling work to study and manage multiple ecosystem services in agroecosystems.
- From 2010 to 2018, she was one of the four assistants for scientific management in the Research Division «Environment and Agronomy» and was responsible for the structuring challenge «Valorisation and management of biodiversity in agroecosystems».
- From 2012 to 2018, Françoise is a member of the coordination unit of the INRA metaprogram on Ecosystem Services, and co-leader of the metaprogram in 2018-2019.
- Since 2016, she is president of the Strategic Committee of the Scientific Interest Group on Vegetable Crops (GIS PIClég).
- She is co-author of more than 110 peer-reviewed scientific papers.

## RECENT PUBLICATIONS

1. Laffon L, et al. Conservation Biological Control of Codling Moth (*Cydia pomonella*): Effects of Two Aromatic Plants, Basil (*Ocimum basilicum*) and French Marigolds (*Tagetes patula*). *Insects*. 2022;13(10):908.
2. Génard M, et al. Resource Translocation Modelling Highlights Density-Dependence Effects in Fruit Production at Various Levels of Organisation. *Front Plant Sci*. 2022 Jul 8;13:931297.
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4. Casagrande E, et al. Brown Rot Disease in Stored Nectarines: Modeling the Combined Effects of Preharvest and Storage Conditions. *Phytopathology*. 2022;112(7):1575-1583.
5. Bevacqua D, et al. A parsimonious mechanistic model of reproductive and vegetative growth in fruit trees predicts consequences of fruit thinning and branch pruning. *Tree Physiol*. 2021;41(10):1794-1807.



## Alain PEETERS

**Natural Resources, Human Environment and Agronomy (RHEA), Belgium  
Agroecology Europe, Terres Vivantes, Belgium**

- Alain Peeters is an agronomist and agroecologist. He has a broad theoretical and field knowledge in agronomy and ecology: agriculture; ecology; agroecology; conservation and restoration of biodiversity in grasslands; grassland management; soil-plant-animal relationships; influence of farming systems and practices on biodiversity; assessment and development of sustainable and agroecological farming systems.
- From 1990-2007, he was Professor at the University of Louvain (Belgium) where he directed the Laboratory of Grassland Ecology and coordinated several European research projects. He was also the Western European Representative in the World Association of Grassland Researchers (IGC) (1997-2005) and Representative of Belgium and Western Europe in the European Grassland Federation.
- He is the director of the RHEA Research Centre, whose activities focus on the development and the promotion of agroecological systems.
- Alain is member of the Board of three non-profit associations: Vice-president of Agroecology Europe, President of WWF – Belgium – French Community, member of the Board of Terres Vivantes.
- He has been coordinator of the FAO/CIHEAM Research and Development Network on Grasslands and Forage Crops in Europe, North Africa and the Middle East.
- He played a crucial role in the transposition of European agri-environmental legislations into Walloon (Belgium) legislations: the agri-environmental programme (Regulations 2078/92 and EEC 1257/99) and the Nitrate Directive (Directive 91/676/EEC). He created a start-up, the private company ECOSEM, which is involved in the concrete restoration of biodiversity.

## RECENT PUBLICATIONS

1. Peeters A., Skorjanc K., Wezel A. and Migliorini P., 2021. OASIS, the Original Agroecological Survey Indicator System. A simple and comprehensive system for agroecological transition assessment. *Agroecology Europe, Brussels*: 81 pages. ISBN: 978-2-9602977-0-6.
2. Skorjanc K., Peeters A., Migliorini P. and Wezel A., 2021. OASIS, the Original Agroecological Survey Indicator System. Methodology and guidelines for the assessor. *Agroecology Europe, Brussels*: 117 pages. ISBN: 978-2-9602977-1-3.
3. Peeters A, et al. A Green Deal for implementing agroecological systems: Reforming the Common Agricultural Policy of the European Union. *J Sustainable Organic Agric Syst*. 2020;70(2):83-93.
4. Migliorini P, et al. Controversial topics in agroecology: A European perspective. *International Journal of Agriculture and Natural Resources* 2020;47(3):159-173.
5. Ploeg J, et al. The economic potential of agroecology: Empirical evidence from Europe. *Journal of Rural Studies* 2019; 71:46-61.



## Christian REYNOLDS

**City, University of London, United Kingdom**

- Christian Reynolds is a Reader in Food Policy at the Centre for Food Policy, City University, London; and is the Senior Tutor for Research at the Centre for Food Policy.
- Christian is recognised as a global expert on food loss and waste and sustainable diets and has worked on these issues in Australia, New Zealand, Indonesia, the UK, US, and Europe.
- Christian is the lead editor of the Routledge Handbook of Food Waste (2019); he has also co-authored over 50 peer reviewed publications, as well as multiple reports and book chapters. He has given evidence to UK and NZ parliaments on Food Loss and Waste and contributed to the Accounting and Reporting Standard on this matter. He also researches sustainable cookery; food history; and the political power of food in international relations.
- Christian is the Principal Investigator of 1) the NERC Sustainable Plastics Packaging project: «Reducing plastic packaging and food waste through product innovation simulation». This project has created a Household Simulation Model to focus on plastic food packaging to help manufactures provide the right type of packaging to reduce both food and plastic waste. This model is currently used by WRAP and industry to reduce food waste in many food products. 2) The Alpro Foundation funded project: «Communicating the environmental impact of plant-based recipes». This project produces a tool that calculates the calories, the biodiversity, economic, and climate benefits of plant-based recipes.
- From 2017 to 2020, Christian was employed WRAP as Technical Specialist in international food sustainability. In 2017-18 Christian worked on integrating healthy sustainable eating and food waste reduction messages on a wide variety of projects including the EU-LIFE funded TRiFOCAL project. From 2018-2020 Christian moved to the WRAP Global team, working on Food Waste and Sustainable Eating, working on the REFRESH project, and with multiple global partners including the World Bank, NRDC, and WWF.

### RECENT PUBLICATIONS:

1. Madruga M, et al. Trends in food consumption according to the degree of food processing among the UK population over 11 years. *British Journal of Nutrition*, 2022;1-8.
2. Garg DH, et al.. Food systems governance should be preceded by food systems diplomacy. *Nature Food*, 2022;3(9):667-670.
3. Kandemir, C., et al. Using discrete event simulation to explore food wasted in the home. *Journal of Simulation*, 2022; 16(4):415-435.
4. Kluczkovski A, et al. An Environmental and Nutritional Evaluation of School Food Menus in Bahia, Brazil That Contribute to Local Public Policy to Promote Sustainability. *Nutrients*, 2022;14(7).
5. da Silva JT, et al. Greenhouse gas emissions, water footprint, and ecological footprint of food purchases according to their degree of processing in Brazilian metropolitan areas: a time-series study from 1987 to 2018. *The Lancet Planetary Health*, 2021; 5(11):e775-e785.



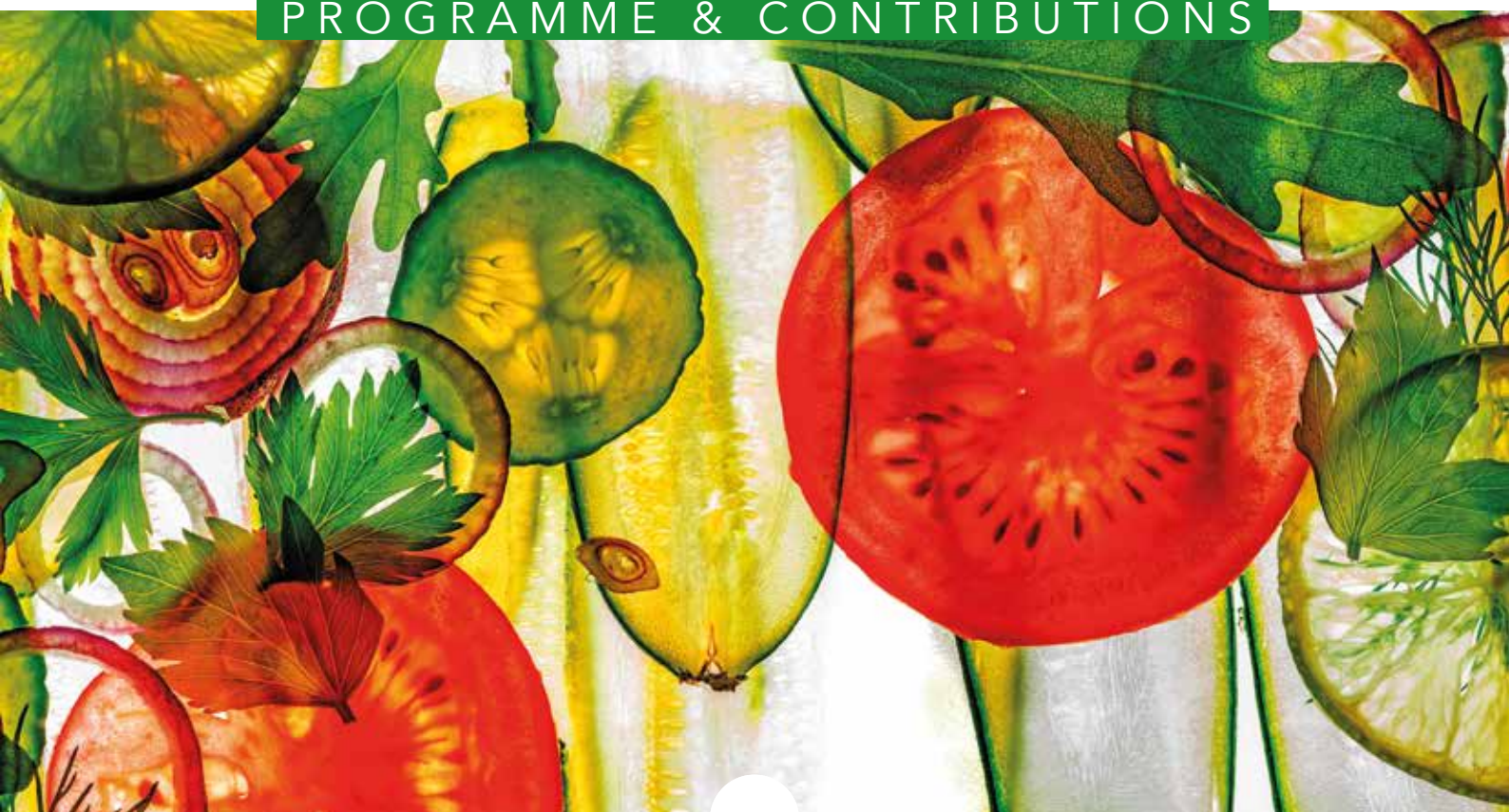




EGEA<sup>edition 9</sup>

International conference

PROGRAMME & CONTRIBUTIONS







DAY 1

WEDNESDAY 20 SEPTEMBER



PROGRAMME

12:30 - 14:00 WELCOME (FREE LUNCH) – REGISTRATION – POSTER DISPLAY

14:00 - 14:30 OPENING SESSION

**Christel Teyssedre**, *Aprifel (FR)*

**Elio Riboli**, *Imperial College London (UK)*

**Joël Doré**, *INRAE (FR)*

**Claire Bury**, *DG Health, European Commission (BE)*

**Maria Del Camino Arroyo Perez**, *Ministry of Agriculture, Fisheries and Food (SP)*

**Marc Fesneau**, *French Minister of Agriculture and Food Sovereignty (FR)*

14:30 - 18:15 SESSION 1

**Fruit and vegetables: what are the benefits for human health and for food and nutritional security?**

**Moderators:** Jean-Michel Lecerf & Elio Riboli

**Introduction:** Jean-Michel Lecerf, Institut Pasteur de Lille (FR)

14:30 - 15:35 KEYNOTE LECTURES

**Research progress on fruit and vegetables on health and chronic diseases**

- Cardiovascular disease prevention

**Monique Verschuren**, *RIVM (NL)*

- Type 2 diabetes prevention – facts and gaps

**Nita Forouhi**, *University of Cambridge (UK)*

- Cancer prevention

**Marc Gunter**, *Imperial College London (UK)*

15:35 - 16:50 KEYNOTE LECTURES

**Emerging research on nutrition and global health**

- Innovation in evaluating gut microbiota and fiber-rich vegetables interactions

**Nathalie Delzenne**, *UCLouvain (BE)*

- The role of fruit and vegetables in mental and brain health

**Saverio Stranges**, *Western University (CA)*

- Nutrition transition towards plant-based foods: ultraprocessed, unprocessed and their health impact

**Benjamin Allès**, *EREN (FR)*

- Fruit and vegetables in food and nutritional security

**Boitshepo Bibi Giyose**, *NEPAD (SA)*

16:50 - 17:20 NETWORKING BREAK AND POSTER VISIT

17:20 - 18:15 ORAL COMMUNICATIONS

- Associations between species diversity in our diet and gastrointestinal cancer risk: results from the European Prospective Investigation into Cancer and Nutrition Study

**Bernadette Chimera**, *IARC (FR)*

- Association between metabolic syndrome and healthy and unhealthy plant-based diets: in the NutriNet-Santé study

**Clémentine Prioux**, *EREN (FR)*

- Antioxidant-rich foods, antioxidant supplements, and sarcopenia in old-young adults ≥55 years old: A systematic review and meta-analysis of observational studies and randomized controlled trials

**Maria de la Serra Besora-Moreno**, *University of Rovira i Virgili (SP)*

**Conclusion:** Elio Riboli, Imperial College London (UK)

**Concluding remarks** by **Olivier Ramadour**, *Consul General of France in Barcelona (SP)*

18:15 - 18:45 POSTER VISIT

19:00 - 20:00 WELCOME COCKTAIL





09:00 - 09:30 WELCOME COFFEE

09:30 - 12:30 SESSION 2

**Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?**

**Moderators:** Françoise Lescourret & Alain Peeters

**Introduction:** Françoise Lescourret, INRAE (FR)

09:30 - 11:15 KEYNOTE LECTURES

- How to preserve and improve soil quality for fruit and vegetable production and health  
**Marc André Sélosse**, *Muséum national d'Histoire naturelle (FR)*
- Tackling climate impacts: fruit and vegetables as part of the crisis or the solution?  
**Giuseppe Montanaro**, *University of Basilicata (IT)*
- Water footprints for fruit and vegetable production: Definitions and optimization practice  
**Diego Intrigliolo**, *Spanish National Research Council (SP)*
- Functional biodiversity to control weeds in fruit orchards  
**Davide Neri**, *Polytechnic University of Marche (IT)*
- Social innovations in fruit and vegetables to address multiple Sustainable Development Goals in food systems  
**Marie-Josèphe Amiot-Carlin**, *INRAE (FR)*

11:15 - 11:45 NETWORKING BREAK AND POSTER VISIT

11:45 - 12:30 ORAL COMMUNICATIONS

- The role of fruit and vegetables in territorial cohesion  
**Rémi KAHANE**, *CIRAD HortSys (FR)*
- Poor access to fruit and vegetables limits the adherence to sustainable diets in The Gambia  
**Zakari Ali**, *LSHTM (GM)*
- The environmental, nutritional and cost impacts of vegan, vegetarian and meat-based meals  
**Berill Takacs**, *University College London (UK)*

**Conclusion:** Alain Peeters, RHEA (BE)

12:30 - 14:00 LUNCH BREAK AND POSTER VISIT

14:00 - 17:20 SESSION 3

**Vegetalizing the diet: what are the determinants of consumer behaviour and choice?**

**Moderators:** Emma Boyland & Frans Folkvord

**Introduction:** Emma Boyland, University of Liverpool (UK)

14:00 - 16:00 KEYNOTE LECTURES

- The factors that influence our food choices across the lifespan  
**Sophie Nicklaus**, *INRAE (FR)*
- I'll have what you're having: why we need to include social factors in healthy eating interventions  
**Roel Hermans**, *Leefstijl Lab (NL)*
- Creating healthy environments: encouraging fruit and vegetable intake at the day care and primary school  
**Gertrude Zeinstra**, *Wageningen University and Research (NL)*
- The role of marketing in shaping dietary preferences and behaviors  
**Tim Smits**, *KU Leuven (BE)*
- Movement behaviors, eating habits, and appetite control: are they really connected?  
**David Thivel**, *Université Clermont Auvergne (FR)*
- Opportunities for public health policies to promote greater fruit and vegetables intake  
**Emma Boyland**, *University of Liverpool (UK)* & **Frans Folkvord**, *Tilburg University (NL)*





DAY

THURSDAY 21 SEPTEMBER



PROGRAMME

**16:00 - 16:30 NETWORKING BREAK AND POSTER VISIT**

**16:30 - 17:20 ORAL COMMUNICATIONS**

- Time-trend of fruit, vegetables and sweets consumption among European adolescents between 2013 and 2018 and related to sociodemographic characteristics: Health Behaviour in School age Children study  
**Judit Queral**, *Institut d'Investigació Sanitària Pere Vi (SP)*
- Food Boost Challenge: application of participatory action research – by, for and with adolescents for assessing small-scale determinants of adolescent's behaviour and actionable possibilities for healthier food choices by adolescents  
**Wendy Scholtes-Bos**, *The Hague University of Applied Sciences (NL)*
- 'Less meat' or 'more fruit and veg'? The role of promotion-prevention framing on attitudes towards diet change in the UK  
**Heidi Zamzow**, *London School of Economics & Political Science (UK)*

**Conclusion:** Frans Folkvord, *Tilburg University (NL)*

**17:20 - 17:50 POSTERS SESSION AWARDS**

**19:30 - 23:00 GALA DINNER (REGISTRATION REQUIRED)**







08:30 - 09:00 WELCOME COFFEE

09:00 - 12:50 **SESSION 4: Placing fruit and vegetables at the center of the one health discussion: solutions, recommendations, actions and priorities**

**Moderators: Boitshepo Bibi Giyose & Christian Reynolds**

**Introduction:** Christian Reynolds, City University of London (UK)

09:00 - 10:00 **KEYNOTE LECTURES**

- State of art and role of public policies to achieve sustainable diet  
**Céline Giner, OECD (FR)**
- A mapping system to have a win-win solution to tackle food insecurity, the multiple forms of malnutrition and climate change  
**Kremlin Wickramasinghe, WHO Europe (DK)**
- Can all people access to healthy and sustainable diet?  
**Anna Herforth, Harvard T.H. Chan (USA)**

10:00 - 10:50 **ORAL COMMUNICATIONS**

- A global analysis of national dietary guidelines on plant-based diets and substitutions for animal-based foods  
**Anna-Lena Klapp, University of Göttingen (GE)**
  - A case study of 'food biodiversity' and experiences of community food growing environments in the City of Brighton & Hove  
**Leah Salm, University of Greenwich (UK)**
  - Protecting health by improving Food Literacy in primary and intermediate schools: an Italian experience with the MaestraNatura e-learning program  
**Annalisa Silenzi, Istituto Superiore di Sanità (IT)**
- Conclusion:** Boitshepo Bibi Giyose, NEPAD (SA)

10:50 - 11:15 **NETWORKING BREAK**

11:15 - 12:40 **ROUND TABLE AND PANEL DISCUSSION**

**Animated by: Christian Reynolds, City University of London (UK)**

- **Boitshepo Bibi Giyose, NEPAD (SA)**
- **Carmen Gloria Gonzalez, University of Chile (CL)**
- **Machteld van Lieshout, The Hague University of Applied Sciences (NL)**
- **Daniel Sauvaitre, French National Association Apples and Pears (FR)**
- **Piedad Coscollá Toledo, Anecoop (SP)**
- **Philippe Binard, Freshfel (BE)**
- **Pilar Santacoloma, FAO (IT)**

12:40 - 13:00 **CONCLUSIONS OF THE EGEA CONFERENCE**

Elio Riboli, Imperial College London (UK)

Joël Doré, INRAE (FR)

Albert Rizenthaler, CESE (FR)

Christel Teyssède, Aprifel (FR)





HUMAN HEALTH



FOOD SAFETY



FOOD BEHAVIORS



PUBLIC POLICIES



SUSTAINABILITY



POSTERS

POSTER	TITLE	AUTHOR (A-Z) COUNTRY	
1	<b>A qualitative study of young peoples' thoughts and attitudes to follow a more plant-based diet</b>	Cecil J. Scotland	
2	<b>Dose-related regulatory effect of raspberry polyphenolic extract on cecal microbiota activity, lipid metabolism and inflammation in rats fed a diet rich in saturated fats</b>	Fotschki B. Poland	
3	<b>Fruit and vegetable consumption: are they associated to movement behaviors?</b>	Fournier E. France	
4	<b>Changing eating habits by decreasing the inherence heuristic: domain, framing, and individual differences in inherence bias in the French student population</b>	Guzman Garcia A. France	
5	<b>The influence of the AntioxObesity weight reduction program on carotenoid concentrations in the blood among adults with excessive body weight</b>	Hamulka J. Poland	
6	<b>Occurrence of pesticides in fruit and vegetables – potential risk in aspect of consumer' health</b>	Lozowicka B. Poland	
7	<b>The effect of technological processes on fungicide residues in berries fruit and dietary risk assessment</b>	Lozowicka B. Poland	
8	<b>Extending the validity of four tools on eating difficulties, parental feeding practices and food choice in UK Children: associations with children's frequency of consumption and liking of fruits and vegetables</b>	Markousi D. United Kingdom	
9	<b>A fresh look at food environments in Sri Lanka</b>	Meeker J. United Kingdom	
10	<b>Exploratory consultation to evaluate availability of fruit and vegetable consumption data in AIAM5 member countries.</b>	Monino M. Spain	
11	<b>SALSA Questionnaire: A tool to assess people's barriers and facilitators for following a healthy and sustainable diet.</b>	Muñoz-Martínez J. Spain	
12	<b>Sour taste sensitivity in children aged 4 - 12 years</b>	Oomen C.M. The Netherlands	





HUMAN HEALTH



FOOD SAFETY



FOOD BEHAVIORS





















PUBLIC POLICIES



SUSTAINABILITY



POSTERS

POSTER	TITLE	AUTHOR (A-Z) COUNTRY	
13	<b>Better nutrition among refugee households with home gardens; effects of the Nutrition and Income Generation Intervention on vegetable consumption in Omugo refugee settlement, Uganda.</b>	Pittore K. The Netherlands	  
14	<b>Nutritional impact of no-added sugar fruit puree consumption at different eating occasions : a modelling study on French children</b>	Poinsot R. France	 
15	<b>Adherence to the Mediterranean Diet Among Pregnant Women in Jersey</b>	Przybylowicz K. Poland	
16	<b>Sustainable school food procurement in England: when there is a will, there is a way</b>	Sabet F. United Kingdom	  
17	<b>Betalains-rich products inhibit sodium-dependent glucose co-transporter 1-mediated glucose uptake by intestinal epithelial cells</b>	Sawicki T. Poland	
18	<b>Consumer knowledge and sentiment of fruit &amp; vegetable dietary guidelines</b>	Scott L. United States	
19	<b>Gender differences in the eating behaviors of an Italian population of children participating to the nutrition education program MaestraNatura</b>	Vari R. Italy	
20	<b>Dietary self-control as a way to improve fruit and vegetable consumption and adherence to dietary recommendations</b>	Wadolowska L. Poland	
21	<b>Nudging food service users to choose fruit-and vegetable-rich items: Five field studies</b>	Yi S. Canada	
22	<b>Can social influence and norms promote more sustainable diets?</b>	Zamzow H. United Kingdom	 
23	<b>Different determinants of preferences for botanically defined fruit and vegetables: evidence from omnivores, vegetarians, and vegans</b>	Zhai Y. United Kingdom	 



► Consult the posters' abstracts



## Benjamin ALLÈS

**Nutritional Epidemiology Research Team (EREN) – CRESS, Sorbonne Paris Nord University, France**

- Benjamin Allès is an Epidemiologist at the National Research Institute for Agriculture, Food and Environment and works within the Nutritional Epidemiology Research Team (EREN) of the French epidemiology and statistics research center (CRESS) at the University of Paris, since 2014.
- He is also a Lecturer in Nutritional Epidemiology at Sorbonne Paris Nord University.
- Benjamin Allès mainly studies determinants of food behavior and dietary patterns, focusing on plant-based diets and especially vegetarianisms, in relationship with health, in the context of improving food sustainability.
- Besides his research activities, he has also been involved in national expertise tasks with public authorities such as French ANSES, or international: evaluation of a public health nutrition policy for the European commission, or WHO European NCDs office workshops.
- From 2010 to 2013, Benjamin studied and worked at Laval University in Canada as a PhD Student and post-doctoral fellow respectively, conducting studies about dietary patterns, circulating lipids, and cognitive decline in older people from France and Quebec.

### RECENT PUBLICATIONS

1. Allès B, et al. Comparison of Sociodemographic and Nutritional Characteristics between Self-Reported Vegetarians, Vegans, and Meat-Eaters from the NutriNet-Santé Study. *Nutrients*. 2017 Sep 15;9(9):1023.
2. Allès B, et al. Food choice motives including sustainability during purchasing are associated with a healthy dietary pattern in French adults. *Nutr J*. 2017 Sep 18;16(1):58.
3. Gehring J, et al. Consumption of Ultra-Processed Foods by Pesco-Vegetarians, Vegetarians, and Vegans: Associations with Duration and Age at Diet Initiation. *J Nutr*. 2021 Jan 4;151(1):120-131.
4. Reuzé A, et al. Rebalancing meat and legume consumption: change-inducing food choice motives and associated individual characteristics in non-vegetarian adults. *Int J Behav Nutr Phys Act*. 2022 Sep 1;19(1):112.
5. Baudry J, et al. Associations between measures of socio-economic position and sustainable dietary patterns in the NutriNet-Santé study. *Public Health Nutr*. 2022 Oct 10:1-11.



## Marie-Josèphe AMIOT-CARLIN

**National Research Institute for Agriculture, Food and Environment (INRAE), France**

### RECENT PUBLICATIONS

1. Badji I, et al. Changes in French purchases of pulses during an FAO awareness campaign. *Front Nutr*. 2023 Jan 26;9:971868.
  2. Morrissey C, et al. Vitamin D Supplementation on Carotid Remodeling and Stiffness in Obese Adolescents. *Nutrients*. 2022 May 30;14(11):2296.
  3. Monjot N, et al. Clinical Evidence of the Benefits of Phytonutrients in Human Healthcare. *Nutrients*. 2022 Apr 20;14(9):1712.
  4. Kesse-Guyot E, et al. Key Findings of the French BioNutriNet Project on Organic Food-Based Diets: Description, Determinants, and Relationships to Health and the Environment. *Adv Nutr*. 2022 Feb 1;13(1):208-224.
  5. Amiot MJ, et al. Intake Estimation of Phytochemicals in a French Well-Balanced Diet. *Nutrients*. 2021 Oct 16;13(10):3628.
- Marie-Josèphe Amiot Carlin is Director of Research in Nutrition and Public Health at the Human Nutrition and Food Safety Division of INRAE.
  - She is an expert in food and nutrition security, healthy dietary patterns, plant micronutrients, prevention of obesity and cardiometabolic risk factors and sustainable food systems.
  - Her publications include over 150 original and review articles, 28 book chapters and 2 patents. She has been invited to give over 100 lectures and has coordinated 6 books (Orcid: 0000-0003-4563-4587).
  - She directed a research unit in human nutrition in Marseille and was co-director of three other research units, including two on nutrition in Marseille and an interdisciplinary center in Montpellier on sustainable agri-food systems.
  - Since 2021, she has been in charge of the Key Initiative on Food and Health within the University of Montpellier's site of excellence.
  - Since 2020, she is Vice-president in charge of international partnerships of the French Society of Nutrition.





## Philippe BINARD

### **Freshfel Europe, Belgium**

- Philippe Binard is the General Delegate of the Freshfel Europe secretariat, overseeing the activities of the association. He is responsible for the external representation of the association and is answerable to the Freshfel Europe Board and membership.
- Philippe Binard joined the fresh fruit and vegetables business in 1987, working for CIMO (European Fruit and Vegetables Importers Association) and becoming General Delegate of that organisation in 1992.
- In 2001, he was appointed General Delegate of Freshfel Europe, the new association launched as the single platform for the European fresh produce sector and representing the interest of the fresh fruit and vegetables sector with more than 200 members across the fresh produce supply chain from production down to retail.



## Nathalie DELZENNE

### **Louvain Drug Research Institute, Catholic University of Louvain, Belgium**

### RECENT PUBLICATIONS

1. Delzenne NM et al. Editorial: The double burn of malnutrition: the place of key nutrients revisited. *Curr Opin Clin Nutr Metab Care.* 2022 Nov 1;25(6):423-424.
2. Neyrinck AM, et al. Constipation Mitigation by Rhubarb Extract in Middle-Aged Adults Is Linked to Gut Microbiome Modulation: A Double-Blind Randomized Placebo-Controlled Trial. *Int J Mol Sci.* 2022 Nov 24;23(23):14685.
3. Seethaler B, et al. Short-chain fatty acids are key mediators of the favorable effects of the Mediterranean diet on intestinal barrier integrity: data from the randomized controlled LIBRE trial. *Am J Clin Nutr.* 2022 Oct 6;116(4):928-942.
4. Bachmann R, et al. Akkermansia muciniphila Reduces Peritonitis and Improves Intestinal Tissue Wound Healing after a Colonic Transmural Defect by a MyD88-Dependent Mechanism. *Cells.* 2022 Aug 27;11(17):2666.
5. Neyrinck AM, et al. Breath volatile metabolome reveals the impact of dietary fibres on the gut microbiota: Proof of concept in healthy volunteers. *EBioMedicine.* 2022 Jun;80:104051.

- Nathalie Delzenne is a Full Professor at the Faculty of Pharmaceutical and Biomedical sciences at UCLouvain. She is leader of the research group in Metabolism and Nutrition at UCLouvain.
- She has been pioneer in the discovery of nutrients targeting the gut microbiota (prebiotics) and elaborated the molecular mechanisms behind their effects on the control of metabolic and behavioural diseases.
- Nathalie is a highly cited researcher with nearly 300 peer-reviewed papers in the field and involved in national and international research consortia (KBBE MyNewGut, Excellence Project FOOD4GUT and MicroBOOST, FIBER TAG project) who obtained multiple scientific awards.
- She is full member and member of the board of the Royal Academy of Medicine in Belgium, founding member and past-President of the Belgian Nutrition Society, and present chair of the scientific committee of ESPEN (European society for clinical nutrition and metabolism).



## Nita FOROUHI

**University of Cambridge, United Kingdom**

- Nita Forouhi is a physician scientist in the Medical Research Council Epidemiology Unit at the University of Cambridge where she is Professor of Population Health and Nutrition and works on the link between diet, nutrition and the risk of diabetes, obesity and related metabolic disorders.
- Her research interests include nutritional epidemiology, the development and application of improved methods to assess diet including nutritional biomarkers, and global nutrition and health.
- Nita serves in several academic roles including as co-lead of the National Institute of Health Research (NIHR) Cambridge Biomedical Research Centre theme on Nutrition, Obesity, Metabolism and Endocrinology, and she is an NIHR Senior Investigator. She is also a Principal Investigator on several studies including the EU-FP6 funded EPIC-InterAct Study, the Fenland Study, the SABRE study and the EU-FP7 funded InterConnect Project and EPIC-CVD study. She has published over 300 scientific articles.
- Nita is the Director of Organizational Affairs at the University of Cambridge School of Clinical Medicine and she is also a keen educator, training postgraduate students, postdoctoral fellows and public health trainees.
- Nita trained in Medicine at the University of Newcastle where she also obtained a First-Class Honor degree in Immunology. She further trained in General Medicine and Diabetes & Endocrinology in Edinburgh and obtained the MRCP. She was a Wellcome Training Fellow and was awarded a Master and PhD in Epidemiology at the London School of Hygiene & Tropical Medicine.

## RECENT PUBLICATIONS

1. Forouhi NG. Embracing complexity: making sense of diet, nutrition, obesity and type 2 diabetes. *Diabetologia*. 2023; 66(5):786-799.
2. Zheng JS, et al. Association of plasma biomarkers of fruit and vegetable intake with incident type 2 diabetes: EPIC-InterAct case-cohort study in eight European countries. *BMJ*. 2020; 370:m2194.
3. Zheng JS, et al. Plasma Vitamin C and Type 2 Diabetes: Genome-Wide Association Study and Mendelian Randomization Analysis in European Populations. *Diabetes Care*. 2021; 44(1):98-106.
4. Pearce M, et al. Associations of Total Legume, Pulse, and Soy Consumption with Incident Type 2 Diabetes: Federated Meta-Analysis of 27 Studies from Diverse World Regions. *J Nutr*. 2021; 151(5):1231-1240.
5. Mba CM, et al. The association between plasma zinc concentrations and markers of glucose metabolism in adults in Cameroon. *Br J Nutr*. 2023:1-8.



## Céline GINER

**Organisation for Economic Co-operation and Development (OECD), France**

## RECENT PUBLICATIONS

1. Giner C, & Placzek O (2022). Food insecurity and food assistance programmes across OECD countries. *OECD Food, Agriculture and Fisheries Papers*, n° 183, Éditions OCDE, Paris
2. Giner, C, Hobeika M, & Fischetti C (2022). Gender and food systems. *OECD Food, Agriculture and Fisheries Papers*, n° 184, Éditions OCDE, Paris
3. Deconinck, K, Giner, C, Jackson, L A, & Toyama, L. (2022). Making better policies for food systems will require reducing evidence gaps. *Global Food Security*, 33, 100621.
4. Brooks, J, & Giner, C (2021). What Role Can Agricultural Policies Play in Encouraging Healthier Diets?. *EuroChoices*, 20(3), 4-11.
5. Giner, C, & Brooks, J (2019). Policies for encouraging healthier food choices. *OECD Food, Agriculture and Fisheries Papers*, n° 137, Éditions OCDE, Paris

- Céline Giner is a Policy Analyst at the Organisation for Economic Co-operation and Development (OECD) where she works at the Trade and Agriculture Directorate (TAD) in the Agro-food Trade and Markets Division.
- Céline conducts and drives research on policies related to global food systems, including policies for encouraging healthier and more sustainable food choices, policies that address gender inequality in food systems and food assistance programmes.
- Céline is responsible for the OECD Food Chain Analysis Network, an expert group in agro-food systems analysis.
- She was trained in quantitative economics and econometrics at the French National School for Statistics and Data Analysis and at the University of Essex. She recently participated to a professional training provided by the French National School of Administration for experienced civil servants.





## Boitshepo Bibi GIYOSE

### African Union Development Agency (AUDA-NEPAD), South Africa

- Boitshepo Bibi Giyose is a Senior Nutrition Officer for Policy and Programmes in the Nutrition and Food Systems Division at FAO, but currently on secondment to the African Union Development Agency as special advisor to the CEO since January 2018.
- Her work focuses on integrating and mainstreaming nutrition into agriculture and related development agendas, and to promote a multisector approach for addressing all forms of malnutrition.
- She holds a MS in International Nutrition from Cornell University, NY. and a BS in Nutrition and Dietetics from Appalachian State University, USA.
- Ms. Giyose was awarded a «Distinguished Alumna Award» in recognition of exceptional professional achievement by Appalachian State University in 2007. She was also named Senior Policy Scholar in 2011 by the Global Child Nutrition Foundation – USA - for her work on Home Grown School Feeding. She has served on numerous international scientific technical and policy advisory committees.

### RECENT PUBLICATIONS

1. Garcia-Casal MN, et al. *Staple crops biofortified with increased vitamins and minerals: considerations for a public health strategy.* *Ann. N.Y. Acad. Sci.* 2017; 1390(1):3-13.
2. Hunter D, et al. (2017) *Schools as a system to improve nutrition: A new statement for school-based food and nutrition interventions.* *UNSCN Discussion Paper* 64 p.
3. Drake L, et al. 2017. «School Feeding Programs in Middle Childhood and Adolescence.» *In Disease Control Priorities (third edition): Volume 8, Child and Adolescent Health and Development, edited by D. A. P. Bundy, N. de Silva, S. Horton, D. T. Jamison, and G. C. Patton.* Washington, DC: World Bank.



## Carmen Gloria GONZÁLEZ

### University of Chile, Chile

- ### RECENT PUBLICATIONS
1. González, CG, Reyes, M. *Gusto dulce: percepción, fuentes alimentarias y preferencias.* *Rev Chil Nutr* 2023 (In press)
  2. González, CG, et al. *Sweetness of Chilean Infants' Diets : Methodology and Description.* *Nutrients* 2022; 14 (7):1447.
  3. González, CG, et al. *Aplicación y efectividad de un modelo educativo en hábitos saludables con entrega de fruta y programa de actividad física en escolares.* *Rev Chil Nutr* 2020; 47 (6): 991-999.
  4. Venegas, C, et al. *Consumption of non-nutritive sweeteners by pre-schoolers of the food and environment Chilean cohort (FECHIC) before the implementation of the Chilean food labeling and advertising law.* *Nutr J* 2020; 19, 69:1-11.
  5. González, CG. *Frutas y verduras perdidas y desperdiciadas, una oportunidad para mejorar el consumo.* *Rev Chil Nutr* 2018; 45:198.

- Carmen Gloria González is a professor at the Institute of Nutrition and Food Technology, of the University of Chile.
- She is a Nutritionist with a Master in Nutrition and Food and Ph.D. in Nutrition and Food from the University of Chile.
- Carmen is the Chief of the Food Sensory Evaluation Laboratory and the 5-a-day program in Chile. Furthermore, she does postgraduate teaching and research.
- Her areas of expertise are food sensory evaluation, food labeling, promotion of fruit and vegetables consumption, and food and nutrition education.



## Marc J GUNTER

**Imperial College London, United Kingdom**

- Marc Gunter is Professor and Chair in Cancer Epidemiology and Prevention in the Department of Epidemiology and Biostatistics at the School of Public Health, Imperial College London.
- He is a molecular epidemiologist, and his main research focus is the role of nutrition, diabetes, and obesity in cancer development and prognosis, with an emphasis on studying the mechanisms linking metabolic dysfunction and endocrine pathways with cancer.
- Marc serves as joint coordinator of the European Prospective Investigation into Cancer (EPIC). He currently coordinates a major EU-funded project to uncover novel causes of renal, pancreatic and colorectal cancer (DISCERN) and is a lead investigator in a Cancer Grand Challenge project (PROMINENT).
- He is senior editor for Cancer Prevention Research and a peer reviewer for several other scientific and medical journals. He serves on numerous committees and panels for international organizations and charities such as the World Cancer Research Fund.

## RECENT PUBLICATIONS

1. Murphy N, et al. Associations between glycaemic traits and colorectal cancer: A Mendelian Randomization analysis. *J Natl Cancer Inst.* 2022 May 9;114(5):740-752.
2. Murphy N, et al. Insulin-like growth factor-1, insulin-like growth factor-binding protein-3, and breast cancer risk: observational and Mendelian randomization analyses with ~430 000 women. *Annals of oncology* 2021; 31 (5): 641-649.
3. Rothwell JA, et al. Metabolic Signatures of Healthy Lifestyle Patterns and Colorectal Cancer Risk in a European Cohort. *Clinical gastroenterology and hepatology* 2020.
4. Murphy N, et al. Circulating Levels of Insulin-like Growth Factor 1 and Insulin-like Growth Factor Binding Protein 3 Associate With Risk of Colorectal Cancer Based on Serologic and Mendelian Randomization Analyses. *Gastroenterology.* 2020; 158 (5): 1300-1312.e1320.
5. Aglago EK, et al. Consumption of Fish and Long-chain n-3 Polyunsaturated Fatty Acids Is Associated With Reduced Risk of Colorectal Cancer in a Large European Cohort. *Clinical gastroenterology and hepatology* 2020; 18 (3): 654-666.e656.



## Anna HERFORTH

**Harvard T.H Chan School of Public Health, United States**

## RECENT PUBLICATIONS

1. Global Diet Quality Project. 2022. *Measuring what the world eats: Insights from a new approach.* Geneva: Global Alliance for Improved Nutrition (GAIN); Boston, MA: Harvard T.H. Chan School of Public Health, Department of Global Health and Population.
  2. Herforth A et al. 2022. *Methods and options to monitor the cost and affordability of a healthy diet globally. Background paper for the State of Food Security and Nutrition in the World 2022.* Rome: FAO.
  3. Herforth A et al. 2020. *Cost and affordability of healthy diets across and within countries. Background paper for the State of Food Security and Nutrition in the World 2020.* FAO, Rome.
  4. Herforth A et al. *Diagnosing the performance of food systems to increase accountability toward healthy diets and environmental sustainability.* *PLoS One.* 2022 Jul 29;17(7):e0270712
  5. Ma S et al. *Most Commonly-Consumed Food Items by Food Group, and by Province, in China: Implications for Diet Quality Monitoring.* *Nutrients.* 2022 Apr 22;14(9):1754.
- Anna Herforth is a Senior Research Associate at Harvard T.H Chan School of Public Health, and a Visiting Senior Researcher at Wageningen University & Research.
  - She holds a Ph.D. in International Nutrition from Cornell University, MS in Food Policy from Tufts University, and a BS in Plant Science from Cornell University.
  - She is the Principal Investigator of the Global Diet Quality Project, and Co-Director of the Food Prices for Nutrition project.
  - Dr Herforth is leading initiatives to improve measurement of food systems for healthy diets. She developed the Cost and Affordability of a Healthy Diet indicator that has recently been adopted by the UN FAO as a global food security indicator. She has worked in Africa, South Asia, and Latin America, including with agricultural and indigenous communities.
  - Anna co-founded and co-leads the Agriculture-Nutrition Community of Practice (Ag2Nut), a professional community of over 8,000 members from 130 countries.





## Roel HERMANS

### LeefstijlLab, the Netherlands

- Roel Hermans is a behavioural scientist working in the area of health promotion. His areas of expertise include the influence of the built and social environment on eating behavior, health behavior change and science communication.
- Roel has a background in the Pedagogical Sciences and received his PhD from the Faculty of Social Science at Radboud University in 2013. His doctoral thesis was on the social influences on food intake.
- Next to his academic endeavours, Roel has worked as behavioural consultant at the Netherlands Nutrition Centre and Jumbo Supermarkten BV working at the intersection of science, policy, business and society.
- In 2020, Roel founded LeefstijlLab, an inspiration and activation platform aimed at promoting a healthy lifestyle. Through his brand, Roel offers behavioral coaching, training and education to individuals and coaches. In addition, he works as an independent behavioral consultant for different health organizations in the Netherlands.

### RECENT PUBLICATIONS

1. Ronteltap et al., *Digital health interventions to improve eating behavior of people with lower socioeconomic position: A scoping review of behaviour change techniques.* *BMC Nutrition*, 8, 145 (2022).
2. Poelman et al, *Eating behavior and food purchases during the COVID-19 lockdown: A cross-sectional study among adults in the Netherlands.* *Appetite*. 2021 Feb 1;157:105002.
3. Folkvord, F., Hermans, R.C.J. *Food Marketing in an Obesogenic Environment: a Narrative Overview of the Potential of Healthy Food Promotion to Children and Adults.* *Curr Addict Rep*. 2020; 7: 431–436.
4. Waterlander et al. *A System Dynamics and Participatory Action Research Approach to Promote Healthy Living and a Healthy Weight among 10–14-Year-Old Adolescents in Amsterdam: The LIKE Programme.* *Int. J. Environ. Res. Public Health*. 2020 Jul 8;17(14):4928.
5. Hermans, R.C.J. et al. *Public Health Nutrition Communication in the Netherlands: from information provision to behavior change. The handbook of eating and drinking, 2020.*



## Diego INTRIGLIOLO

### Spanish Research Council (CSIC), Spain

- Since 2021, Diego Intrigliolo is a Senior Scientist at the Desertification Research Center at the Spanish National Research Council in Valencia, where he continued his research work on topics related to agronomic practices to increase water use efficiency in woody crops and vine cultivation techniques to optimise grape and wine production and quality in warm and semi-arid environments under a context of severe land degradation and water scarcity.
- He studied at the Polytechnic University of Valencia where he obtained his PhD in Agricultural Engineering.
- Diego's research studies aim at improving on-farm irrigation efficiency, plant water use efficiency and indeed water productivity.
- Currently, Diego is combining his research activities with additional tasks related with benchmarking research needs in the agricultural water management area.
- He is the Spanish national scientific expert for the European Joint Soil Programme on agricultural soils and the PRIMA Joint Programme «Partnership for research and innovation in the Mediterranean area» where he also serves in the Scientific Advisory Committee.
- Diego is associate editor for the indexed Journals *Irrigation Science* and *Australian Journal of Grape and Wine Research*.

### RECENT PUBLICATIONS

1. Mirás-Avalos. et al. *Quantitative analysis of almond yield response to irrigation regimes in Mediterranean Spain, Agricultural Water Management, Volume 279, 2023, 108208, ISSN 0378-3774*
2. López-García et al. *Yield estimations in a vineyard based on high-resolution spatial imagery acquired by a UAV, Biosystems Engineering, Volume 224, 2022, Pages 227-245, ISSN 1537-5110.*
3. González-Gómez et al. *Assessing almond response to irrigation and soil management practices using vegetation indexes time-series and plant water status measurements, Agriculture, Ecosystems & Environment, Volume 339, 2022, 108124, ISSN 0167-8809.*
4. Rubio-Asensio et al. *Effects of Cover Crops and Drip Fertigation Regime in a Young Almond Agroecosystem. Agronomy. 2022; 12(11):2606*
5. Gisbert ,et al. *Characterization of Local Mediterranean Grapevine Varieties for Their Resilience to Semi-Arid Conditions under a Rain-Fed Regime. Agronomy. 2022; 12(9):2234*



## Giuseppe MONTANARO

**University of Basilicata, Italy**

- Giuseppe Montanaro is Associate Professor at the University of Basilicata, Italy.
- He holds a PhD in Crop Systems, Forestry and Environmental Sciences from the University of Basilicata.
- His expertise covers plant-environment interactions, including remedial techniques that increase ecosystem services via improving the structure and function of soil. He focused on carbon budget calculation embracing C fluxes such as Rs NEP, NPP, GPP and the NECB framework to account anthropogenic lateral transport of carbon.
- His research also focuses on fruit quality, water relations, soil fertility remediation and photosystem II efficiency. Giuseppe is actively pursuing easy-to-use techniques at the orchard scale and new technologies to boost the accumulation of carbon in soil.
- He studied the external (e.g. light, VPD, wind) and internal (e.g. secondary metabolites, xylem hydraulic resistance) plant factors in determining water flow and accumulation of nutrients. He focused on plant water relations in fruit trees and grapevines under environmental constraints.
- He has approached plant phenotyping (e.g., RGB, NIR, 3D\_RGB) to study response to the environment (e.g., drought, salinity). He also focused on the image-based phenotyping of some fruit quality traits as combined with artificial intelligence data analytics.

### RECENT PUBLICATIONS

1. Montanaro et al., Management options influence seasonal CO<sub>2</sub> soil emissions in Mediterranean olive ecosystems. *European Journal of Agronomy*, 2023, Vol. 146, 126815.
2. Montanaro et al. A synthetic cytokinin primes photosynthetic and growth response in grapevine under ion-independent salinity stress. *Journal of Plant Interactions*, 2022; 17(1): 789-800.
3. Petit G, et al, Susceptibility to *Xylella fastidiosa* and functional xylem anatomy in *Olea europaea*: revisiting a tale of plant-pathogen interaction. *AoB Plants*. 2021 May 21;13(4):plab027.
4. Montanaro et al. Carbon Fluxes in Sustainable Tree Crops: Field, Ecosystem and Global Dimension. *Sustainability* 2021; 13(16): 8750.
5. Montanaro G, et al. Carbon budget in a Mediterranean peach orchard under different management practices. *Agriculture, Ecosystems and Environment*, 2017; 238: 104-113.

### RECENT PUBLICATIONS

1. Malusà, E et al. Editorial: Plant root interaction with associated microbiomes to improve plant resiliency and crop biodiversity, volume II. *Front Plant Sci*. 2023 Feb 14;14:1143657.
2. Lodolini et al. Time and type of pruning affect tree growth and yield in high-density olive orchards. *Scientia Horticulturae*. 2023 Jan 1 ;111831.
3. Khosravi et al. Continuous Third Phase Fruit Monitoring in Olive with Regulated Deficit Irrigation to Set a Quantitative Index of Water Stress. 2022 Dec 19; 8(12):1221.
4. Giorgi et al. Living mulch under the row of young peach orchard. *Acta Horticulturae*. 2022, Dec 1 ;193-198.
5. Neri et al. Current trends and future perspectives towards sustainable and economically viable peach training systems. *Scientia Horticulturae*. 2022 Nov 17; 305:111348.



## Davide NERI

**Polytechnic University of Marche, Italy**

- Davide Neri has a degree in Agricultural Science at the Faculty of Agriculture of the University of Bologna. He also obtained a doctorate in arboriculture at the same university.
- He has collaborated and is collaborating in several international, national and regional research projects on plant physiology, fruit germplasm, arboriculture and oliveculture, sustainable crop management.
- He has been a member of several technical and scientific committees of national and international conferences like the Scientific Committee of the International Strawberry Congress 2022 in Belgium.
- He has been involved in numerous research projects including precision fruit farming and has published more than 300 arboricultural publications.





## Sophie NICKLAUS

**National Research Institute for Agriculture, Food and Environment (INRAE), France**

- Sophie Nicklaus is Director of Research 1<sup>st</sup> class at INRAE, at the Centre for Taste and Feeding behavior (Centre des Sciences du Goût et de l'Alimentation) in Dijon, France. Since 2017, she has been leading the team 'Determinants of eating behaviour across the life course, relationships with health' at this centre.
- During her training as an agricultural engineer (AgroParisTech), she was interested in the sensory and nutritional qualities of foods and their determinants. Since her thesis at the University of Bourgogne, she has been studying children's eating behaviour (food preferences; appetite control), to assess the effect of food properties (sensory properties, energy density) in the development and evolution of food preferences and consumption in children, using experimental and epidemiological approaches (in particular within the framework of two birth cohorts, OPALINE and ELFE).
- She is particularly interested in the impact of early food experiences on later eating behaviour and their contribution to health. She has published over 110 original articles and 21 reviews in international peer-reviewed journals; 22 book chapters; 1 edited book and a book for the general public on these topics.
- She is currently collaborating with public health authorities in France to develop and evaluate updated recommendations on infant feeding.

### RECENT PUBLICATIONS

1. Arrazat L, et al. Traffic-light front-of-pack environmental labelling across food categories triggers more environmentally friendly food choices: a randomised controlled trial in virtual reality supermarket. *Int J Behav Nutr Phys Act.* 2023 Jan 26;20(1):7.
2. De Rosso S, et al. Counseling parents about child feeding: a qualitative evaluation of French doctors and health/childcare professionals' experiences and perception of a brochure containing new recommendations. *BMC Public Health.* 2022 Dec 8;22(1):2303.
3. Dahmani J, et al. Nutritional quality and greenhouse gas emissions of vegetarian and non-vegetarian primary school meals: A case study in Dijon, France. *Front Nutr.* 2022 Oct 10;9:997144.
4. Bell L, et al. Supporting strategies for enhancing vegetable liking in the early years of life: an umbrella review of systematic reviews. *Am J Clin Nutr.* 2021 May 8;113(5):1282-1300.
5. Marty L, et al. The motivational roots of sustainable diets: Analysis of food choice motives associated to health, environmental and socio-cultural aspects of diet sustainability in a sample of French adults. *Cleaner and Responsible Consumption.* 2022 Jun 1;5:100059.



## Pilar SANTACOLOMA

**Food and Agriculture Organization of the United Nations (FAO), Italy**

### RECENT PUBLICATIONS

1. FAO, 2023. Boosting the capacities of small-scale producers and small and medium-sized enterprises for the nutrition of the most vulnerable. Santacoloma, P., et al.
2. Santacoloma P and Zarate, E. 2022. 'How can policy environment enhance small-scale producers' participation in institutional food procurement for school feeding? Emerging institutional innovations and challenges in Latin American countries' In L. Swenson, S. Schneider and F. Tartanac, *Public Food Procurement for Sustainable Food Systems and Healthy Diet.* Rome, FAO, BI and UFRGS
3. FAO E-learning courses 2022: Small and Medium Enterprises and Nutrition: making the business case <https://elearning.fao.org/course/view.php?id=725> and Small and Medium Enterprises and Nutrition: upgrading business models <https://elearning.fao.org/course/view.php?id=816>. Santacoloma P, Uccello E. and Anta, M. (Eds)
4. FAO and INRAE. 2020. Enabling sustainable food systems: Innovators' handbook. Loconto A., Poisot A.S. and Santacoloma P. (Eds), Rome, FAO and INRAE.
5. Santacoloma, P., Telemans, B., Mattioni, D., Puhac, A., Scarpocchi, C., Taguchi, M. and Tartanac, F. 2021. Promoting sustainable and inclusive value chains for fruits and vegetables – Policy review. Background paper for the FAO/WHO International Workshop on Fruits and Vegetables 2020. Rome, FAO, <https://www.fao.org/documents/card/es/cb5720en/>

- Pilar Santacoloma has nearly 20 years of professional experience in agricultural economics and rural development including specialized knowledge on agri-food systems analysis, agribusiness and market linkages, value chain development, agricultural policy, enterprise development, food safety and quality standards, institutional innovations, public-private partnerships, SMEs and nutrition, and project design and management in East Africa and parts of Asia, East Europe and Latin America
- Pilar is Agri-food systems officer at the Food and Nutrition Division (ESN) of the Food and Agriculture Organization of the United Nations (ESN, UN-FAO) since 2019. She leads design, implementation and monitoring of projects on food systems for healthy diets – SMEs, youth and women entrepreneurship, biodiversity and market development in several countries, including strategic advice for resource mobilization together with UN system and other organizations.
- She also develops concepts, methodologies and guidelines for innovative sustainable markets and food systems for healthy diets in collaboration with partner organizations and leads the design and facilitation of capacity development activities and policy consultations on food systems for healthy diets with nutrition lens at global, regional and national levels.
- Pilar started as a farm economist at the UN-FAO in 2001 and then worked as Agribusiness Economist. From 2014 to 2019, she became Agri-food systems officer at the Sub-regional Office for Mesoamerica (SLM) UN-FAO.
- She holds a BSc in Medicine Veterinary and Zootechnics and a MSc in Agricultural Economics from Universidad Nacional de Colombia, and a PhD in Agricultural Economics from Hohenheim University, Germany.



## Daniel SAUVAITRE

**National Association Apples and Pears (ANPP), France**

- Daniel Sauvaitre is an arboriculturist and winemaker in Charente.
- He is the president of the National Association Apples and Pears (ANPP) since its creation in November 2008.
- He is also a member of the WAPA (World Apple and Pear Association), an association that brings together 16 producing countries of apple and pear.
- Daniel Sauvaitre is also secretary general of Interfel, the French interprofession of fresh fruit and vegetable.



## Marc André SELOSSE

**Museum national d'histoire naturelle de Paris, France**

- Marc Andre Selosse is a microbiologist and professor at the Muséum national d'Histoire Naturelle, and at the Universities of Kunming (China) and Gdansk (Poland). He is the head of the Plant and Fungal Interactions and Evolution team
- His research focuses on the ecology and evolution of mycorrhizae, a major symbiosis between soil fungi and the roots of most land plants. He also has a general interest in symbiosis and its evolution.
- Marc Andre Selosse was director of the French Botanical Society from 2010 to 2018 and is now president of the BioGée Federation.
- He is member of the French Academy of Agriculture and editor of four international scientific journals: *New Phytologist*, *Ecology Letters*, *Symbiosis and Botany Letter*.
- He wrote 210 research papers, 52 book chapters, 27 forewords to books, more than 420 videos or content on the Internet, and 250 outreach papers.

### RECENT PUBLICATIONS

1. Evans A, et al. *Historical biogeography and local adaptation explain population genetic structure in a widespread terrestrial orchid.* *Ann Bot.* 2023 Jan 21:mcad010.
2. Diouf, M et al. *Succession of the microbiota in the gut of reproductives of *Macrotermes subhyalinus* (Termitidae) at colony foundation gives insights into symbionts transmission.* *Frontiers in Ecology and Evolution.* 2023, Jan 09
3. Maurice, K et al. *Fertility Islands, Keys to the Establishment of Plant and Microbial Diversity in a Highly Alkaline Hot Desert.* *SSRN Electronic Journal.* 2023, Jan 1.
4. Perez-Lamarque, B et al. *Structure and specialization of mycorrhizal networks in phylogenetically diverse tropical communities.* *Environ Microbiome.* 2022 Jul 20;17(1):38.
5. Mujica, M et al. *Mycorrhizal fungi in the waiting room: fungal associations in Orchidaceae shed light on mycorrhizal evolution.* 2022, Oct 13



## Tim SMITS

**KU Leuven, Belgium**

- Tim Smits is a professor in Persuasion and Marketing Communication at KU LEUVEN. He has a background in Social Psychology (MSc & PhD), Statistics (MSc), Marketing, Ethics and Communication.
- He is the current vice-dean of Education for the Faculty of Social Sciences, the former director of the Institute for Media studies and the former programme director of the Master in Corporate Communication at KU LEUVEN.
- Tim published on various topics within these fields, but his main research focus pertains to persuasion and marketing communication dynamics that involve health and/or consumer empowerment and how these are affected by situational differences or manipulations. He also has a more methodological line of research on science replicability.
- He is a reviewer for a wide range of academic journals, a regular blogger and media expert on the topic of persuasion and marketing communication. He is also a keynote speaker on persuasion, nudging and related topics.

## RECENT PUBLICATIONS

1. Hallez, L et al. Persuasive packaging? The impact of packaging color and claims on young consumers' perceptions of product healthiness, sustainability and tastiness. *Appetite*. 2022 Dec; 182(18) : 106433.
2. Hallez, L et al. Nothing but 'peaches and cream'? The impact of fruit images and a sugar claim on young consumers' perceptions and expectations of dairy products. *Food Quality and Preference*. 2022 Jul ; 102(1) : 104687.
3. Decorte, P et al. «Everywhere You Look, You'll Find Food»: Emerging Adult Perspectives Toward the Food Media Landscape. *Ecol Food Nutr*. 2022 May-Jun;61(3):273-303.
4. Hallez, L., et al. (2021). Can It Hurt to Be Honest About Nudging? the Impact of a (Disclosed) Social Norm Nudge on Food Preferences and Choice. In: Waiguny, M.K.J., Rosengren, S. (eds) *Advances in Advertising Research (Vol. XI)*. European Advertising Academy. Springer Gabler, Wiesbaden.
5. Qutteina, Y et al. Food for Teens: How Social Media is Associated with Adolescent Eating Outcomes. *Public Health Nutr*. 2022 Feb;25(2):290-302



## Saverio STRANGES

**Schulich School of Medicine & Dentistry, Western University, Canada**

- Saverio Stranges is currently Professor and Chair of the Department of Epidemiology and Biostatistics within the Schulich School of Medicine & Dentistry, at Western University, in London, Ontario, Canada. He also holds a cross-appointment as Professor in the Departments of Family Medicine and Medicine. At Western University, Dr. Stranges is Director of the Africa Institute as well.
- He is a medical doctor, public health specialist and chronic disease epidemiologist, with extensive experience in the field of epidemiology and public health research. His research focuses on Global Health as well as the epidemiology and prevention of chronic disease and aging, specifically regarding the role of lifestyles, nutritional and psychosocial factors, such as dietary patterns, sleep behaviors and social determinants of health.
- Dr. Stranges completed his medical education in 1996, and specialty training in Preventive/ Public Health Medicine in 2000 in his native country of Italy at the University of Naples Federico II. He then enrolled in a PhD Program in Epidemiology and Environmental Health and had the opportunity to complete the requirements for his degree in the Department of Epidemiology and Environmental Health (formerly Department of Social & Preventive Medicine) at the State University of New York at Buffalo in the US (2004).
- In Buffalo, Dr Stranges also started his academic career as an Assistant Professor. From 2006 to 2015, he was a Senior Lecturer and then an Associate Clinical Professor (with tenure) of Cardiovascular Epidemiology in the Division of Health Sciences at the University of Warwick Medical School in the United Kingdom.
- In Warwick, Dr. Stranges was also Director of the Academic Clinical Training in Public Health, as well as Honorary Consultant Physician at the University Hospitals of Coventry and Warwickshire NHS Trust, where he worked in the Lipid and Coronary Prevention outpatient clinics within the Warwickshire Institute for the Study of Diabetes, Endocrinology and Metabolism. Prior to his appointment at Western University in Canada, Dr. Stranges worked as Scientific Director of the Department of Population Health at the Luxembourg Institute of Health, in Luxembourg, where he still holds a formal role as Scientific Advisor.
- Dr. Stranges is Vice-President of the Chronic Disease Section of the European Association of Public Health, as well as an Associate Editor for several journals in the area of Public Health.

## RECENT PUBLICATIONS

1. Singh SS, et al. Influence of the Social Environment on Ideal Cardiovascular Health. *J Am Heart Assoc*. 2023 Feb 21;12(4):e026790.
2. Collings PJ, et al. Device-measured physical activity and sedentary time in a national sample of Luxembourg residents: the ORISCAV-LUX 2 study. *Int J Behav Nutr Phys Act*. 2022 Dec 29;19(1):161.
3. Backes A, et al. Associations Between Wearable-Specific Indicators of Physical Activity Behaviour and Insulin Sensitivity and Glycated Haemoglobin in the General Population: Results from the ORISCAV-LUX 2 Study. *Sports Med Open*. 2022 Dec 12;8(1):146.
4. Rodrigues R, et al. Sleep Problems and Psychological Well-Being: Baseline Findings from the Canadian Longitudinal Study on Aging. *Can J Aging*. 2022 Nov 21:1-11.
5. Stranges S, Luginaah I. Nutrition and health: Time for a paradigm shift for climate change. *Nutr Metab Cardiovasc Dis*. 2022 Dec;32(12):2782-2785.





## David THIVEL

**Université de Clermont-Auvergne, France**

- David Thivel holds a PhD in Physiology of Exercise and Human Nutrition (INRAE and Université Blaise Pascal, France).
- He also completed two post-doctoral positions at the New York Nutrition Obesity Research Center (Columbia University, USA) and the Healthy Active Living and Obesity Research Group (Ottawa, Canada).
- David's main research interests are in the area of metabolic, energy and nutritional adaptations to daily activities and diet- and exercise-induced energy deficits, particularly in paediatric obesity.
- David is currently the director of the AME2P research laboratory (University of Clermont Auvergne) and is the president of the European Group on Childhood Obesity (ECOG).

### RECENT PUBLICATIONS

1. Pixner T, et al. *The relationship between glucose and the liver-alpha cell axis - A systematic review.* *Front Endocrinol (Lausanne).* 2023 Jan 5;13:1061682.
2. Fillon A, et al. *Changes in Sedentary Time and Implicit Preference for Sedentary Behaviors in Response to a One-Month Educational Intervention in Primary School Children: Results from the Globe Trotter Pilot Cluster-Randomized Study.* *Int J Environ Res Public Health.* 2023 Jan 7;20(2):1089.
3. Pélissier L, et al. *Is dieting a risk for higher weight gain in normal-weight individual? A systematic review and meta-analysis.* *Br J Nutr.* 2023 Jan 16:1-23.
4. Ennequin Get al. *There is a need for a complete consideration of overall movement behaviors for the prevention, treatment, and follow-up of cancer risks and patients.* *Front Public Health.* 2022 Dec 19;10:1080941.
5. Fillon A, et al. *Dietary- but not exercise-induced acute iso-energetic deficit result in short-term appetitive compensatory responses in adolescents with obesity.* *Appetite.* 2023 Feb 1;181:106401.



## Piedad Coscollá TOLEDO

**Anecoop, Spain**

- Piedad Coscollá holds a degree in Economics and Business Administration from the University of Valencia.
- She has a master's degree in Retail Distribution Marketing from the University of Valencia and has completed the Agri-Food Companies Management Programme at the San Telmo Business School in Seville.
- After working in the United Kingdom for a year, she joined Anecoop S. Coop. in 1993, where she is currently the Marketing and Corporate Image Manager.
- She also works with various national and international organisations and bodies to promote the consumption of fresh fruit and vegetables.





## Machteld VAN LIESHOUT

**The Hague University, the Netherlands**

- Dr Machteld van Lieshout (1971) is currently a principal lecturer at The Hague University of Applied Sciences (THUAS), the Netherlands.
- She educated at Wageningen University, the Netherlands where she graduated with an MSc in Nutrition & Health and a PhD in Nutrition, Food Technology and Biotechnology. Following her departure from Wageningen, she held research positions in Scotland and South Africa and worked as a nutrition consultant, both independently and at the KraftHeinz Company, in the Netherlands.
- Since 2017, she combines teaching and research at the Department of Nutrition & Dietetics and the Research Group Healthy Lifestyle in a Stimulating Environment, which is part of the Centre of Expertise Health Innovation at THUAS. Her main research area is healthy lifestyle of children and adolescents, digital research and support tools related to mHealth, eHealth, nutritional assessment, etc.
- In 2021-2022, Machteld was project leader for the research phase of the Food Boost Challenge. A program which recently won the Pim Breebaart Research Award. According to the unanimous jury, in addition to a qualitatively strong study, the team, which also includes Wendy Scholtes-Bos and Sanne de Vries, also set up and conducted the most innovative research.
- Machteld is an ambassador for research-driven education integrating her research projects within the curriculum of Nutrition & Dietetics. Connecting research, education and innovation of professional practice, she and her colleague Dr Maartje de Groot recently started an innovation community for the promotion and application of eHealth in Nutrition & Dietetics.
- Machteld recently started as project leader for the Westland Educational BooST, a 4-year-long design-oriented project for development of an educational concept for vocational students enabling them to jointly solve public-private issues.

### RECENT PUBLICATIONS

1. Van Lieshout M, et al. *Wishes and needs of children, parents and healthcare professionals for blended care for children with overweight*. ISBNPA. 2023 (abstract).
2. Van Lieshout M, et al. *The Food Boost Challenge: a social innovation designed for stimulating adolescents into consuming more fruit and vegetable products*. Acta Horticulturae 2022. Accepted.
3. Cámara, M, et al. *International requirements for demonstrating the beneficial effects of tomato products on atherosclerosis prevention*. Acta Horticulturae 2022:1351; 249-56.
4. Wijbers JV, et al. *Endometriosedieet: ondersteunend aan een betere kwaliteit van leven? Nederlands Tijdschrift voor Obstetrie en Gynaecologie 2021;134:134-138*.
5. Van Lieshout M, et al. *Choice of substitute products significantly affects energy and nutrient intake estimates in a digital dietary intake tool (eICDAM) A Global Twenties Vision, hosted by Wageningen University & Research. 2021:186 (Abstractbook)*



## Monique VERSCHUREN

**RIVM National Institute for Public Health and the Environment, Bilthoven, the Netherlands**  
**Julius Center for Health Sciences and Primary Care, University Medical Center Utrecht, Utrecht University, Utrecht, the Netherlands**

### RECENT PUBLICATIONS

1. Scheffers FR, et al. *Substitution of pure fruit juice for fruit and sugar-sweetened beverages and cardiometabolic risk in European Prospective Investigation into Cancer and Nutrition (EPIC)-NL: a prospective cohort study*. PHN 2021;25:1504-1514.
2. Nooyens ACJ, et al. *Adherence to dietary guidelines and cognitive decline from middle-age: the Doetinchem Cohort Study*. AJCN 2021;114:871-881
3. Scheffers FR, et al. *Pure fruit juice and fruit consumption are not associated with incidence of Type 2 Diabetes after adjustment for overall dietary quality in the European Prospective Investigation into Cancer and Nutrition-Netherlands (EPIC-NL) Study*. JN 2020;150:1470-1477
4. Biesbroek S, et al. *Are our diets getting healthier and more sustainable? Insights from the European Prospective Investigation into Cancer and Nutrition – Netherlands (EPIC-NL) cohort*. PHN 2019;22:2931-2940.
5. Nooyens ACJ et al. *Fruit and vegetable intake and cognitive decline in middle-aged men and women: the Doetinchem Cohort Study*. Br J Nutr 2011;106:752-61.

- Monique Verschuren studied Human Nutrition (Wageningen University), specializing in Epidemiology.
- She is Head of the Department 'Life Course and Health' at Centre for Nutrition, Prevention and Health Services of the National Institute for Public Health and the Environment in Bilthoven.
- She is a professor of 'Healthy Vascular Ageing in Public Health Perspective' at the Julius Center for Health Sciences and Primary Care, Utrecht.
- Main research topics are dietary and lifestyle determinants of cardiovascular disease and cognitive decline and also healthy ageing with a focus on maintaining vitality and preventing frailty over the life course.
- She is the principal investigator of the Doetinchem Cohort Study, an ongoing longitudinal study that started in 1987, PI of the Dutch EPIC-MORGEN cohort and member of the international Steering Committee of the EPIC-Study (European Prospective Study into Nutrition and Cancer). She was responsible for the chapter on diet, smoking and physical activity in the 2012 and 2016 "European Guidelines on Cardiovascular Disease Prevention in Clinical Practice».
- She is director of the recently assigned WHO Collaborating Center on Life Course and Health.
- She is co-author of over 350 international peer-reviewed papers (H-index=79).



## Kremlin WICKRAMASINGHE

**WHO European Office for the Prevention and Control of Noncommunicable Diseases, Denmark**

- Kremlin (MBBS, MSc, PhD) is the Acting Head of the WHO European Office for the Prevention and Control of Noncommunicable Diseases (the «NCD Office»), which is an integral part of the Division of Country Health Programmes, WHO Regional Office for Europe. The NCD Office is responsible for providing technical support to the 53 Member States of the WHO European Region in areas of prevention of noncommunicable diseases, addressing their risk factors and conducting NCD surveillance.
- He is also the Regional Adviser for Nutrition, Physical Activity and Obesity.
- Prior to this position, he worked as a Technical Officer on Noncommunicable Diseases (NCD) Risk Factors, since 2017 in the same office.
- Before joining WHO, he was a researcher and the co-director of the WHO Collaborating Centre on Population Approaches to NCD Prevention at the University of Oxford, United Kingdom.
- He has published numerous reports and peer-reviewed papers and co-edited the textbook «An Introduction to Population-level Prevention of Non-Communicable Diseases,» published by the Oxford University Press.
- He has a special interest in multisectoral responses to health promotion, quantifying the outcome of health policies and implementation research. Kremlin graduated as a medical doctor with an MBBS from the University of Colombo. He holds an MSc in Global Health Science and a DPhil (PhD) in Public Health from the University of Oxford.

## RECENT PUBLICATIONS

1. Maximova K, et al. Exploring educational inequalities in hypertension control, salt knowledge and awareness, and patient advice: insights from the WHO STEPS Surveys of adults from nine eastern European and central Asian countries. *Public Health Nutr.* 2023 Feb 13:1-28.
2. Kontsevaya A, et al. Missing data and other challenges in assessing inappropriate marketing of baby foods in the Russian Federation: a cross-sectional study. *BMJ Open.* 2023 Jan 23;13(1):e066282.
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4. Rieger M, et al. Projecting cardiovascular deaths averted due to trans fat policies in the Eurasian Economic Union. *Public Health Nutr.* 2022 Oct 3:1-10.
5. Lauber K, et al. Corporate political activity in the context of sugar-sweetened beverage tax policy in the WHO European Region. *Eur J Public Health.* 2022 Oct 3;32(5):786-793.



## Gertrude ZEINSTRAS

**Wageningen University & Research, the Netherlands**

## RECENT PUBLICATIONS

1. Zeinstra GG, et al. Implementation of four strategies in Dutch day-care centres to stimulate young children's fruit and vegetable consumption. *Appetite.* 2023 Feb 1;181:106378.
2. van Kleef E, et al. Which factors promote and prohibit successful implementation and normalization of a healthy school lunch program at primary schools in the Netherlands? *J Health Popul Nutr.* 2022 Oct 15;41(1):47.
3. Müller C, et al. The sweet tooth of infancy: Is sweetness exposure related to sweetness liking in infants up to 12 months of age? *Br J Nutr.* 2022 Aug 11:1-11.
4. Zeinstra GG, et al. Strategies to increase primary school children's fruit and vegetable intake during 10AM snack time. *Appetite.* 2021 Aug 1;163:105235.
5. Sandvik P et al. Yuck, This Biscuit Looks Lumpy! Neophobic Levels and Cultural Differences Drive Children's Check-All-That-Apply (CATA) Descriptions and Preferences for High-Fibre Biscuits. *Foods.* 2020 Dec 23;10(1):21.

- Since 2011, Gertrude works as a scientist and project leader in the Food, Health & Consumer Research group within Wageningen University and Research.
- She works on different projects in various teams on the topic of food choice behaviour and interventions to change behaviour in specific consumer groups: children, adolescents, elderly. Many studies are performed in real life settings such as schools and day cares. Observing and understanding the food choice behaviour of consumers creates opportunities for changing eating behaviour and helping consumers to make the healthy choice the easy choice. Gertrude also works on food waste behaviour from a consumer perspective.
- Gertrude worked previously on the PhD-project 'Code Delicious', which was a collaboration between the division of Human Nutrition and the department of Communication Science. The aim of the project was to encourage fruit and vegetable intake in children aged 4-12 years. She performed six different studies within this project: qualitative, survey and experimental research. On Friday the 22nd of January 2010, Gertrude successfully defended her thesis: Encouraging vegetable intake in children; the role of parental strategies, cognitive development and properties of food.
- Gertrude was educated as a nutrition researcher. She obtained her Master degree Nutrition & Health at Wageningen University & Research.



## SESSION 1:

Fruit and vegetables: what are the benefits for human health and for food and nutritional security?

Moderators: Jean-Michel Lecerf & Elio Riboli



## KEYNOTE LECTURES

### **Fruit & vegetable consumption and cardiovascular disease prevention**

**Monique VERSCHUREN, RIVM, The Netherlands**

A healthy diet is the cornerstone of cardiovascular disease prevention. All dietary guidelines around the world include recommendations on adequate intake of fruits and vegetables, although the precise definition of adequate intake can slightly differ. Fruit and vegetables are one of the (few) food groups that people are encouraged to eat, while for many other foods and nutrients there are limitations formulated in the guidelines. In general, guidelines recommend to eat around 400 grams of fruits and vegetables per day. The only concern regarding fruits is the sugar content. This is why some countries classify fruit juice as a sugar-rich drink. Others allow a partial replacement of fruit with fruit juice, in order to make it more feasible for people to meet the recommendation.

In most countries, food consumption surveys show that a large proportion of the population does not meet the recommendation for fruit and vegetables. This illustrates that there is room for improvement, and substantial health benefits could be achieved by increasing consumption of fruits and vegetables in the general population.

There is ample evidence from prospective cohort studies for the cardioprotective effect of fruit and vegetables. A recent meta-analysis showed that with each 200 g/day increase in fruit and vegetable intake, the risk for coronary heart disease was lowered by 8% (RR 0.92; 95% CI 0.90-0.94), the risk for stroke by 16% (RR 0.84; 95% CI 0.76-0.92) and the risk for total cardiovascular disease by 8% (RR 0.92; 95% CI 0.90-0.95). The protective effect of fruits and vegetables was observed also beyond the intake levels recommended in dietary guidelines. Reduction of cardiovascular risk continued up to intakes of 800 grams per day, which indicates that eating more than the current recommendations yields additional health benefits.

There are a number of mechanisms by which fruit and vegetables reduce the risk of cardiovascular diseases. Fruit and vegetables are a rich source of potassium, fiber, vitamins and bioactive compounds. The rich potassium content contributes to lower blood pressure levels. Other proposed mechanisms include anti-oxidative and anti-inflammatory effects. Research is ongoing to unravel pathways by which (different components of) fruits and vegetables influence disease risk. Because of the many substances and mechanisms involved, the recommendation is to eat a wide variety of fruit and vegetables.

In addition to health effects of our diet, more recently also the effect on planetary health has become a central issue. In that respect, shifting towards a more plant based diet is key, in order to reduce the carbon footprint of our diet. The EAT Lancet Commission has defined the 'healthy reference diet' that optimizes both human and planetary health. In this diet, recommendation for fruit is 200 grams per day (range 100-300 g/d) and vegetable intake 300 grams per day (range 200-600 g/d), which for vegetables is even a bit higher than in most current dietary guidelines. This may be a further stimulus for increasing fruit and vegetable intake, although not all fruits and vegetables can be considered good for planetary health.





## SESSION 1:

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## KEYNOTE LECTURES

***Fruit & vegetables and type 2 diabetes prevention-facts and gaps*****Nita FOROUHI, University of Cambridge, United Kingdom**

The global burden of diabetes continues unabated, with projections indicating that ~783 million people will have the condition by 2045, greater than 90% of these being type 2 diabetes. There is an urgent need for identifying and tackling factors that are modifiable in order to delay or prevent the potential adverse downstream health consequences such as high rates of cardiovascular disease and reduced life expectancy.

Nutrition therapy with dietary modification is a well recognised strategy for the management of type 2 diabetes, but what do we now know about the role of diet and nutrition for the prevention of type 2 diabetes? More specifically, the consumption of fruit and vegetables has been promoted for good health for decades, but what is their role for type 2 diabetes?

The public health message to consume «5-a-day» of fruit and vegetables has been around since at least the 1980s and this message is promoted by the World Health Organization and country specific agencies. What is the evidence for the effectiveness of this message and what proportion of the population is meeting this recommendation in Europe or elsewhere? There have also been calls for much greater amounts of daily fruit and vegetable consumption and some national guidelines promote higher quantities. On the other hand, could even less than 5-a-day be sufficient for health, in line with the old adage «an apple a day keeps the doctor away»? This lecture will consider what the current intakes of fruit and vegetables are in relation to the global health promotion guidance, and it will explore the relevance of this message to the prevention of type 2 diabetes and assess whether other intake amounts may also be relevant.

Beyond quantity, the variety of fruit and vegetable consumption is also relevant, but this has been less researched. We will explore the role of variety over and above quantity of intake in the development of type 2 diabetes. Some popular modern diet plans such as Atkins and keto diets that are based on low or very low carbohydrate intakes recommend the limitation of the consumption of certain fruit and vegetables. We will explore whether there are differences in the health impacts of different types of fruits and vegetables, and also consider briefly as to what the mechanisms of association with disease risk might be including the potential role of bioactives.

We will also discuss challenges in the field and future directions including how to assess fruit and vegetable consumption. Specifically, we will look at whether we can use objective methods such as through the use of nutritional biomarkers to better measure dietary intakes and the relationship with type 2 diabetes risk, complementing the information from subjective reports. The discovery or use of appropriate biomarkers could also open up possibilities for precision or personalised nutrition.



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## KEYNOTE LECTURES

***Fruit & vegetables and cancer prevention*****Marc GUNTER, Imperial College London, United Kingdom**

Cancer is a growing global public health crisis - there were 19 million cancer cases and 10 million cancer deaths worldwide in 2020 with more than half of cases attributed to breast, lung, colorectal, prostate, stomach, and liver cancer. The cancer burden is projected to increase globally to approximately 25 million by 2032 and more than 30 million by 2040. Identifying the causes of cancer and the development of effective prevention strategies is a global public health priority. Approximately 30%-40% of the cancer burden in Western countries can be linked to known risk factors that are largely modifiable. Of the remaining 60%, a small proportion can be linked to inherited genetic variants that confer higher risk of specific cancers but the causes underlying the remainder are not known. The role of diet in cancer development has long been debated and despite decades of research, there is still uncertainty as to the link between specific aspects of the diet and cancer.

The consumption of fruits and vegetables is part of a healthy, balanced diet. However, whether these foods can prevent certain cancers is still not clear, despite decades of research. The most recent World Cancer Research Fund Global Update Report concluded there was strong evidence that wholegrains and dietary fibre reduce risk of colorectal cancer while the consumption of non-starchy vegetables or fruit probably protects against a number of upper aerodigestive tract cancers. Evidence for other cancer types is less consistent. Experimental models have demonstrated potential chemopreventive properties of specific phyto-compounds found in fruits and vegetables; however, data in humans are inconsistent which may reflect challenges in accurately assessing diet and nutritional exposures.

In this presentation I will provide an overview on current evidence linking fruits and vegetables to cancer, highlighting major gaps in our understanding and potential research opportunities. We will also discuss challenges in the field and future directions including how to better assess fruit and vegetable consumption and whether methods such as the use of nutritional biomarkers could complement questionnaire-based research for application in studies of cancer. I will also briefly discuss new «omics» approaches and gene-environment interaction analyses that could shed light on mechanistic pathways.







## SESSION 1:

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## KEYNOTE LECTURES

***Innovation in evaluating gut microbiota and fiber-rich vegetables interactions*****Nathalie DELZENNE, UCLouvain, Belgium**

The gut microbiome is composed of hundreds of billions of bacteria and other microorganisms, that play a crucial role in human physiology during the whole life. A dysbiosis, including alterations of the gut microbial diversity, composition and function, occurs in many non-communicable diseases (NCD), including obesity and related cardio-metabolic disorders, intestinal diseases, cancer, or even psychiatric diseases. Several approaches are under development to « target » the gut microbiome in order to manage metabolic and behavioural alterations associated with NCD. Edible vegetables contain a huge variety of dietary compounds which are able to interact with the gut microbiome and are prone to improve key gut functions (endocrine, immune, or barrier functions, nutrients absorption...). In the 90's, the concept of prebiotic has been elaborated to refer to substrates that interact with the gut micro-organisms thus conferring a beneficial physiological effect on the host. Fermentable dietary fibers (DF), which are largely present in fruits and vegetables, appear as key nutrients in this context. The intervention studies with DF in human volunteers or patients presenting i.e. obesity, revealed inter-individual variability in terms of biological and health outcomes. In view of the placebo-controlled intervention studies we performed with prebiotic DF in healthy, obese or alcohol-use disorder patients, we have unraveled how the initial characteristics of the microbiota, but also other « environmental » components participate to personalized gut microbial modulation and related health outcomes. From our data and other team's contribution, we have to take into account for the interpretation of the individual response to prebiotic and DF intervention, the co-treatment with drugs, the exposure to contaminants or food additives, the level of physical activity, the psychological traits (stress, depression, addiction), and merely, the characteristics of the gut microbiome prior intervention. Most of the studies have been performed with « isolated » DF or prebiotics, whereas the interest to consume natural edible sources of DF allows to combine their effect with other bioactive molecules. We will illustrate how vegetable-food based approach with edible sources of inulin-type fructans translates into significant change in microbiome (increase in specific Bifidobacteria and targeted modification of other species) and into change in participate to personalized gut microbial modulation and related health outcomes food-related behaviour and gastro-intestinal tolerance. In many studies, the interaction between nutrition and gut microbiota is elaborated upon the analysis of data sequencing of the fecal microbial genome. The dynamics of the interaction throughout the day or in response to meal is rather difficult to elaborate in human. Our recent data support the interest of new non-invasive methodologies (breath volatolome analysis) in the study of the kinetics of food-microbiome interactions in humans. In conclusion, the gut microbiome must be now considered as a key element to take into account in personalized nutrition and medicine. New data support the particular interest of edible plants as source of prebiotic DF and of other bioactive components participating to the elaboration and maintenance of the gut microbiome and health.



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## KEYNOTE LECTURES

### ***The role of fruit and vegetables in mental and brain health***

**Saverio STRANGES, Western University, Canada**

The beneficial role of regular fruit and vegetable consumption in health and general wellbeing has been long recognized. In particular, higher intakes of fruit and vegetables may have a protective role for several chronic diseases including CVD, cancer and neurodegenerative diseases. Observational studies and clinical trials provide evidence to inform clinical and public health recommendations.

Positive mental health or mental wellbeing has recently emerged as an important predictor of overall health and longevity. Mental wellbeing is more than the absence of mental illness or psychiatric pathology. It implies 'feeling good' and 'functioning well' and includes aspects such as optimism, happiness, self-esteem, resilience, agency autonomy and good relationships with others.

Likewise, the concept of Brain Health is gaining momentum in the scientific community, as brain health is essential for physical and mental health, social wellbeing, productivity, and creativity.

The potential protective effects of healthy lifestyles including regular fruit and vegetable consumption on both mental and brain health is an emerging area of research. Specifically, a growing body of epidemiological data supports a beneficial role of fruit and vegetables in the prevention and management of common mental and cognitive disorders.

Furthermore, observational evidence on the behavioural correlates/determinants of positive mental health, as opposed to mental illness, is now emerging. Recent findings from population-based studies suggest that higher intake of fruit and vegetable may be associated with increased odds of high mental wellbeing and reduced odds of low mental wellbeing.

Recent systematic reviews and meta-analyses of observational studies corroborate the evidence of potential benefits from higher and regular consumption of fruit and vegetable on both mental and brain health, with a reduced risk of cognitive decline or cognitive impairment.

With regard to potential mechanisms, several antioxidants found in fruit and vegetables have been shown to be associated with optimism and positive mental wellbeing in middle aged adults, as well as with beneficial effects on cardiometabolic health and cognition. Studies have also reported a dose-response relationship of fruit and vegetable intake with mental health, up to seven portions a day. Fruit and vegetable consumption might also be acting as a proxy for a complex set of highly correlated dietary exposures, including fish, whole grains..., which might contribute to the observed associations with both mental and brain health. As most of the epidemiological data is based on cross-sectional studies, further prospective studies and randomized clinical trials should be carried out to corroborate the causality of the epidemiological data.

In terms of recommendations for the application in daily practice, people should strive to meet recommended dietary guidelines (at least 5 portions, 400g/day); fill their plate with fruits and veggies during every snack or meal; add more color and variety to diet by trying new types of produce, which will enhance nutritional diversity; improve home environment by placing fruits and veggies in prominent places; integrate fruit and vegetable intake within an overall healthy lifestyle, which includes regular physical activity, sleep hygiene, abstention from smoking and heavy alcohol consumption. Finally, public health policies on fruit and vegetable consumption cannot ignore the influence of social and environmental determinants of health on food choices and lifestyles.





## SESSION 1:

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## KEYNOTE LECTURES

***Nutrition transition towards plant-based foods: ultraprocessed, unprocessed and their health impact*****Benjamin ALLÈS, EREN, France**

The ongoing nutrition transition toward an increase of sustainability involves a rebalance between animal and plant food. Indeed, there is growing scientific evidence about the fact that following diets with higher contributions of plant food, also called plant-based diets, could be relevant to decrease the pressure on the environment caused by our food systems.

A better understanding of the nutritional quality of current plant-based diets including vegetarianisms is required. The impact of these diets on health has already been investigated using epidemiological approaches, for example in the context of cardiovascular health. There is also growing evidence that all plant-based diets may not be equal in terms of nutritional quality, and thus, could have different consequences on health outcomes. Indeed, epidemiological studies have been using indicators to qualify plant-based diets in terms of their overall nutritional quality. For example, two Plant-based diet indicators (PDIs) were developed: a score corresponding to a healthy plant-based diet (healthy PDI) including food such as fruit and vegetables, whole grains and cereals, legumes, etc.; and on the contrary, an unhealthy plant-based diet indicator (unhealthy PDI) for diets rich in sugary drinks, sweet and fatty or salty foods (cakes and pastries, chocolate bars, French fries, etc.). Several studies reported a protective role of a healthy PDI against cardiovascular diseases, and on the contrary a higher risk of developing such diseases with unhealthy PDI. These indicators have already been computed in European cohorts, such as the French NutriNet-Santé cohort in France, indicating that an opposition between healthy and unhealthy plant-based diet was also existing.

Recent dietary indicators, such as the contribution of ultra-processed products or products from organic farming to the diet, could add to our knowledge in this area. Indeed, these indicators allow a better characterization of healthy diets which are mostly based on unprocessed food, and food with low levels of chemical contaminants such as pesticides, on top of a better nutritional quality. In the NutriNet-Santé study in France, we observed through diverse epidemiological studies that some individuals who were following plant-based diets had a low contribution of ultraprocessed food to their diet, but also had very high intakes of organic food. Conversely, some individuals were following plant-based diets with a high contribution of ultraprocessed food.

Altogether, the scientific evidence from epidemiological observational studies in nutrition suggests that it is now important to consider a broader range of indicators to estimate the nutritional quality of plant-based diets. Indeed, a better understanding of the potential impact on health of these diet is still required to promote them in public health nutrition initiatives, especially in the current context of the sustainable nutrition transition.





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## KEYNOTE LECTURES

### ***Fruit and vegetables in food and nutritional security***

**Boitshepo Bibi GIYOSE, NEPAD, South Africa**

Malnutrition in all its forms – undernutrition (stunting and wasting), micronutrient deficiencies and increasing overweight and obesity fuelling the rise of NCDs – has become a significant global challenge. This triple burden is the greatest threat facing most of the world's development trajectory as the current and next generation of the children are deprived of reaching their full human development potential.

The low production, cost, transportation, processing, and storage challenges continue to hamper the optimum consumption of fruits and vegetables across the world. This notwithstanding, we know the multiple health and other benefits of an increased consumption of fruits and vegetables.

To name but a few here;

- Because of their high vitamin, mineral, fibre and numerous phytochemicals, fruits and vegetables are not only protective and preventive against a slew of diseases, they also contribute to the growth of infants and young children, while ensuring the healthy state of adolescent girls, pregnant and lactating mothers.
- Horticulture supports small holder family farmers especially women and the youth as these crops are relatively easier to grow, harvest and prepare.
- Fruits and vegetables contribute immensely to dietary diversification for better nutrition and health especially in communities that still have very starchy carbohydrate-based diets.
- They provide an economic opportunity. In most instances e.g. in Africa, women are the ones that manage the open markets and small to medium enterprises.
- If grown according to the best Agro-production technologies and knowhow, they also can contribute to preserving soil health, in this way providing an opportunity to address environmental and climate challenges.
- Moreover, in terms the ever-growing School Food, Health and Nutrition programmes globally, their addition to the menus affords the learners to have diverse and nutritious meals which they may not receive from their homes.

Thanks to the global movement around Agri-food Systems transformation for healthier diets and improved nutrition in a bid to achieve the SDGs amongst other commitments. Recently there has been a positive outlook for policy reviews, innovation, and building capacities for a myriad of cadres and practitioners. Additionally, there is a growing awakening around consumer education, regulated advertising of unhealthy foods, including in schools for healthier and more nutritious diets that include a fair share of fruits and vegetables.

If indeed the horticulture initiatives are implemented accordingly and taken to scale, we should see improvements in fruits and vegetables consumption. As mentioned earlier, some downsides regarding fruits and vegetables have always been prohibitively high costs, high perishability, safety, plus poor access to quality seed and other technologies, plus knowledge transfer. Through supportive policies that also regard private (sector) partnerships for investments and innovative financing, these hurdles can and should be overcome.





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## ORAL COMMUNICATIONS

**Associations between species diversity in our diet and gastrointestinal cancer risk: results from the European Prospective Investigation into Cancer and Nutrition Study****B. Chimera<sup>(1)\*</sup>, G.T. Hanley-Cook<sup>(2)</sup>, C. Biessy<sup>(1)</sup>, M.Deschasaux<sup>(3)</sup>, M.Touvier<sup>(3)</sup>, E. Kesse-Guyot<sup>(3)</sup>, B. Srour<sup>(3)</sup>, C. Casagrande<sup>(1)</sup>, G. Nicolas<sup>(1)</sup>, J. Blanco Lopez<sup>(1)</sup>, C. J. Millett<sup>(4)</sup>, K. A. Murray<sup>(5,6)</sup>, P.Vineis<sup>(7)</sup>, C. Lachat<sup>(2)</sup>, M. J. Gunter<sup>(1)</sup>, I. Huybrechts<sup>(1)</sup> on behalf of the EPIC Network****OBJECTIVES**

The European Prospective Investigation into Cancer and Nutrition Study (EPIC) observed a significant inverse association between food biodiversity and total mortality, as well as cause-specific mortality, including deaths due to gastrointestinal cancer. However, no prior studies assessing the link of food biodiversity with gastrointestinal cancer risk have been performed. This further elucidates the gap in knowledge on the potential health benefits of food biodiversity in human diets. Therefore, this study aimed to assess how dietary species richness (DSR), a measure of food biodiversity, is associated with gastrointestinal cancer risk in European populations.

**METHODOLOGY**

Biodiversity is routinely partitioned into three components: richness, evenness, and disparity. Unlike for species richness (total number of species in a sample), there is currently no consensus on the measurement of species evenness (distribution of relative abundance of different species in a sample) and disparity (the level of similarity between species in a diet e.g. nutritionally or taxonomically). This present study therefore only focuses on DSR. The associations between DSR and subsequent gastrointestinal cancer risk were conducted among 450,111 adults enrolled in the European Prospective Investigation into Cancer and Nutrition Study (EPIC, initiated in 1992), free of cancer at baseline. Usual dietary intakes were assessed at recruitment with country-specific dietary questionnaires. The DSR of an individual's yearly diet was calculated based on the absolute number of unique biological species in each (composite) food and drink using the European Food Safety Authority's FoodEx2 food classification and description system in combination with the detailed EPIC food classification system (NCLASS). Associations were assessed by fitting multivariable-adjusted Cox proportional hazards regression models, adjusting for smoking, education, marital status, physical activity, alcohol, total energy intake, Mediterranean diet score, red and processed meat consumption, and fiber intake.

**RESULTS**

During a median follow-up time of 14.1 years (SD=3.9), 10,705 participants were diagnosed with gastrointestinal cancer. Hazard ratios (HRs) and 95% confidence intervals (CIs) comparing overall gastrointestinal cancer risk in the lowest and highest quintiles of DSR indicate significant inverse associations, in multi-adjusted models [HR (95% CI): 0.77 (0.68-0.86); Wald-test for trends P-value <0.0001. Significant inverse associations were also observed between DSR and the incidence of specific cancer types; namely oesophageal, proximal colon, colorectal, and liver cancer (p-trend<0.05 for all cancer types).

**CONCLUSION**

In this large Pan-European cohort, higher DSR was inversely associated with overall gastrointestinal cancer risk and the risk of specific cancer types, independent of socio-demographic, lifestyle, and other known dietary risk factors. Although further research is needed to validate our results and to investigate further the putative pathways involved in food biodiversity and human health, our results suggest that food biodiversity needs to be taken into account to guide the development of sustainable food based dietary guidelines.

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no conflicts to declare



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## ORAL COMMUNICATIONS

**Association between metabolic syndrome and healthy and unhealthy Plant-Based diets: in the NutriNet-Santé study****C. Prioux<sup>(1)\*</sup>, J. Baudry<sup>(1)</sup>, F. Berthy<sup>(1)</sup>, A. Reuzé<sup>(1)</sup>, M. Touvier<sup>(1)</sup>, L. Fézeu<sup>(1)</sup>, V. Deschamps<sup>(2)</sup>, C. Verdot<sup>(2)</sup>, S. Wagner<sup>(3)</sup>, E. Kesse-Guyot<sup>(1)</sup>, B. Allès<sup>(1)</sup>****OBJECTIVES**

Prior studies have shown that plant-based diets are associated with lower risk of cardiovascular diseases but the risk seems to differ according to the nutritional quality of plant food intakes. We aimed to investigate the cross-sectional association between metabolic syndrome (MetS) and healthful and unhealthful Plant-Based diet Indices (hPDI and uPDI).

**METHODOLOGY**

This study included 16,358 participants from the NutriNet-Santé study who underwent a clinical visit, allowing to collect blood samples for the measure of total cholesterol, low- and high-density lipoprotein cholesterol, triglycerides and anthropometric measurements. The MetS was assessed following the joint interim definition. The consumption of food such as fruits and whole grains to the diet compared to animal food can be reflected by hPDI, and its opposite uPDI reflecting the consumption of food such as refined grains and desserts were estimated using data from 24-h dietary records. The association between these plant-based diet indices and MetS were estimated by multivariable robust Poisson regression models with robust errors. Sex-stratified analyses were conducted.

**RESULTS**

In both women and men, a higher contribution of healthy plant food to the diet was associated with a lower prevalence of MetS (women: PR hPDI 0.74; 95% CI: 0.69, 0.80, men: PR hPDI 0.82; 95% CI: 0.76, 0.89). Similar trends were observed for all the MetS components (abdominal obesity, elevated blood pressure, elevated triglyceridemia, low HDL and elevated glycaemia) and BMI, except for low HDL and elevated glycaemia in men. Only in women, a higher contribution of unhealthy plant food to the diet was positively associated with the prevalence of MetS (PR uPDI: 1.12; 95%CI: 1.03, 1.21) and elevated triglyceridemia (PR uPDI: 1.21; 95%CI: 1.09, 1.33).

**CONCLUSION**

In this large scale observational study, we observed that it is necessary to consider the nutritional quality of plant food: healthy vs. unhealthy plant food, to promote plant-based diets in prevention of cardiovascular diseases.



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## ORAL COMMUNICATIONS

**Antioxidant-rich foods, antioxidant supplements, and sarcopenia in old-young adults  $\geq 55$  years old: a systematic review and meta-analysis of observational studies and randomized controlled trials.****M. Besora-Moreno<sup>(1)\*</sup>, E. Llauradó<sup>(1, 2)</sup>, R-M. Valls<sup>1</sup>, L. Tarro<sup>(1, 2)</sup>, A. Pedret<sup>(1)</sup>, R. Solà<sup>(1, 2, 3)</sup>.****OBJECTIVES**

Sarcopenia is a disabling muscular multifactorial disease involving the oxidation process in old-young adults. According to the recent revised consensus of the European Working Group on Sarcopenia in Older People (EWGSOP2), 2019, sarcopenia is defined by 3 criteria: 1) low muscle strength based on grip strength ( $<27$  kg for men,  $<16$  kg for women); 2) low muscle quantity or quality based on the appendicular skeletal muscle mass (ASM) (the sum of the muscle mass of the four limbs;  $<20$  kg for men,  $<15$  kg for women); and 3) low physical performance based on gait speed ( $\leq 0.8$  m/s) (1). Physical activity and/or nutrition are promising tools to prevent or treat sarcopenia (2).

We aimed to evaluate the relationship between antioxidant-rich foods (A-RF) and sarcopenia (muscle mass, strength, and function) based on observational studies, and to assess the effectiveness of antioxidant interventions in  $\geq 55$ -year-old adults via randomized controlled trials (RCTs). Moreover, to confirm if the observational studies results were in accordance with the RCTs results.

**METHODOLOGY**

We performed a systematic review and meta-analysis of observational studies and RCTs regarding the impact of A-RF and antioxidant supplements on sarcopenia or the risk of low muscle mass, muscle strength, and physical function. We conducted a systematic search in the MEDLINE<sup>®</sup>/PubMed, Cochrane Library, and CINAHL electronic databases from 2000 to 2020 using the following keywords for sarcopenia and specific nutrients/foods: sarcopenia, muscle mass, muscle strength, physical function, antioxidants, ascorbic acid, vitamin A, vitamin E, carotenoids, copper, selenium, zinc, magnesium, iron, phenols, diet, vegetables, fruit, fabaceae/legumes, nuts, seeds, tea, chocolate/cacao, and oils. The risk of bias was assessed and meta-analyses were performed using the Review Manager program.

**RESULTS**

The systematic review included 28 studies (19 observational studies, 9 RCTs), whereas the meta-analysis included 4 RCTs. Results of the systematic review of observational studies revealed that higher A-RF consumption was associated with better muscle mass, muscle strength, physical function, and overall sarcopenia status in old-young adults. Results of the RCTs meta-analysis indicated that higher fruit/vegetable consumption, supplementation with magnesium, and vitamin E plus vitamin D and protein significantly reduced the time to complete 5 stands (mean difference; 95% CI;  $-1.11$  s;  $1.70$ ,  $-0.51$ ;  $p < 0.01$ ). Additionally, including tea catechin supplementation significantly increased handgrip strength ( $1.02$  kg;  $0.60$ ,  $1.44$ ;  $p < 0.01$ ). Additionally, to answer the objective, only the positive association of fruit and vegetable consumption with muscle mass obtained via the observational studies were confirmed by the RCTs.

**CONCLUSION**

In sum, A-RF or antioxidant supplementation could be effective tools for sarcopenia, especially improving muscle strength and function. The best interventions according to the meta-analysis of the RCTs were supplementation of vitamin E in combination with vitamin D and protein, magnesium, tea catechins, and increasing fruit and vegetable consumption.

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## SESSION 2:

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?

Moderators: Françoise Lescouret & Alain Peeters



### KEYNOTE LECTURES

#### ***How to preserve and improve soil quality for fruit and vegetable production and health***

**Marc André SÉLOSSE, Muséum national d'Histoire naturelle, France**

Soils are food for plants and from there, for humanity: they not only provide nutritional support, but also shape the health of terrestrial organisms by their quality. Our new understanding of soils, which were long considered as abiotic compartments, is that they are living. Thanks to DNA methods, which arose in the 90's and have been largely developed in the two last decades, we understand now how soil life is biodiverse (fungi, bacteria, amoebas, etc.). We also understand, mainly thanks to transcriptional and experimental approaches, its functional diversity: the processing of dead organic matter, atmospheric nitrogen and mineral substrates from underlying rocks, thus producing fertility. We understand how bioturbation is shaping the porosity of soil and, together with organic matter, its ability to retain water. Finally, the roots of most (cultivated) plants associate with soil fungi to form mycorrhizas, symbioses where fungi receive plant carbon in exchange for mineral and water resources: yet this association extends far beyond nutrition since it provides protection to the plants and boosts their immune system systemically (many other traits are modified systemically, even in organs that are harvested, such as fruits).

We have to check the compatibility of classic agronomical methods with this new understanding. Tilling, leaving soils bare in winter (or between rows of plants) and abusing pesticides should be revisited; in Europe, >60% of soils are degraded. Among the clearest solutions we can offer are the addition of organic matter (as amendment and as fertilizer), permanent plant cover, and a no-till option, coupled with stronger limitation of pesticide use (in France, 98% of soils are polluted by them). By providing a grazing task and N-P-K rich organic matter, cattle and animal farming in general are not necessarily deleterious, to a certain level at least.

Finally, a debate often arises about the reduction of productivity that new methods can entail. One should consider that (i) 30% of food is wasted after harvest, (ii) 71% of agricultural land is devoted to animal feeding (which should be reduced since western meat consumption is in the toxic zone for human health), and (iii) the selection of plant varieties dedicated to the new practices (such as the INRA-ResDur breeding programme to create grapevine cultivars in France) is pending. It is false to claim that new practices are dangerous: only ignoring the soil as a capital for the future is dangerous.





## SESSION 2:

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?



## KEYNOTE LECTURES

**Tackling climate impacts: fruit and vegetables as part of the crisis or the solution?****Giuseppe MONTANARO, University of Basilicata, Italy**

Global climate change is mainly driven by increasingly elevated atmospheric carbon dioxide (CO<sub>2</sub>) concentration along with other greenhouse gases (GHG) (CH<sub>4</sub>, N<sub>2</sub>O) which results in increasing air temperature. The agricultural sector shares about 13-21% of global GHG emissions. In addition, emissions from cropland are predicted to increase because of the intensification and extensification due to agricultural land expansion and production growth in some countries (e.g., Africa and Latin America). However, agriculture might serve as a climate change mitigation solution through carbon (C) sequestration in soil, in tree biomass and reducing GHG emissions. Cropland has been recognized among land use types (e.g., forestry land, grassland, wetlands) that influence a variety of ecosystem processes and, in turn, ecosystem services related to GHG fluxes (e.g., photosynthesis, soil respiration, decomposition, biodiversity). Hence, the role of agriculture is crucial in this scenario. Following this, the adoption of sustainable field management strategies (e.g., reduced or no-tillage, increasing C-input, recycling of pruning materials, cover crops, reduced or avoided mineral fertilization) is central to increasing CO<sub>2</sub> removals/sequestrations and reducing emissions. For example, in a sustainable peach orchard about 800 g C m<sup>-2</sup> might be removed per year, being approx. 30% higher than that in conventional orchards. Hence, agriculture delivers not only provision service (food) but also an atmospheric CO<sub>2</sub> regulating service. In addition, the amount of C stored into soil is increasingly recognized and economically valued through carbon farming, which would be essential to support profitability of agriculture especially in marginal areas.

Consumers are increasingly driven by low-impact food because of their increasing awareness on climate-change issue. Hence, consumers are reducing meat consumption and choosing plant-based food which is perceived as healthy and environmentally friendly food. The link between agriculture and consumers is somehow reinforced by the European Green Deal with its 'Farm to Fork' (F2F) strategy. The F2F outlines the sustainable guidelines aimed at reducing the impact of the agricultural sector on ecosystems and social life as well as preserving agricultural productivity and food security.

Improved communication (e.g., by label) of the impact of agricultural process at ecosystem dimension might improve the perception of the global warming power mitigation of agriculture, therefore a methodology to assess/certify it is highly desirable. For example, the multi-criterion 'Product Environmental Footprint' proposed by the European Commission or the CO<sub>2</sub> accounting methodology at ecosystem scale (net ecosystem carbon balance, NECB). For the agrifood sector, it is relevant to account for the emissions of the technosphere through Life Cycle Assessment (LCA) but also for the removal/sequestration by the biosphere and pedosphere through additional accounting frameworks (e.g., NECB). However, an integration of different GHG accounting procedures within a carbon neutrality approach would be pivotal to provide a comprehensive role of agriculture in climate change challenge.







## SESSION 2:

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?



## KEYNOTE LECTURES

**Water footprints for fruit and vegetable production: Definitions and optimization practice****Diego INTRIGLIOLO, Desertification Research Center (CIDE), CSIC-UV-GVA, Spain**

Water is a main natural resource for agricultural production and in many European farming systems is a scarce resource which availability is predicted to be even more at risk in the near future due to global change. The goal for this presentation is to provide first a sound technical definition for the water footprints related to the fruit and vegetable cultivation in the field and then to explore agronomic practices that could contribute to reduce the water footprints and indeed increasing the water productivity. This can be achieved at different spatial and working scale where a systematic approach can be appraised. Under this perspective, it is considered important to understand how management practices determine plant physiology and to quantify the impact of cultivation techniques on the water cycle at the level of an entire basin.

Certain management practices, such as precision irrigation, can contribute to increasing water use efficiency at the plot level. However, net water savings can be obtained through other management practices that reduce consumptive water use by crops, as well as increasing water available to all users in a watershed. This includes the soil management by using organic mulching and the canopy management by means of the training systems and the orchard/vineyard design. In addition, particularly in fruit tree crops, regulated deficit irrigation is a smart watering practices that concentrates water restrictions only in those phenological periods where tree crops are less sensitive to water deprivation. In addition, deficit irrigation has the agronomic advantage of potentially improving fruit and grape composition. However, it is important to monitor the degree of water stress imposed in order to avoid that a moderate water stress reaches too severe levels harmful for tree productivity. The final application of these types of strategies by growers will require the on-field determination of plant water status, which is time-consuming and difficult to be carried out at the commercial level. To overcome this limitation, models could be employed to predict plant water status and transpiration under certain soil water deficit situations. The enormous advancements made in the last year in terms of digitalization and data analysis are resulting in the widespread use of decision support systems. However, to implement these digital tools, more knowledge is required for predicting plant physiological responses to water restrictions. Recently, new research has been initiated in relation to incorporating the agro-ecology approach by combining in horticulture production systems different crops by means of intercropping or by including cover crops in the orchards/vineyard alleyways.

Indeed, the fruit and vegetable industry faces the challenge of ensuring the continuous supply of food for a growing population without compromising the natural resources available, namely land and water. A sustainable intensification process is therefore required which is only possible by searching for additional agronomic and engineering solutions to keep improving water productivity and by better implementing at the different scales the solutions already tested at a research-level such. The challenge is also to integrate at a large scale, the potential solutions, which require that the water governance aspects are considered either by better adapting current local regulations or tailoring the possible technologies to the existing water allocation mechanisms already in place.





## SESSION 2:

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?



## KEYNOTE LECTURES

**Functional biodiversity to control weeds in fruit orchards****Davide NERI, Polytechnic University of Marche, Italy**

Monospecific crops are documented to cause problems with increasing risks of pest and weed infestation, soil-borne diseases, in several intensive fruiting areas. Diversifying the cropping system by companion species, cover crops, intercropping and the presence of a permanent stripe of grass cover between the rows and living mulches understorey the tree rows are key factors for inducing higher diversification to limit the risk of soil sickness and to control more aggressive weeds. An adequate soil coverage can contribute to various functional ecosystem services and increase soil fertility, improving biological diversity and mitigating soil quality loss due to monoculture.

The actual standard method of floor management in intensively managed, monospecific orchards and vineyards consists of maintaining permanent grassing between the rows. While herbicide and tillage are used for weed control between trees along the rows, but their repeated use tends to decline the soil quality and reduce orchard biodiversity. The selection of mulching species can be a solution for such a problem. Farmers have various options for selecting cover crops, including annuals, biennials or perennials, and these may be grasses, legumes or other broadleaf plants. A selection of promising species is based on some relevant characteristics, such as vegetative aptitude and high adaptability to local pedoclimatic conditions and were tested in different orchards.

Some stoloniferous species (with offshoots/runners) from the local flora, i.e. *Fragaria* spp. were particularly promising. The choice of these species was mainly related to limited rooting depths and high stoloniferous capacity, which induce a weaker competition with fruit trees for water and nutrients, yet they rapidly cover the soil a limited the growth of more aggressive weeds, which is one of the key factors to veer orchards and vineyards toward sustainability. The living mulches mimic natural ecosystems to increase biodiversity and provide ecological services. In a practical setting, their use improve the economic and ecological sustainability of the orchards. For instance, cash crops, such as strawberries, edible and aromatic herbs could be considered as an intercrop without impairing tree root development or soil nutrient status, which could compete efficiently enough with weeds to act as a living mulch, and could potentially provide additional income, thus reinforcing both economic and ecological sustainability.

Practicing a more ecological approach to weed control could become feasible and inviting for fostering long-term sustainability in organic orchards and vineyards. However, such systems may lead to new challenges and jeopardize weed control, energy and water consumption, initial competition between main and cover crops, and habitat for vole populations. But living mulches have been shown to improve soil organic matter and nutrient, tree root growth and soil microorganism populations, reducing soil erosion and improving overall soil quality while reducing weed management costs.





## SESSION 2:

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?



## KEYNOTE LECTURES

**Social innovations in fruit and vegetables to address multiple Sustainable Development Goals in food systems****Marie-Josèphe AMIOT-CARLIN, INRAE, France**

Although there is no single definition, social innovation refers to the design and implementation of new solutions that involve conceptual, process, product or organizational change, and are ultimately aimed at improving the well-being of individuals and communities. To meet social demands and address challenges of demography, environment, economy, health and equity, innovations often function as seeds of change, modifying and/or replacing dominant practices. However, social innovation is not systematically «positive», even if it has potential. To support social innovations, we need to adopt a systemic approach and design solutions with different actors at different levels, from local to global. The territorial scale is interesting for combining with micro-scale approaches at the individual level (to study changes in agricultural or consumption practices) and macro-scale ones (for global economic and environmental changes). In order to consider ecological and economic dimensions, the territorial scale can serve as a meso-scale where change processes can be better taken into account through a multi-actor local approach. Moreover, retrospective approaches could be useful to avoid new problems in the assumed social innovations.

As part of the promotion of plant-based food profiles, it is necessary to implement fruit and vegetable consumption that is below recommended levels for most of the world's population. In this area, social innovations are spreading throughout the food system, from production to consumption, through shorter food supply chains, urban agriculture, community-supported agriculture, solutions to food waste, food education and community-building initiatives. Research and development currently supports new varieties and agro-ecological practices that are driven by the demand for socio-ecological change (less pesticides). Despite the knowledge on consumers' socio-economic motivations and educational interventions, the interaction between the consumer and his or her food environment is less studied. Social innovations have been devised to develop and influence food environments to improve consumer access to diversified and safe fruit and vegetables, and make them more affordable. What's more, the loss and waste of around half the fruit and vegetables produced in globalized food systems has serious consequences in terms of the loss of beneficial nutrients (fibres, vitamins, minerals). To tackle this problem, there are circular economy strategies to reduce losses from farm to fork. Social innovations driven by women can also help meet the challenges of gender equity, which manifest themselves at different levels. Combinations of actions are needed to implement innovations and accompany the transition to a sustainable fruit and vegetable system in a «one health» context, in order to achieve the multiple objectives of sustainable development.

The presentation will focus on several cases of social innovation from the literature, with the aim of illustrating the complexity of food systems in both North and South.







## SESSION 2:

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?



## ORAL COMMUNICATIONS

***Sustainable school food in England; A realist evaluation***F. Sabet <sup>(1)\*</sup>**OBJECTIVES**

Driven by the growing evidence of the direct link between diet and childhood obesity, and diet and climate change, this study explores the role of school-caterer partnerships in mobilising healthy and sustainable school food culture. The paper argues that a new understanding of school food reflected in healthy and sustainable school meals and enhanced by experiential food education practice is a prerequisite for addressing both childhood obesity, social inequalities, and climate crises in the UK.

The overarching purpose of this study is to gain a theoretical as well as practical understanding of what sustainable school food is, as reflected in meals and education provision in primary schools in England.

**METHODOLOGY**

This research adopts a realist evaluation methodology to theorise sustainable school food, then enacts and evaluate a sustainable school menu intervention enhanced by a food education content in three schools with different catering models in England. Data was collected using a mixed methods approach at two-stages, starting with a synthesis at stage one using data from a survey to 8 schools, semi structured interviews with key informants, and semi structured observations in 3 schools. Data in stage two was collected using observations in schools, focus groups with different stakeholders, and secondary data from school documents to evaluate the cost and sustainability of the meals before and during the interventions.

**RESULTS**

This study reveals three core principles that should be guiding sustainable school food in England; prioritising school food provenance, reducing meat and increasing plant-based meals and reversion to scratch cooking in the school kitchens.

**CONCLUSION**

Findings from both studies highlight the need for an integrative approach to school food. Enhancing sustainable meal provision with contextualised food education is particularly urgent for pupils from disadvantaged backgrounds where sustainable school food can promote health equalities while minimising the impacts of climate change through an environmentally sensitive school food system. An operational and conceptual framework is proposed to guide sustainable school food programmes in primary education in England.



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## SESSION 2:

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?



## ORAL COMMUNICATIONS

**Poor access to fruit and vegetables limit the adherence to sustainable diets in The Gambia**Z. Ali <sup>(1)\*</sup>, P. Scheelbeek <sup>(2)</sup>, J. Felix <sup>(2)</sup>, B. Jallow <sup>(3)</sup>, A. Prentice <sup>(1)</sup>, R. Green <sup>(2)</sup>.**OBJECTIVES**

The objective was to assess adherence of Gambian diets to the EAT-Lancet guidelines for health and sustainability and identify potential areas to improve nutritional and planetary health.

**METHODOLOGY**

This was a secondary analysis using a recent nationwide dataset with comprehensive food consumption data from 12,713 households. Adherence to health and sustainability guidelines was performed by comparing intake of different food groups to the EAT-Lancet dietary guidelines. A context-specific «sustainable and healthy diet index (SHDI)» based on adherence of different food groups to the EAT-Lancet recommendations was computed and used to model the socio-economic and geographic determinants of households that achieved higher scores on this index, using multivariable mixed effects regression.

**RESULTS**

This study found very low adherence to the sustainable dietary targets in The Gambia. Low intake of fruit and vegetables was a strong predictor for low adherence to EAT-Lancet diet targets. However, intake of refined grains and added sugars exceeded the recommendations while consumption of important food groups such as dairy, poultry, and beef and lamb were much lower than the EAT-Lancet targets. Higher SHDI scores were associated with female headed households, small household sizes, high wealth index, and residing in an urban settlement. Furthermore, seasonality and crop production diversity played an important role in the diet, with healthier and more sustainable diets reported in the dry season as compared to the rainy season.

**CONCLUSION**

This study shows that the intake of fruit and vegetables is a main driver of household's ability to follow sustainable dietary guidelines. The study also shows that while the Gambian diet is less healthy, it is low in components known to impact most on the environment such as beef, dairy, lamb, and pork. Dietary policy to improve health and sustainability should focus on the substitution of refined grains by wholegrains and improve access and affordability of fruit and vegetables.



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**SESSION 2:**

Fruit and vegetables at the core of sustainability: what environmental and social impacts, and levers?


**ORAL COMMUNICATIONS**
**The environmental, nutritional and cost impacts of vegan, vegetarian and meat-based meals**

 B. Takacs<sup>(1, 2)\*</sup>, A. Z. Kalea<sup>(3, 4)</sup>, A. Borrion<sup>(1)</sup>
**OBJECTIVES**

Our food system is a major driver of environmental degradation and climate change. Current food consumption patterns have also been causally associated with malnutrition, obesity and other non-communicable diseases, which account for 71% of all deaths globally. The wide implications of food consumption choices on both planetary and human health offer a unique and important opportunity for integrated action on promoting sustainable food consumption choices. For this, harmonized and integrated assessments that can assess multiple dimensions of food choices are needed but are limited especially at the meal level. The aim of this research was to carry out an integrated assessment of the environmental impacts, nutritional quality, and cost of four commonly consumed meals (lasagne, chilli, curry and teriyaki) and their 'meat-based', 'vegetarian', 'vegan', and 'whole-food vegan' recipe variations and provide evidence-based information on how to mitigate the negative environmental impacts of meals while maintaining or improving their nutritional quality.

**METHODOLOGY**

The environmental impacts (global warming, freshwater eutrophication, terrestrial acidification, and water depletion potential) of meals were estimated from cradle to plate following the standard LCA methodology (ISO 14040 and ISO 14044). The nutritional quality of meals was assessed using a nutrient profiling model, the Nutrient Rich Food Index (NRF 17.3), which included 20 nutrients: 17 nutrients to encourage (protein, fibre, vitamin A, B1, B2, B9, B12, C and E, and minerals: K, Ca, Mg, Fe, I, Cu, Zn, Se) and 3 nutrients to limit (saturated fat, added sugars, and sodium). Recipe costs were calculated based on ingredient costs and wastage costs.

**RESULTS**

Irrespective of the type of cuisine, the whole-food vegan recipe variation of meals had the lowest environmental impact and the highest nutrient density. Meat-based meals had 14 times higher environmental impact, while vegetarian meals had 3 times higher environmental impact than vegan meals. Whole-food vegan meals had significantly higher concentrations of fibre, vitamin A, vitamin B1, magnesium and copper than meat-based meals. Recipe costing revealed that plant-based meals also cost less to prepare (£1.29) than vegetarian (£1.41) and meat-based (£1.60).

**CONCLUSION**

This research, along with a growing body of evidence, suggest that plant-based meals may not only have substantially lower environmental impacts but may also have higher nutrient density, and cost less to prepare than their meat-based and vegetarian alternatives. Results of this comprehensive, integrated assessment highlight the importance of adding vegetables, whole-grains and legumes to recipes as these micronutrient-rich foods can substantially increase the nutritional quality of meals and contribute to addressing micronutrient deficiencies in populations in a sustainable way that promotes both human and planetary health.



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## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice?

Moderators: Emma Boyland & Frans Folkvord



### KEYNOTE LECTURES

#### ***The factors that influence our food choices across the lifespan***

**Sophie NICKLAUS, INRAE, France**

Introducing more plant-based foods, particularly fruit and vegetables (FV), in western diets is a well-acknowledged way to improve their healthiness and reduce their environmental impact. However, a comprehensive vision of the complex network of factors that influence individual food choices is necessary to identify track towards improvement of food choices through the inclusion of more plant-based foods. The core influencing factors of food choices can be boiled down to a simple trilogy: the individual, the food, and the context. Individual factors can be related to biological (nutritional status, development, metabolic status...) and psychological factors (eating behavior temperament, mental health, stress, food literacy...); contexts to socio-cultural (social norms, food culture...) and situational factors (food environment, time of the year, of the day; social environment...); and food-related factors to intrinsic (nutritional composition, palatability, familiarity...) and extrinsic determinants (price, packaging, labelling...). The influence of these factors evolves across the lifespan.

In childhood, biology drives drastic evolutions with the newborn having specific dietary needs and limited intestinal and oral abilities, which highly constraint the diet. The infant quickly develops eating abilities with dietary experience, highlighting the importance of psychological development in relation to learning. Vegetalizing the diet only becomes relevant during complementary feeding. During this transition and up until the development of food neophobia/pickiness (by the end of the second year), introducing plant-based foods is simple as children easily accept a variety of foods. The child is fully dependent on the feeding context, i.e. in general the dietary choices made by his/her parents, which also reflect on the factors influencing adults' choices (i.e. cultural, financial, practical...). Later in childhood, during the developmental peak in food neophobia, introduction of plant-based foods might involve specific challenges, especially if they are not yet known by children. Adolescence is marked by profound biological changes which may alter food choices. The social environment beyond the family becomes more important and may expose to different food cues. The increasing importance of body image may create a very specific context for mental health unbalance and lead to sub-optimal choices, and ultimately eating disorders. This may create an opportunity to increase the share of foods with low energy density such as FV. However, in western environments, the food offer is highly skewed towards unhealthy foods which strongly alter the opportunity to consume FV. During the transition from adolescence to adulthood, specific contextual aspects impose a remodeling of food choice criteria, e.g., leaving the family household, which imposes the development of food literacy autonomy, bearing financial constraints related to partial financial autonomy, all potentially threatening FV consumption. In adulthood, established habits tend to channel food choices, but social contexts and life events (parenthood, diseases, and retirement) may remodel choices and lead to increased plant-based foods. Food-related factors are prominent. Automatic motivation may override reflective decision-making. However, food choices can be modified by the built environment choice architecture or by the provision of information leading to trade-offs between different food values (price, taste, healthiness, sustainability...). In old age, biological changes impose a redefinition of nutritional needs. Familiarity as well as loss of food autonomy may lead to a delegation of food-choice decision making.





## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice? cts?



## KEYNOTE LECTURES

***I'll have what you're having: why we need to include social factors in healthy eating interventions*****Roel C.J. HERMANS, LeefstijlLab, The Netherlands**

Food and eating play a pivotal role in many social activities and gatherings, and there is ample evidence to suggest that the intake of family, friends and peers exerts a powerful influence on what and how much people eat. The key challenge, however, in many health programs is how to support and engage the social context to make sustainable changes to healthier eating. The goal of this talk is twofold: 1) to share research findings on how social factors influence food choice and intake in children, adolescents and adults 2) identifying mechanisms and elements in these studies that can be translated into the development of healthy eating interventions 3) discuss practical implications and highlight evidence-based recommendations for healthy eating interventions aimed at the improvement of fruit and vegetable intake in children and adolescents.

To do so, I will first present a narrative overview of the research on social influences on eating - with a specific focus on modeling of eating behaviors. In particular, I will present findings of my own research as well as that of my colleagues (e.g., Herman, Bevelander, Vartanian, Higgs, & Robinson) within this specific research domain. I will discuss the factors that may moderate the strength of the effects found and consider the mechanisms through which these effects occur.

On basis of the findings presented, I conclude that social influence is a primary predictor of eating behavior and that the consistent and substantial effects found in scientific research make it important enough to consider in public health policy. This is crucial in an environment where a large number of preventive interventions still focus on children, adolescents and adults in an isolated individual context and the above mentioned social factors are rarely included.

In the final part of my talk, I will therefore highlight some evidence-based recommendations for healthy eating interventions aimed at the improvement of fruit and vegetable intake in children and adolescents.





## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice?



## KEYNOTE LECTURES

**Creating healthy environments: Encouraging fruit and vegetable intake at the day care and primary school****Gertrude ZEINSTR**, *Wageningen University and Research, The Netherlands*

Fruit and vegetables are important constituents of a healthy and sustainable diet. However, in many countries, children's fruit and vegetable consumption is below the recommended daily intake. Childhood is an important period to support the development of healthy eating habits, because food preferences and eating habits that children have obtained at a young age are more likely to be remained throughout life.

The day care and school are suitable settings to promote the development of healthy eating habits, because both are playful learning environments, children engage in multiple eating moments, and teachers and peers can act as role models. Schools have the additional advantage of a high reach and the potential to reduce inequities, because all children attend primary school.

Here we show three studies that implemented various strategies to support children's fruit and vegetable consumption. It is important to evaluate such strategies on both effectiveness and on implementation success.

**1/** The Veggie Time project tested the strategy of repeated exposure in the real-life day care setting. Children were repeatedly exposed to three different – relatively unfamiliar - vegetables which were each presented in two forms. Repeated exposure increased children's intake of pumpkin and white radish (with ~ 15 gram), whereas intake of zucchini remained stable (around ~20 gram).

**2/** In a second project, 13 day care locations chose one out of five promising fruit and vegetable supporting strategies to implement for at least 10-12 weeks. A concrete implementation plan was developed with the researchers. Gardening and playful learning were most frequently chosen (4x), followed by repeated exposure (3x) and cooking (2x). Implementation of a self-chosen strategy resulted in satisfactory scores for acceptability, feasibility, appropriateness in sustainability, with somewhat lower scores for cooking. Staff reported that children's eating pleasure for vegetables and their willingness to taste new fruit and vegetables increased.

**3/** A primary school project compared three strategies: a 5-day fruit and vegetable policy, no school food policy, and providing a bowl filled with fruit and vegetables in the classroom. Actual portion sizes were weighed to assess consumption. Children's fruit and vegetable consumption during the morning snack break at school was 60 g at the no-policy schools, 130 g at the schools with a 5-day policy and 250 g at the schools that provided a bowl with free fruit and vegetables.

These projects show that day cares and schools can effectively contribute to children's fruit and vegetable consumption, with availability, experiential learning and repeated exposure as key elements. We should utilize these environments to encourage the development of healthy and sustainable eating habits among children.







## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice? cts?



## KEYNOTE LECTURES

***The role of marketing in shaping dietary preferences and behaviors*****Tim SMITS, KU Leuven, Belgium**

Marketing messages in all their variety are an integral part of our daily (media) lives and foods are often present as the marketed product or to represent lifestyles. In the last decade, marketers have also explored more covert forms of advertising that are not as easily recognized as advertising such that advertising literacy and resistance to persuasion are not as easily engaged by consumers. With the advent of influencer marketing, we also see that advertising messages adopted a somewhat more 'real-life' messaging and consumers, in turn, now also adopt some of this marketing style in their own social media posts. So, what is the effect of this heavy dose of marketed food messages in our daily lives?

To answer this question, we first focus on the existing evidence concerning the effects of a single exposure to advertising. Previous meta-analyses suggest that even such a single exposure does trigger effects among children and adolescents (but not among adults). Given that most advertised food is non-core (high levels of fat, sugar, salt) and that we are exposed to many more ads, this is alarming in itself. Next, we discuss the often subtle effects of different types of physical (e.g., packaging), media (e.g., TV shows) and digital (e.g., social media) marketing. The focus will be on effects that are documented among children and adolescents. Many of these messages cues have effects that 'fly under the radar' but can be detrimental considering the repeated and habitual nature of many food behaviors. The theoretical underpinnings of how, psychologically, these persuasion processes unfold will be discussed and the crucial combination of both the massive exposure and the subtle persuasive cues will be highlighted. The potential of persuasion knowledge and advertising literacy in the mitigation of these advertising effects will also be discussed.

We will then zoom in on the recent research that deals with social media food messages. Recent research shows that, much like traditional marketing, social media are heavily biased towards unhealthy foods and towards excessive portions of such unhealthy foods. This is counterintuitive for consumers interested in healthy foods given that they typically encounter a much healthier timeline, even on the same social media. Research also shows that exposure to such non-core foods leads to an increased preference for these foods and that this is due, for a large part, to an increased perception that others ('everyone in my timeline') are frequently eating these foods.

Finally, we also discuss the opportunities and guidelines for core foods such as fruits and vegetables to take these dynamics into account. Prior research does suggest that many of the food marketing effects also exist for healthier options, albeit typically with a smaller effect size. Specifically for social media, research demonstrated that increased exposure to core foods also cultivates food literacy, which in turn can lead to an increased preference for and consumption of healthy foods.





## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice?



## KEYNOTE LECTURES

***Movement behaviors, eating habits, and appetite control: are they really connected?*****David THIVEL, Clermont Auvergne University, France**

For long, the two sides of energy balance have been considered independently while we now know that they interact and that any modification of one will lead to adaptations/compensations from the other. In the fifties, Mayer and Edholm proposed for the first time some classical and seminal analysis effectively highlighting an association between individuals' daily physical activity level and their daily food intake. These results however also pointed a large interindividual variability and interestingly an inversion of this association in people with low level of daily physical activity. This led Taylor in 1974 to propose a J-Shape relation between daily activities and food intake, with a zone of nutritional non-regulation in individuals with low physical activity. Although there has been a growing interest in these appetitive and nutritional responses to physical activity and acute exercise for the last 20 years, less is known regarding the potential effects of the other components of individuals' movement behaviors, sedentary time and sleep, that might play an important role in the determination of this J-Shape curve. A better understanding of this relationship and of all its determinant seems of high importance to better prevent weight gain but also to implement more efficient and better individualized weight loss interventions. Importantly, while most of the evidence currently available focuses on the individual effects of physical activity, sedentary time or sleep, on our eating habits and appetite control, the lately developed and widespread 24-hour approach combining these behaviors should also be considered. This presentation will propose an overview of the actual evidence concerning the effects of these movements' behaviors individually and together, on children and adults' eating habits and food intake control. Using epidemiological and observational data, the presentation will also try to use laboratory-based evidence to explain how our daily activities and behaviors might impact not only our energy expenditure but also our energy intake and eating behaviors.





## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice?



## KEYNOTE LECTURES

**Opportunities for public health policies to promote greater fruit and vegetable intake****Emma BOYLAND, University of Liverpool, United Kingdom  
& Frans FOLKVORD, Tilburg University, The Netherlands**

In order to improve people's eating behavior, there is an urgent need to systematically test and implement novel and (cost-)effective methods of making fruit and vegetables more appealing, accessible and affordable to increase their intake among citizens, in particular for children and adolescents. Currently, marketing and promotion activities for unhealthy foods and beverages are aggressive, omnipresent and influential. Overconsumption of these unhealthy products contributes to the disease burden and premature mortality as a result of both excess body weight and malnourishment. Further, the large number of people living with overweight and obesity and suffering from associated morbidities has a strong impact on healthcare costs worldwide and threatens the provision of high quality healthcare provision.

As the majority of children and adolescents do not eat the recommended amount of fruits and vegetables, we need to change the obesogenic environment to a healthogenic environment and implement public health policies to promote greater fruit and vegetable intake. Sufficient intake of fruits and vegetables prevents people from developing several non-communicable diseases, among them cardiovascular diseases, several forms of cancer, and poor mental health outcomes. In addition, plant-based diets are more sustainable for planetary health and should therefore be communicated and promoted more intensively.

Therefore, public health policies, such as laws, regulations, and actions, should promote and ensure that specific health and mental wellbeing goals are met in order to protect vulnerable social and cultural groups, including children and adolescents, fulfilling the UN Sustainable Developmental Goals. Considering that unhealthy foods have higher intrinsically rewarding properties that make them more «wanted» and «liked» than fruit and vegetables, most people automatically prefer to eat these foods over healthier options. In combination with the extensive promotion of these unhealthy foods, increasing the rewarding value of these foods, urgent action is needed to make the healthier choice the easiest one. More specific, public health policy interventions like reducing the marketing of energy-dense snacks to children and increasing the promotion of healthier foods, such as fruits and vegetables, may be effective and necessary instruments to improve the dietary intake of children and adolescents and reduce the risk of their experiencing some chronic diseases later in life. Moreover, some studies showed that the promotion of fruit and vegetables can effectively increase intake, although most studies have only focused on short-term outcomes and on popular fruits and vegetables. There is robust evidence that public health policies focused on the food environment, such as marketing restrictions and fiscal policies can effectively improve dietary health via changes in purchasing and consumption. These initiatives need to be extended and expanded across Europe to maximise the potential for public health benefit. In sum, public health policies should be more often implemented to create a world where the healthy choice is the easiest choice, which would reduce (childhood) obesity and improve people's health, as well as to make the food system more sustainable.







## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice?



## ORAL COMMUNICATIONS

**Time-trend of fruit, vegetables and sweets consumption among European adolescents between 2013 and 2018 and related to sociodemographic characteristics: Health Behaviour in School age Children study**J. Queral <sup>(1)(2)\*</sup>, A. Wargers <sup>(3)</sup>, E. Llauradó <sup>(2)</sup>, L. Tarro <sup>(2)</sup>, W. Jansen <sup>(3) (4)</sup>, R. Solà <sup>(2) (5)</sup>**OBJECTIVES**

Adolescence is a period with rapid physical, cognitive and psychosocial changes and, where, the establishment of behavioural patterns (dietary and physical activity) starts.

<sup>1</sup> Earlier studies showed that many European adolescents do not eat recommended daily fruit or vegetable and many eat sweets daily. <sup>2</sup> Lifestyles are different with age, sex and different socioeconomic status (SES) levels. <sup>3,4</sup>

This study aims to analyse the time-trend of fruit, vegetables and sweets consumption, among European adolescents between 2013 and 2018 related to sociodemographic characteristics, using the Health Behaviour in School age Children (HBSC) data.

**METHODOLOGY**

The HBSC study is a cross-national research study into health and well-being of adolescents (11-15 years old) across Europe and North America conducted in collaboration with World Health Organization (WHO).

The present study included data from 36 countries of the Europe region about fruits, vegetables and sweets consumption between 2013 to 2018 and related to sociodemographic characteristics (age, sex and SES). A total of 182,719 participants was included in the analysis from 2014 and 185,245 from 2018. The study was approved by Erasmus Medical Centre's ethical commitment (Ref: MEC-2022-0771). The principal outcomes are the dietary behaviours (fruit, vegetable and sweets consumption) and the secondary outcomes are the sociodemographic characteristics (SES, age and sex).

The time trend of dietary behaviours was estimated by binary logistic and a multivariable logistic regression to know how the FAS, age and sex differences in dietary behaviours.

**RESULTS**

The time-trend by country showed that 10 of 36 countries resulted in a significant increase in fruit and vegetables consumption, especially in East Europe countries, and 16 of 36 countries showed a significant decrease in sweets consumption over time, especially in Central Europe countries.

The time-trend by age, sex, and FAS showed a significant increase in daily fruit and vegetables consumption and a significant decrease of daily sweets consumption between 2014 and 2018 in all age, sex, and FAS categories.

The interaction analysis between sociodemographic characteristics categories, showed that in 15 years old adolescents decrease significantly the daily fruit consumption [OR (99% CI)= 0.962 (0.919, 1.007),  $p=0.03$ ] and daily sweets consumption [OR (99% CI)= 0.946 (0.897, 0.997),  $p=0.006$ ] in comparison with 11 years old adolescent. Related to FAS categories, a significant decrease of daily vegetables consumption from FAS categories was showed [OR (99% CI)= 0.941 (0.905, 0.979),  $p<0.001$ ].

**CONCLUSION**

Between 2013 and 2018 European adolescents improved their dietary habits. However, over time older adolescent consumed less fruit and sweets daily than the younger adolescent and adolescent with low SES consumed less vegetable daily than adolescents with high and medium SES.

These results highlight the necessity to adapt policy recommendations in dietary behaviours to specific age and SES (FAS) groups of the population.

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## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice?



## ORAL COMMUNICATIONS

**The Food Boost Challenge: application of participatory action research for identifying changeable determinants and actionable improvements towards healthier food choices.****M. van Lieshout** <sup>(1,2)\*</sup>, **M.G.J. Meijers** <sup>(3)</sup>, **W. Scholtes-Bos\*** <sup>(1,4)</sup>, **M.F. Arias** <sup>(1,5)</sup>, **S.I. de Vries** <sup>(1,6)</sup>**OBJECTIVES**

Within the Food Boost Challenge (FBC) participatory action research was conducted to assess determinants of adolescent's behaviour and possibilities for healthier food choices.

**METHODOLOGY**

The FBC is a social quadruple helix innovation process consisting of four phases. In each phase, adolescents, (peer) researchers (students and applied researchers), and partners from the food system (non-governmental and commercial organizations) collaborate to transform ideas into action. Phase 1, lasting 3-5 months, involves students exploring barriers and drivers for change for healthier food choices among adolescents (aged 12-20 years-old) using interactive research methods. In phase 2, lasting about 1 month, students/scholars (16-26 years-old) are challenged to develop their innovative ideas into concepts that promote healthier food choices. These concepts are presented to and evaluated by a jury of experts in a nation-wide competition. The concepts fall into one of four categories: I) innovative technology to stimulate a healthy diet; II) new food products/concepts targeting adolescents; III) hotspots, which are physical places and/or events that influence and improve the experience of healthier food choices; IV) new routes to market, such as new channels and/or ways of presenting products. In phase 3, lasting approximately 2 months, consortia of students, peer researchers, and partners develop a selection of concepts into prototypes. In phase 4, lasting 1-2 weeks, these prototypes are showcased at a national level. The first FBC ran from August 2021 until May 2022, aiming to empower adolescents to increase their consumption of vegetables and fruit products. The second FBC ran from August 2022 until June 2023, aiming to empower adolescents to make healthier food choices at hotspots, which are places where large numbers of adolescents gather.

**RESULTS**

This abstract focuses on results of phase 1 of both Food Boost Challenges. In FBC-1, about 200 students from 9 Bachelor programs studied what adolescents (>1000) need for increasing their vegetable and fruit intake. In FBC-2, 5 students from another university of applied sciences studied what adolescents (about 1000) experienced as most challenging/promising regarding healthier food choices. Students were instructed to apply interactive research methods, which included spy-on-the-wall observations, mind-maps, informal interviews in school canteens, classroom quizzes using digital tools, and interactive games such as «cross the line», «choice game», and «association game». The use of props, step-by-step explanations of activities, and ample recognition of adolescents' contributions were found to provide the most valuable insights into determinants of their behaviour and possibilities for healthier food choices.

**CONCLUSION**

The interactive methods applied in phase 1 of both Food Boost Challenges enabled students to easily and quickly get to the heart of matters of adolescent's food behaviour. This generated a wealth of changeable determinants of adolescent's behaviour towards healthier food choices and identified ample actionable improvements for healthier choices.

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## SESSION 3:

Vegetalizing the diet: what are the determinants of consumer behaviour and choice?



## ORAL COMMUNICATIONS

***Less meat' or 'more fruit and veg'? The role of promotion-prevention framing on attitudes towards diet change in the UK.*****H. Zamzow<sup>(1)</sup>, D. Krpan<sup>(1)</sup>****OBJECTIVES**

Evidence of the environmental and health hazards of meat-centric diets is growing, along with the need to identify the most effective messaging strategies to encourage people to change their eating habits. 'Meatless Monday' programs have been running for decades, and current campaigns have adopted the refrain 'less and better meat.' Yet some studies show that drawing attention to the absence of meat has a negative effect on consumers, compared with emphasising the abundance of plant-based options. At the same time, efforts to improve diets using language such as 'eat more fruits and vegetables' have met with limited success. Are these seemingly subtle differences important?

Regulatory Focus Theory proposes that people will pursue goals with either a promotion focus or a prevention focus, in order to meet two separate but fundamental survival needs. As regulatory focus involves motivations to achieve gains (promotion focus) versus avoid losses (prevention focus), we were interested in whether this framing could influence attitudes towards diet change in the UK.

**METHODOLOGY**

A pilot study confirmed 'more' to be associated with promotion focus, 'less' and 'restrict' with prevention focus, and 'replace' with neither, thus serving as a neutral reference. These terms were applied to craft message frames describing the emerging dietary norm: 'more plant-based', 'less meat and dairy', 'restrict meat and dairy', or 'replace meat and dairy with plant-based foods'. We then ran an online experiment with 471 UK nationals (age 18-74, 62% female, no dietary restrictions) recruited via the Prolific Academic crowdsourcing platform. After being randomly assigned to read one of the four messages, participants rated their interest and intentions regarding the new norm on a scale of 1-5. Variables related to enjoyment of new foods, dietary habits, and demographics were also collected.

**RESULTS**

A one-way ANOVA showed no significant difference between framing conditions on receptivity to the new norm based on interest in diet change ( $p = .409$ ) or intentions to either increase consumption of plant-based foods ( $p = .704$ ) or decrease consumption of animal-based foods ( $p = .738$ ). Across conditions, interest was significantly higher than intention to increase plant consumption, which in turn was higher than intention to decrease animal consumption ( $p < .001$ ). Regression analysis indicated enjoyment of new foods was a strong predictor of interest in the new norm, over and above being female, left-leaning, or reported level of meat consumption ( $p < .001$ ,  $R^2 = 0.317$ ).

**CONCLUSION**

We find no evidence to indicate that receptivity towards changing dietary norms in the UK is influenced by the way in which the shift in eating behaviour is described. Policymakers and advocacy groups should therefore direct their efforts at identifying other elements of message frames which could be leveraged for greater impact.



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## SESSION 4:

Placing fruit and vegetables at the center of the One Health discussion- Solutions, recommendations, actions and priorities

Moderators: Boitshepo Bibi Giyose & Christian Reynolds



## KEYNOTE LECTURES

### State of art and role of public policies to achieve sustainable diet

Céline GINER, OECD, France

As highlighted in the OECD report Making Better Policies for Food Systems (OECD, 2021), food systems around the world are expected to simultaneously provide food security and nutrition for a growing population; livelihoods for millions of farmers and others actors along the food chain; and improve the environmental sustainability of the sector. Food systems face the «triple challenge» of simultaneously meeting these objectives.

Unfortunately, food systems are currently a long way off from meeting the triple challenge. Globally about 2 billion people do not have regular access to sufficient, safe, and nutritious food, while an even greater number are overweight or obese. At the same time, repercussions of the COVID-19 crisis and Russia's war on Ukraine are putting pressure on the livelihoods of people working along all stages of the food supply chain. The environmental damage from food production is also considerable: food systems account for 21-37% of anthropogenic greenhouse gas emissions.

Better policies are needed to address this «triple challenge». But policies aiming to improve outcomes in one dimension of the triple challenge can also affect other dimensions, either positively (a synergy) or negatively (a trade-off). Given these complex interactions, designing better policies can be challenging. In addition, achieving better policies for food systems has often been difficult because of disagreements over facts, diverging interests, and differences over values. Better policies will depend on robust policy processes that are evidence-based, inclusive, and can mediate between differing values.

Giner and Brooks (2019) outlined a four-track approach for policies to encourage healthier dietary choices in a way that is consistent with the wider objectives for the food and agriculture sector. This four-track approach consists of demand-side public interventions, working with industry at the supply-demand interface, regulations to align private incentives with public incentives, and fiscal measures. While this four-track approach was developed in the context of food nutrition and health, these interventions can be applied to environmental sustainability.

The presentation will provide insights on how public policies can contribute to achieving healthier and more sustainable diets based on recent OECD analysis on policy approaches towards healthier food choices (Giner and Brooks, 2019), on potential impact of dietary changes on the triple challenge (Tallard et al., 2022), on the environmental impacts of food systems (Deconinck and Toyama, 2022) (Deconinck and Hobeika, 2022), on food insecurity and food assistance programmes across OECD countries (Giner and Placzek, 2022) and on simplified nutritional food labelling schemes (forthcoming).

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## SESSION 4:

Placing fruit and vegetables at the center of the One Health discussion- Solutions, recommendations, actions and priorities



## KEYNOTE LECTURES

***A mapping system to have a win-win solution to tackle food insecurity, the multiple forms of malnutrition and climate change*****Kremlin WICKRAMASINGHE, WHO European Office for the Prevention and Control of Noncommunicable Diseases, Denmark**

Noncommunicable diseases (NCDs) are the leading cause of death in the WHO European Region, with undernutrition and obesity showing geographic disparities. Climate change has been identified by the World Health Organization (WHO) as one of the greatest health threats of the 21st century. Planetary health, of which climate change is one aspect, is based on the concept that human health and human civilization depend on flourishing natural systems<sup>(1)</sup>. One Health is an approach to optimizing the health of humans, animals and ecosystems by collaboration among these fields. Tackling food insecurity, multiple forms of malnutrition and climate change within a One Health arena requires consideration of the 'bigger picture' in addressing complex problems, which is the aim of this work. «Systems thinking» refers to ideas and methods that encourage consideration of the 'bigger picture' in addressing complex problems. This research uses systems thinking methods, a literature review and experts' feedback to identify and map the linkages between factors and policy actions designed to prevent NCDs and malnutrition, address climate change and food insecurity whilst also optimizing health across humans, animals and ecosystems. As part of this programme of work, a causal loop diagram was co-designed and created with local stakeholders following the principles of group model building methods, looking at NCD prevention and climate change. Food security, including food environments, systems and policies were key variables. As part of the next phase, the system's intersections and common system behaviour patterns (archetypes) will be identified. This approach and output will identify win-win solutions to tackle food insecurity, malnutrition and climate change and highlight the role of fruit and vegetables. It will additionally help to ensure the WHO is effectively able to support Member States in a way that is focused on strengthening action for systems change as well as acting as a visual and advocacy tool for future engagement and collaboration.



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## SESSION 4:

Placing fruit and vegetables at the center of the One Health discussion- Solutions, recommendations, actions and priorities



## KEYNOTE LECTURES

**Can all people access to healthy and sustainable diet?****Anna HERFORTH, Harvard T.H. Chan, United States**

Abundant consumption of fruits and vegetables is the most universal recommendation for healthy diets across national and global dietary guidance. Most people in the world are far from meeting this guidance, however. New nationally representative data collected in 2021-2022 shows that most people in the 56 countries surveyed are missing at least one recommended food group on any given day. While most people consume at least some amount of vegetables, fruits are commonly absent: in one quarter of the countries surveyed, a majority of people are missing fruit on any given day. Other data suggest that the amount of fruits and vegetables consumed is far below the 400 grams or more per day recommended by the World Health Organization.

Lack of access is one culprit underlying low consumption of fruits and vegetables, among other recommended food groups. The Cost and Affordability of a Healthy Diet is an indicator recently adopted by FAO as a global food security indicator to complement the Prevalence of Undernourishment and Food Insecurity Experience Scale. This indicator has revealed that approximately three billion people cannot afford a healthy diet, meaning a least-cost diet that satisfies dietary guidelines. The majority of those who cannot afford a healthy diet are living in sub-Saharan Africa and South Asia. On average globally, fruits and vegetables command 44% of the cost of a healthy diet, which puts them out of reach for many people. Food balance sheet data show that availability of fruits and vegetables is lower than recommended amounts in most regions of the world. To summarize the evidence, there is a lack of supply, which translates to low affordability, which in turn can preclude adequate dietary consumption of fruits and vegetables. The health consequences of low fruit and vegetable consumption include higher risk of diet-related noncommunicable diseases and certain nutrient deficiencies.

When people cannot access adequate fruits and vegetables, what can be done? Now and over the long term, investment in seed systems, gene banks, cold chains, and other research and development for improved, locally-adapted and resilient production is needed. Other more immediate actions to improve physical and economic access include social protection efforts to help people purchase or grow vegetables and fruits for themselves, and conservation of wild areas which may provide access when markets and cultivation do not. Finally, efforts to reinforce cultural preferences for traditional species and preparations of vegetables and fruits are essential to sustaining recognition and demand. In tandem with these efforts, greater attention needs to be paid to estimating the availability of fruits and vegetables to ensure that progress and gaps in fruit and vegetable production are accurately captured, including minor and underutilized species.







## SESSION 4:

Placing fruit and vegetables at the center of the One Health discussion- Solutions, recommendations, actions and priorities



## ORAL COMMUNICATIONS

**A global analysis of national dietary guidelines on plant-based diets and substitutions for animal-based foods**A.-L. Klapp <sup>(1)\*</sup>, N. Feil <sup>(2)</sup>, A. Risius <sup>(1)</sup>**OBJECTIVES**

Discussing plant-based diets and substitutions for animal-based foods in food-based dietary guidelines (FBDGs) can be a key step in making dietary recommendations more sustainable and healthy, as well as more inclusive. The existing large-scale evaluations of FBDGs do not assess whether and to what extent different countries cover the broad spectrum of plant-based diets and have policy positions on vegetarian diets (including vegan diets), and whether they mention specific plant-based alternatives to milk, dairy products, and meat. The main aim of this study was to determine whether and how FBDGs provide such information.

**METHODOLOGY**

95 guidelines and 100 corresponding countries were assessed, using an exploratory sequential mixed method. This involves a qualitative explorative content analysis, followed by a hierarchical cluster analysis. Furthermore, the Balanced Food Choice Index (BFCI) was constructed, which measures the extent to which FBDGs provide recommendations that cover the broad spectrum of plant-based diets. In order to explore the correlations between FBDGs' recommendations and ecological and economic country characteristics, ordinary least squares regression was used.

**RESULTS**

It was found that most countries do not provide information that cover the broad spectrum of plant-based diets, indicated by the mean score of the BFCI (33.58 out of 100 points). For instance, 18% do not mention plant-based sources of protein, 30% do not mention plant-based iron, and 39% do not discuss plant-based calcium. A total of 38 guidelines (40%) contain a position on vegetarian diets. Nearly half (45%) of all FBDGs already mention plant-based alternatives to meat or animal milk. The regressions showed that the BFCI correlates positively with countries' ecological efforts and negatively with the importance of animal-based products in their economy.

**CONCLUSION**

This study demonstrates a considerable information insufficiency in current FBDGs worldwide. FBDGs should provide recommendations for the broad spectrum of plant-based diets and balance the ethical, ecological, religious, and economic aspects that play a role in people's food choice.

**AUTHOR DISCLOSURES**

A.-L.K and NF are part-time employees at ProVeg e.V. ProVeg International is a food awareness organization with the mission to reduce the global consumption of animals by 50% by 2040. All opinions presented in this article belong to the authors alone and not to any organization to which they are or were affiliated. AR reports no conflicts of interest.

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## SESSION 3:

Placing fruit and vegetables at the center of the One Health discussion- Solutions, recommendations, actions and priorities



## ORAL COMMUNICATIONS

## A case study of 'food biodiversity' and experiences of community food growing environments in the City of Brighton & Hove

L. Salm<sup>(1)\*</sup>, C. Turner<sup>(1)</sup>, B. Nicholls<sup>(2)</sup>, N. Nisbett<sup>(3)</sup>

### OBJECTIVES

Community food growing (CFG) environments (such as allotments and community gardens) have been gaining popularity in response to unsustainable food systems processes, the over saturation of unhealthy retailing environments, as well as recoded benefits they provide across health, social and environmental dimensions. Food environment research has typically focused on formal retailing environments and diet outcomes, with little focus on environmental considerations such as biodiversity. Furthermore, CFG environments and their role in contributing to food biodiversity remain understudied within the literature.

There is huge potential in harnessing the experiences and lessons from communities in localities that are committed to shifting to more sustainable food systems through CFG activities. The city of Brighton & Hove (B&H), UK, provides a well-suited case-study city given its long history of community food projects and 'green' values.

This PhD project therefore aims to work with urban community food growers to understand their fruit and vegetable 'food biodiversity', lived experiences of CFG environments, and potential inequities preventing access to these environments in B&H.

### METHODOLOGY

Featuring an interdisciplinary, phased, case-study design, this research incorporates both social and natural science methods.

A collaborative approach with urban community food growers will explore their lived experiences of CFG environments through participatory visual methods and in depth-interviews. To assess food biodiversity, a sub-set of participants will record the dietary species richness of their allotment produce through a food diary. This will be compared with a survey of species richness availability of the other food environments that participants engage with.

To investigate the structural barriers to participation, this study will work in partnership with B&H City Council and B&H Allotment Federation to map the provisions of CFG, inform an Equalities Impact Assessment, and undertake policy level stakeholder workshops to identify barriers and solutions to widening access to CFG.

### RESULTS/ OUTCOMES

This novel case study will contribute to 1) a rich understanding in how experiences and preferences shape food biodiversity, and vice versa in a local food environment context 2) City Council and other decision-making informed by participatory research findings 3) cross-sector advocacy tools at local and national levels to promote and remove barriers to CFG.

### CONCLUSION

This study will operate at both the grassroots and policy level to contribute to our understanding and pursuit of diversifying local food environments for diet, biodiversity, and equitable participation gains.



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**Declaration:** No authors declare a financial or other conflict of interest for this work.



## SESSION 4:

Placing fruit and vegetables at the center of the One Health discussion- Solutions, recommendations, actions and priorities



## ORAL COMMUNICATIONS

**Protecting health by improving Food Literacy in primary and intermediate schools: an Italian experience with the MaestraNatura e-learning program**A. Silenzi <sup>(1)\*</sup>, R. Vari <sup>(1)</sup>, A. d' Amore, R. Masella, B. Scazzocchio <sup>(1)</sup>**OBJECTIVES**

Food Literacy (FL) is defined as a set of food-related skills and knowledge that, when applied correctly, enable people to make informed and proper choices about food and nutrition, thus contributing to the improvement of their health. MaestraNatura (MN) is an innovative educational program implemented by ISS, supported by the Ministry of Health with the aim of raise the awareness of the importance to have a balanced relationship with food. Final objective of MN program is to favor the adoption of a healthy diet by acquiring the ability to transfer the theoretical principles of the Food Pyramid, in particular an adequate intake of fruit and vegetables, into a real-world context. Here we report the results of the effectiveness of MN in increasing FL in public primary and intermediate school students.

**METHODOLOGY**

Three hundred fiftyfour primary school students (181 females/173 males), aged 9-10 years, and 566 intermediate school students (294 males/272 females), aged 11-13 years, were enrolled to evaluate the effectiveness of the MN program. An experimental group (MN) and a control group (CO) were organized in each school so that the sociocultural and economic characteristics of the students were as homogeneous as possible. The CO group participated in classical nutrition education lessons focusing on food groups, different meanings of foods and nutrients, and the food pyramid. The MN group participated in all theoretical and practical activities of the MN curriculum. The knowledge gained was assessed through specific questionnaires administered to both groups.

The MN students were also asked to organize a weekly food plan (WFP), both before to start (T0) and at the end of the educational path (T1) to evaluate the FL improvement.

**RESULTS**

The MN group of students, either from primary or intermediate school, showed a significantly higher percentage of correct answers than the CO group for all the administered questionnaires. The MN students showed a major improvement from T0 to T1 in organizing the weekly menu. The results obtained in the two different age groups of MN students were compared in terms of knowledge improvement and ability to apply it in practical activities. Primary school students responded better than the intermediate ones ( $p < 0.001$ ) and showed a better ability in planning the weekly food plan with respect to the older ones. In particular, the younger students, although starting from a worse basal level than the older ones ( $p < 0.001$ ), were able to gain better results than them at T1 ( $p = 0.0056$ ).

**CONCLUSION**

MN establishes itself as an effective, accessible, and easy-to-monitor program that can promote attainment of a higher level of FL and awareness of the importance of having proper eating habits to preserve one's health. The results obtained underscore the importance of starting health promotion programs early to achieve greater effectiveness.

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## EGEA 2023 SPONSORS

The EGEA conference secretariat warmly thanks the companies and associations that supported the organization of this 9<sup>th</sup> edition.



**THE CSIF** is the professional federation of French fresh fruits and vegetables importers. Our members companies import and distribute tropical, exotic and out-of-season fruits and vegetables. CSIF brings together 1.5 million tonnes, for a turnover of 1.5 billion euros, or about 70% of fruits and vegetables from third countries marketed in France.

More information on: <https://csif.eu/>



**INTERFEL** was founded in 1976 and encompasses all the fresh fruit and vegetables production trades. Every aspect is represented: production, shipping, import, export, wholesaling, distribution (large supermarkets, specialized businesses, and institutional restaurants). As a private organization by law and initiative, Interfel is a recognized National Interprofessional Farming Association under French rural law, and under the European Union, since 21 November 1996, as part of the single CMO (Common Market Organization).

**The challengers of the sector:**

- Rebuilding competitiveness on the national and international levels.
- Supporting and developing the consumption of fresh fruit and vegetables.
- Supporting the market share of our production in consumption in France and developing that of our operators on the foreign markets.
- Strengthening the support given to research, experiment, and innovation actions of the sector.

More information on: [www.interfel.com/](http://www.interfel.com/)



**MERCABARNA** is the largest wholesale food market in Barcelona (almost 600 businesses operating within its premises), serving as a crucial hub for the distribution of fresh produce, seafood, and meat in the region. In addition to its core functions as a wholesale market, Mercabarna also serves as a knowledge and innovation hub, offering educational programs, research facilities, and networking opportunities to promote entrepreneurship and advancements in the food industry.

More information on: [www.mercabarna.es/en/](http://www.mercabarna.es/en/)



**SAVEURS COMMERCE** is the National Federation of Specialized, local, Food Shops in France. It represents fruit and vegetables traders, whether in stores or on markets. Saveurs Commerce helps to bring together and promote the profession to public authorities and consumers.

More information on: <https://www.saveurs-commerce.fr/>



**SNIFL-SC** - the National Union of Importers/Exporters of Fruits and Vegetables – Saint-Charles is a professional association law 1884, based on Saint-Charles International in Perpignan, the first European platform for Marketing, Transport and Logistics in fruit and vegetables. The SNIFL currently brings together 74 companies involved in the trading of fruit and vegetables (import/export) and 49 «Associate Member» companies (These associate members are transporters/logisticians, Ssii, training centers, equipment manufacturers, organizations financial, etc.). The SNIFL adheres to all the major structures in the sector, such as INTERFEL at the National level or FRESHFEL at the European level. The Syndicate is also represented, via FRESHFEL, at the European Commission in Brussels by two experts within the framework of the Observatory of Fruits and Vegetables.

More information on: [www.interfel.com/connaitre-interfel/membres/snifl/](http://www.interfel.com/connaitre-interfel/membres/snifl/) & <https://public.saintcharlesinternational.com/>



## CONFERENCE VENUE

### Novotel Barcelona City.

Avenida Diagonal 201, (Entrance through Ciutat de Granada), Barcelona

#### Access:

- Metro L1: stop « Glories »
- Bus N7: stop « Diagonal – Ciutat de Granada »

## CONFERENCE OPENING HOURS

- Wednesday, 20 September: 12:30 – 19:00
- Thursday, 21 September: 09:00 – 18:00
- Friday, 22 September: 08:30 – 13:00

## ACCESS AND BADGES

For organizational and security reasons, we would like to kindly request all participants to always wear their name badge during the conference.

## LANGUAGES

The official language of the conference is English. Translation into French will be provided during the sessions.

## FOOD AND DRINKS

Welcome cocktail, coffee, tea, and lunches are included in the registration fee and offered to all participants.

Please note that no food or drink are allowed in the session room.

## INTERNET CONNECTION

### Free access to the Novotel Wifi network:

- 1 Select NOVOTEL network
- 2 Select TICKETS (not Guest)
- 3 Username: MEETINGS@NOVOTEL
- 4 Password: @NOVOTEL

## PHOTO & VIDEO

Photos & footage will be taken during the conference and gala dinner and will be used by Aprifel to promote EGEA and disseminate its conclusions. If you do not wish to issue authorisation to be filmed and for your image to be used, please report this to registration desk.

## LOST AND FOUND

For lost and found items, please refer to the registration desk.

## GETTING AROUND

The organizers offer all participants a 2-day travel card that you can get at registration:

- This card is non-transferable.

- It provides unlimited journeys on public transport in Barcelona for consecutive periods of 2 days (48 h).

- It includes: metro, bus and Montjuïc funicular (TMB), urban railway (FGC, Zone 1), tram (TRAM) and Barcelona regional mainline trains (Rodalies de Catalunya, Zone 1), metro service, travel between the airport and Barcelona city centre.

- Montjuïc Cable Car is not included.

**To plan your journey:** [www.tmb.cat](http://www.tmb.cat)

## WEBSITES OF INTEREST

- **Barcelona City Official Web Site:** <https://www.barcelona.cat/en/>
- **Barcelona Tourism:** [www.barcelonaturisme.com](http://www.barcelonaturisme.com)

## SAFETY TIPS

Use the safety deposit boxes at your hotel or accommodation to store valuable items, such as personal documents and air tickets.

## FIRST AID / MEDICAL ASSISTANCE

**In case of emergency call 112** (medical emergencies, fires, and police assistance).

This emergency services system is available 24/7. It will connect you to the appropriate emergency service, depending on your situation.

## GALA DINNER

### Thursday, 21 September, from 19:30

2023 marks the 20th anniversary of the EGEA conference. The celebration gala dinner is fully booked.

If you have registered for the gala, you should have received an invitation card at conference registration. If not, please contact the organizers.

We kindly ask you to present this invitation at the gala entrance.

#### Venue

Cuines Santa Caterina restaurant in Barcelona  
Avinguda de Francesc Cambó, 20, Barcelona

Metro stations: Urquinaona (Line 1) or Jaume I (Line 4)



## YOUR FEEDBACKS MATTER

**To better meet your expectations, we'd like to know your opinion. Thank you for taking the time to share your feedback with us.**



## PLACING SUSTAINABILITY AT THE CORE OF EGEA CONFERENCE

**Sustainability will be an essential feature of EGEA conference: whether in the presentations, the discussions or in the organisation itself. Indeed, EGEA steering committee has aimed at including this dimension as much as possible in the practical aspects of the conference, while guaranteeing the experience of the participants. Here are some explanations on how sustainability has guided the organisation of EGEA conference.**

From the very beginning of the planning of the event, sustainability criteria were included in the specifications as broadly as possible. Specific requirements were thus stated for catering, travel, inclusiveness among speakers and participants, and sobriety in the use of resources.

### WORKING WITH COMMITTED COMPANIES

Aprifel selected a professional conference organiser certified **ISO 20121<sup>1)</sup>**, to help organise the conference. The conference venue chosen to host EGEA has a policy regarding sustainability (rated Gold in the Accord Group's sustainability charter).

For the other actors of the conference – restaurants, printer etc.- specific charters have been drawn up to set out the requirements about:

- **Catering** to ensure the nutritional quality and the proportion of plant-based and minimally processed products, the careful management of the quantities served and the use of reusable and plastic-free crockery.
- **Material aspects of the event:** Reusable equipment (table, chairs, set design) has been selected when possible and the communication tools have been limited to the essentials (badge, participant booklet and bag) -and are made with sustainable resources. For example, the paper booklet is made from sustainably managed forests and vegetable-based inks, and the bag material is spun and assembled in France by a company employing disabled workers.

### LIMITING TRANSPORTATION NEEDS

Barcelona was chosen to host the conference because of its easy access and as it offers alternatives to flying. The city has an **international airport and easy connections by train or car** from several European countries. Barcelona also offers an **extensive public transportation network** to reach the city and navigate the downtown area.

The venue opens the possibility of a **walking- first congress**. It is served by **two metro and bus lines**. Conference attendees can be **accommodated directly on site**, and an extensive range of additional accommodation is available nearby, at all rates.

The choice of **venues for the social part of the event** was also guided by the desire to encourage soft mobility. The first one is less than a 15-minute walk from the conference venue, the other is about 30-minute walk or less than 15 minutes by metro. Finally, specific **information** has been sent to participants regarding sustainable transportation and a **48h free pass for Barcelona public transports** was offered to all attendees at registration.

### A CERTIFICATION PROCESS TO MAKE THIS COMMITMENT CONCRETE

To make these commitments tangible and verifiable, the EGEA steering committee has launched a **sustainability labelling process** for the conference. To this end, the REEVE label (Eco-event network) has been chosen and the process is underway. Considering the specific aspects of the conference, some thirty commitments covering 8 sustainability topics have been made and will be audited for the obtention of the certification.

After the conference, the **event's carbon footprint** (travel and food of the participants) will be estimated and shared. Based on the results, a **compensation plan** will be put in place.



TO CONTRIBUTE  
TO THE  
COMPENSATION  
ACTION

Send an e-mail to  
[contact-egea@kit-group.org](mailto:contact-egea@kit-group.org)  
to obtain a secured link

1. ISO 20121 is a voluntary international standard for sustainable event management





## EGEA COMMITMENTS ENCOMPASSES 8 SUSTAINABILITY TOPICS



### 1•VENUE

Minimise negative impacts on the host site and residents.



### 2•RESPONSIBLE USE OF RESSOURCES

Limit event-related objects, reduce and optimise printing, and chose reusable furniture.



### 3•SUSTAINABLE TRANSPORTATIONS

Suggest incentives for participants to use public transport, cycle paths and compensation for flights.



### 4•SUSTAINABLE CATERING

Offer a large plant-based and no/minimally processed meals; prevent food-waste.



### 5•TOWARDS ZERO WASTE

Utilise reusable and plastic-free crockery, and waste bins in all premises.



### 6•AN EVENT FOR EVERYONE

Adapt registration fees to resources, select an accessible venue and ensure gender balance of speakers.



### 7•ENGAGING THE AUDIENCE

Publish an environmental report on the conference and information on the measures put in place



### 8•ORGANISATION AND PROGRESS

Include sustainability criteria in the specifications of our suppliers and define indicators for future EGEA editions.



# EGEA

## 2003-2023

### FROM HERAKLION TO BARCELONA, 20 YEARS OF EGEA

In 2003 Aprifel created EGEA, an international conference designed to **bring together all scientific disciplines and stakeholders** interested in diet and the place of fruit and vegetables in it. This initiative has been placed under the **permanent chairmanship of Prof. Elio Riboli** – an expert in epidemiology and cancer prevention. The conference aims to **formulate concrete scientific-based recommendations to change practices and policies** in favour of healthy, sustainable diet that is accessible to all.

In 2003 the first EGEA conference was organised in Crete, on the shores of the Aegean Sea (in French "Mer Égée"), from which the conference takes its name. The first editions focused on the place of fruit and vegetables in a **Mediterranean dietary pattern and their health benefits**. Over the years, the conferences have opened to other fields (i.e. economics, sociology, public policies, etc.) linked to diet and the consumption of fruit and vegetables.

#### FROM SCIENCE TO ACTION

EGEA consensus have played an active role notably in guiding, the European School Scheme, a vast European policy promoting the consumption of fruit and vegetables in schools. The WHO has also recognised EGEA as an effective and practical strategy for promoting fruit and vegetables consumption (WHO Europe, October 2008). «From science to action» is thus the spirit of the EGEA conferences.

«Health benefits of Mediterranean diet - Cancer & Cardiovascular Diseases»

**Heraklion, Crete**  
**2003**



**2004**

**Perpignan, France**  
« Health benefits of Mediterranean diet - Obesity & Type II Diabetes Prevention»



«Health benefits of Mediterranean diet – From science to preventive actions»

**Rome, Italy**  
**2005**



**2007**

**Bruxelles, Belgium**  
«The role of fruit & vegetables in the fight against obesity»



1<sup>st</sup> Fruit & vegetables summit– UNESCO – Nutrition/Marketing/ Economy

**Paris, France**  
**2008**



**2010**

**Bruxelles, Belgium**  
«Social and health benefits of balanced diets : the rôle of fruit & vegetables»



«Healthy diet, healthy environment within a fruitful economy: The role of fruit & vegetables»

**Milan, Italy**  
**2015**



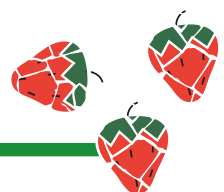
**2018**

**Lyon, France**  
«Nutrition & Health: from science to practice»



«Diet, Fruit and Vegetables and One Health: What contributions?»

**Barcelona, Spain**  
**2023**





## ABOUT APRIFEL

### FROM SCIENCE TO ACTION

The French agency for research and information on fruit and vegetables (Aprifel) is an **association** under the law of 1901, **founded in 1981**. Recognized as being of general interest, Aprifel acts as an **interface between scientists, civil society and fruit and vegetables professionals**.

« Our aim is to inform and mobilise all stakeholders, to translate science into action in favour of healthy and sustainable diet for all. »

Christel TEYSSÈDRE,  
Aprifel's President

To achieve this goal, Aprifel:

- Works for the popularisation and transmission of scientific data on fruit and vegetables.
- Engages the national and international scientific community.
- Produces and disseminates scientific publications and organizes information meetings and international conferences.

### TWO AREAS OF ACTION

**Science constitutes the basis of Aprifel's action.** Thanks to a permanent **scientific watch**, Aprifel nurtures its work and constitutes a **network of international experts**. To **provide new knowledge** related to diet and fruit & vegetables, the association also carries out **research**, alone or with partners.

The second aspect of Aprifel's action aims at **sharing information** to multiple audiences: scientists and experts; health and education professionals; the general audience.

Most of this dissemination is carried out with **expert media partners** (France TV, Réseau Canopé, medical press, etc). Aprifel **website and social media accounts** also constitute a **knowledge hub**. Among its information tools, **Aprifel publishes two newsletters**: Equation Nutrition for the French-speaking public and The Global Fruit and Vegetable Newsletter – GFVN - sharing a **monthly overview of scientific news on healthy and sustainable diets**.


Finally, to facilitate **the transition from knowledge to action**, Aprifel organizes **events bringing together various stakeholders**.



► Discover GFVN

 **6** NATIONAL INFORMATION MEETINGS

**9** INTERNATIONAL SCIENTIFIC CONFERENCES 

with more than **300** SPEAKERS since 2003 

#### EQUATION NUTRITION / GFVN

**11** ISSUES PER YEAR 

French **6 667** SUBSCRIBERS 

English **10 614** SUBSCRIBERS 





## AN ORIGINAL THREE-PARTS GOVERNANCE

In line with its work, Aprifel's governance represents scientists, civil society and fruit and vegetables professionals. The implementation of the association's actions is submitted to the approval of these three councils.

### EXECUTIVE BOARD

- Gathers qualified professionals in the fields of action of the association.
- Defines the major financial orientations of the association.
- Ensures its administrative and financial management.,
- Advises on the financial reports, approves the budgets and the annual action plans.

### SCIENTIFIC COUNCIL

- Brings together and engages all the scientific expertise required to guide the work of the association.
- Analyses recent scientific evidence on issues related to healthy and sustainable diets.
- Provides recommendations for the forecasting and the assessment of risks to human health and the environment.
- Develops explanatory notes to identify relevant research and/or in formation actions.

### CONSUMER COUNCIL

- Brings together representatives of more than ten accredited national consumer associations.
- Calls on the scientific and economic communities to inform consumers about issues that concern them: food waste, price, production...
- Represents a place for dialogue and exchange.

### EXECUTIVE BOARD



**16**  
QUALIFIED  
PROFESSIONALS  
FROM THE FRUIT  
& VEGETABLES  
SECTOR

### CONSUMER COUNCIL

**11**  
NATIONAL  
CONSUMER  
ASSOCIATIONS

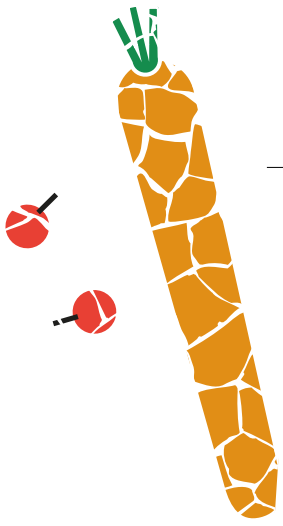


### SCIENTIFIC COUNCIL



**8**  
SCIENTIFIC  
EXPERTS





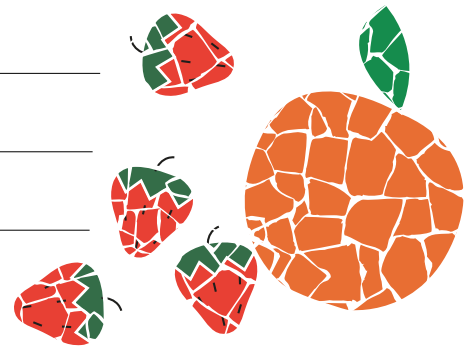
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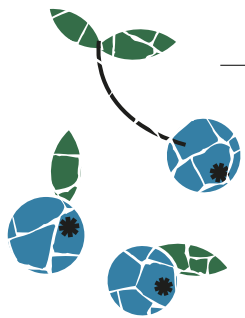
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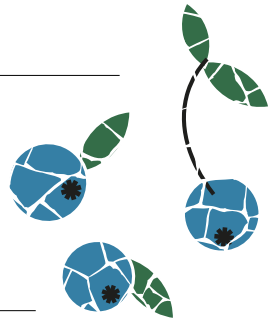
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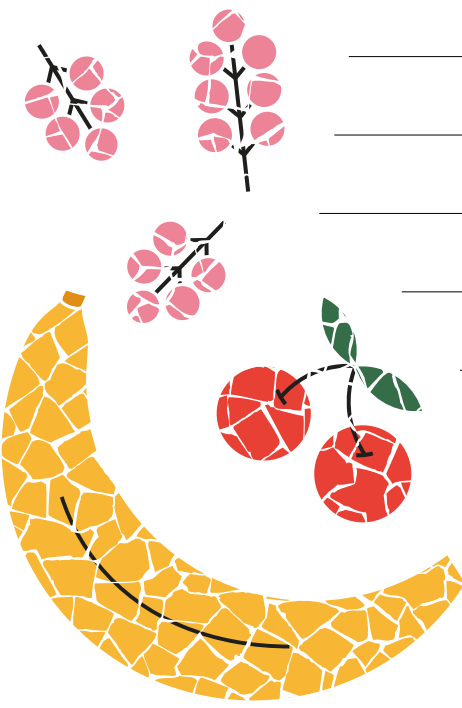
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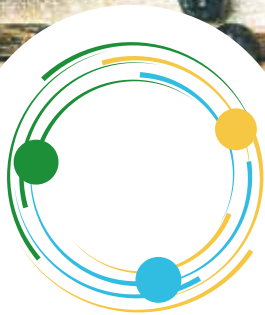


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**Agency for the Research and Information on Fruit And Vegetable**  
Publication Director : Delphine Tailliez  
Writing : Aprifel  
Graphic creation : Abracabéa  
Photos credits : Aprifel, Shutterstock  
Printing : Gramagraf  
Digital : we use toners without heavy metals or toxic substances.



**EGEA** edition 9

International conference

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AGENCY FOR THE RESEARCH AND INFORMATION ON FRUIT AND VEGETABLES

[APRIFEL.COM](http://APRIFEL.COM)



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