2022

CHANGING BEHAVIOUR FROM POLICY TO TABLE

MOVING THE DIAL TOWARDS HEALTHY SUSTAINABLE DIETS

Proceedings from the MyNutriWeb e-symposium

celebrating the 25th anniversary of the Alpro Foundation

alpro foundation

knowledge in plant-based nutrition

Chairs:

Dr Gemma Newman [1]
Prof. Ian Rowland [2]

Speakers:

Cindy Schoumacher [3]
Dr Rosemary Green [4]
Prof. Tim Smits [5]
Dr Kate Laffan [6]
Dr Iina-Maija Ikonen [7]
Dr Christian Reynolds [8]
Dr Jess Haines [9]

[1] UK GP and the Plant Power Doctor – https://gemmanewman.com/
[2] Emeritus Prof. of Human Nutrition, University of Reading, UK
[3] EU policy officer, European Commission, DG Research & Innovation, Bioeconomy & Food Systems
[4] Associate Professor in Sustainability, The London School of Hygiene and Tropical Medicine, UK
[5] Professor in Persuasion & marketing communication, University Leuven, Belgium
[6] Assistant Prof. in Behavioural Science, University College Dublin, Ireland
[7] Assistant Professor (Lecturer) in Marketing, School of Management, University of Bath, UK
[8] Senior Lecturer, Centre for Food Policy, City University, London, UK
[9] Professor of Applied Nutrition, University of Guelph, Canada

Editor:

Sue Baic [7]
Stephanie De Vriese [8]

[8] Freelance registered dietitain, UK
[8] Board of Directors of Alpro Foundation

Produced in collaboration with

MyNutriWeb
Expert nutrition and health learning
https://mynutriweb.com/

Experts in nutrition, health and communications with over 20 years' experience empowering professionals, through online learning. MyNutriWeb provides CPD-accredited live and on-demand learning presenting the latest scientific evidence and everyday practice.

Date: January 2022

CONTENT

EXECUTIVE SUMMARY

- Food systems have considerable influence on health and environment as well as the economy, cultural and socio-economic factors. To achieve health and environmental sustainable targets, substantial changes are needed in the way we farm, produce, transport, package, retail and advertise food as well as in consumer dietary behaviour
- Reductions in the intake of animal food sources and avoidable food waste are critical together with a shift towards more healthy plant-based eating
- Favourable trends in food consumption towards this are appearing across the globe, but the pace of change is slow. Innovative, evidence-based strategies and government policies are essential to further shift the dial towards diets that can sustain both human and planetary health

INTRODUCTION

The hot topic of translating policy into practice for more sustainable diets was the theme of this symposium to commemorate 25 years of the Alpro Foundation (www.alprofoundation.org). It was held at a particularly pertinent time during the week after the UN global warming conference (COP 26). Insightful presentations were delivered by seven leading experts from Europe and North America, to explore policies, along with scientific insights into how to nudge people into new habits. Topics included ways of communicating with consumers about healthier, more sustainable diets; labelling, and the role of the food environment.

Chairing the symposium were, **Professor Ian Rowland** from the University of Reading and chair of the Alpro Foundation Scientific advisory board, together with **GP Gemma Newman**, the Plant Power Doctor. In their opening remarks, they reminded the audience of the significant role our food systems play with regard to achieving health and environmental policy goals, highlighting that around 30% of all global greenhouse gas (GHG) emissions are attributed to how we produce, consume, prepare and dispose of food and drinks.[1]

POLICIES FOR ACHIEVING HEALTHY SUSTAINABLE DIETS

THE EUROPEAN GREEN DEAL, ALTERNATIVE PROTEINS AND DIETARY SHIFT

In the opening session **Ms Cindy Schoumacher**, EU Policy Officer at the Healthy Planet Directorate of the European Commission, DG Research and Innovation (DG RTD), **set the scene by summarising the European Green Deal and highlighting the Farm to Fork strategy for a fair, healthy and environmentally sustainable food system**.

This strategy includes:

- Quantitative targets on proportions of organic farming
- Goals for reducing the use of pesticides, antimicrobials and nutrient losses
- Qualitative targets on food waste prevention and shifts in food consumption patterns

She explained how sustainable food systems need to consider **economic** and **social dimensions** such as accessibility and affordability alongside environmental sustainability to be effective.[2]

Research and innovation are important enablers of the strategy for transition, but **diets need to remain safe**, **nutritious** and of **high quality** in the shift towards more plant-based diets. For example, there is a range of existing projects underway for the development and testing of **alternative protein sources with lower environmental footprints** under the **Horizon 2020 programme**.

These include:

- Protein-rich crops and legumes
- Fungi
- Insects
- Microalgae and other marine-based sources

Ms Schoumacher outlined current work focussing on the Horizon Europe funding stream and the EU Food 2030 policy framework for widening participation, strengthening research and future-proofing nutrition and food systems.[3]

Aspects to consider in assessing new alternative protein food products to meat and dairy include health (safety, allergenicity and bioavailability) alongside drivers and barriers of dietary choices in addition to the environmental footprint.

With regard to the successful promotion of alternative proteins and dairy to drive consumer acceptability and trust, it is important to optimise level of awareness of the innovation through education and communication.

Ms Schoumacher urged the audience to let the Commission, DG RTD, know about the urgent research and innovation gaps on alternative proteins and dietary shift and to look at the ongoing calls for proposals in the Horizon Europe work programmes.[3,4]

Key points

- Research and innovation are key enablers of the transition towards more sustainable diets for health and environment
- Alternative protein sources have great potential to help shift consumer diets
- Education and communication about innovation are important for building consumer acceptability and trust

INFOGRAPHIC SUMMARISING THE SPEAKER'S PRESENTATION.
PRODUCED BY MYNUTRIWEB 2021.

CLICK HERE

WATCH THE PRESENTATION

WHERE ARE WE NOW? SUSTAINABILITY GAPS IN THE UK AND EU

Continuing the theme of environmental policy, **Dr Rosie Green**, Associate Professor in Sustainability, Nutrition and Health at the London School of Hygiene & Tropical Medicine, illustrated how pressures from food systems are steadily increasing over time with impacts **going beyond carbon footprints and GHG emissions to encompass a wide range of environmental factors**. (See figure 1)[5-12]

She highlighted the potential impacts of climate change on food security by reducing cereal yields and nutritional quality.[13,14]

Changes are needed in both food production and dietary behaviour, but this had only been addressed briefly in the recent COP26 summit. In particular, many countries will need to:[15]

- Reduce red meat and dairy food intakes
- Reduce intake of starchy vegetables
- Increase intakes of fruit, vegetables, legumes and wholegrains

Most dietary consumption patterns within the EU are substantially different to those needed to achieve environmental targets.[16]

Dr Green continued by exploring the **UK as a case** study of research and policy on changing diets. Modelling studies show **adherence to the national food-based dietary guidelines** (the Eatwell Guide) would offer **substantial benefits for both health and the environment** (including carbon emissions and water use) but at present **only 0.1% of the population achieve them**.[17]

As part of the **Climate Change Act Framework** to **reduce UK GHG emissions to net zero by 2050**, **substantial reductions in animal protein and dairy consumption are required.** Although red meat intakes are declining, much of this is replaced with poultry which has other associated environmental impacts including deforestation and air pollution. Dairy intake is also declining slowly but intakes of fruit and vegetables remain well below recommended levels.[17]

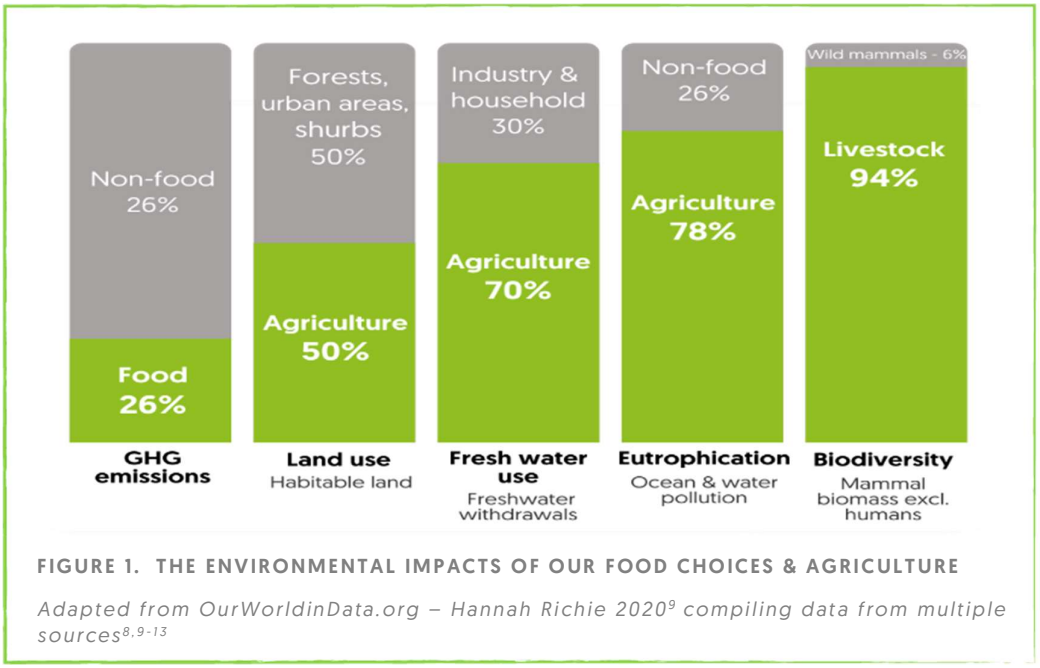


FIGURE 1. THE ENVIRONMENTAL IMPACTS OF OUR FOOD CHOICES & AGRICULTURE

Adapted from OurWorldinData.org – Hannah Richie 2020[9] compiling data from multiple sources[8,9-13]

It appears likely that a **combination of policy factors** such as taxation, subsidies and increased intakes of alternatives to animal protein will be needed to meet targets. These will have benefits and trade-offs for different measures of impact for the environment, health, economics and animal welfare.

Dr Green ended her session by focusing on **UK fruit and vegetable** showing how intakes are currently well below recommended levels. Patterns of consumption have changed dramatically over the past 40 years with a lower domestic contribution to the supply and around **78% of fruit and vegetables imported from abroad**.[18]

The reliance on imports from climate vulnerable countries could negatively affect availability, price and consumption in future. An important consideration in the strategy to improve both health and environmental impacts may therefore be to look at including an emphasis for inclusion of varieties produced domestically.[19]

Key points

- Existing food systems need to change radically if we are to meet climate targets, ensure the future resilience of the food supply and promote health
- Some of this transformation will need to come from changing dietary behaviour and should consider a variety of environmental impacts beyond the carbon footprint
- Dietary modelling has shown changes need to involve the adoption of a more healthful plant-based diet together with consideration of how we source foods such as fruit and vegetables

INFOGRAPHIC SUMMARISING THE SPEAKER'S PRESENTATION.
PRODUCED BY MYNUTRIWEB 2021.

CLICK HERE

WATCH THE PRESENTATION

MOVING FROM POLICY TO PRACTICE

PERSUASION AND NUDGING TOWARDS HEALTHIER DIETS: BASICS AND PITFALLS

Tim Smits, Professor of Persuasion and Marketing Communication at Leuven University, Belgium, began by reminding us that **much of dietary behaviour is driven by subtle cues at the unconscious level**. His work has shown how images of suggested serving size depicted on the front of pack influences the amount served and eaten, leading to potential overconsumption of foods and excess food waste with subsequent impacts on both health and the environment.[20-22]

Other potential influences on attitude and behaviour that can help shift diets to be more sustainable were discussed, and Tim highlighted the important distinction between different approaches to behaviour change:[23]

- **System 1 effects**: approaches addressing persuasion and nudges in behaviour which can have a cumulative impact with multiple small but repeated exposures
- **System 2 effects**: approaches addressing legislation and educational campaigns which are not always received by consumers in the way professionals hope they will be

Recent systematic reviews and meta-analyses of published studies show **advertising and marketing of food affects eating behaviours, particularly in children**. This has important implications for policy action to reduce exposure to unhealthy food advertising.[23,24]

Professor Smits summarised his research, on the **unconscious bias from social media in shaping adolescent eating patterns**.[25-27] Flemish adolescents were asked to take screenshots of food images they encountered on their social media platforms for a week. Analysis revealed that adolescents were most exposed to messages of non-core, less healthy and paid for or branded foods, often with excessively large portion sizes.

This work has also shown that **less healthy foods are often communicated via high volume, descriptive messages that promote excessive portion sizes whereas healthy foods are usually communicated via lower volume messages** that are **often less engaging** and require conscious processing.

Clearly, **the impact of social media on adolescents' food attitudes and eating habits cannot be underestimated**. This provides an opportunity for professionals to influence the promotion of core foods to reach out to consumers in novel and more personal ways.

Professor Smits illustrated the dilemmas of how we can change behaviour including consideration of how food imagery should be regulated to support sustainable consumption patterns. There is a challenge in the current food system in shifting behaviour towards greater intake of healthier foods and a need to raise awareness of the subliminal messages from media of all types.

Key points

- Shifting behaviour and attitudes towards sustainable diets needs to consider the role of unconscious thought processes which are influenced by marketing images in the media
- Approaches addressing persuasion and nudges, as well as marketing, provide an opportunity for professionals to influence the promotion of healthy foods and reach out to consumers in novel and more personal ways

INFOGRAPHIC SUMMARISING THE SPEAKER'S PRESENTATION.
PRODUCED BY MYNUTRIWEB 2021.

CLICK HERE

WATCH THE PRESENTATION

ENCOURAGING BEHAVIOURAL SHIFTS TOWARDS SUSTAINABLE DIETS: UNDERSTANDING INTENTION BEHAVIOUR GAPS

Dr Kate Laffan, from University College in Dublin, continued with the theme of behavioural change. She reported on polls across EU countries which suggest that **although most consumers were not inclined to change animal protein consumption, around 1 in 3 said they intended to reduce meat intake in the future**. Consumers gave a range of reasons for intended change including health, animal welfare, cost and environmental impacts. (See figure 2)[28,29]

However, it is increasingly clear that planned dietary change does not always convert into action.

Dr Laffan suggests that a variety of factors may correlate with these "intention behaviour gaps" including:

- **Physical** (where people are)
- **Temporal** (meal type and day of the week)
- **Social** (who people are with)
- **Mental** (antecedent state and the self-reported decision factors that matter most in the moment)

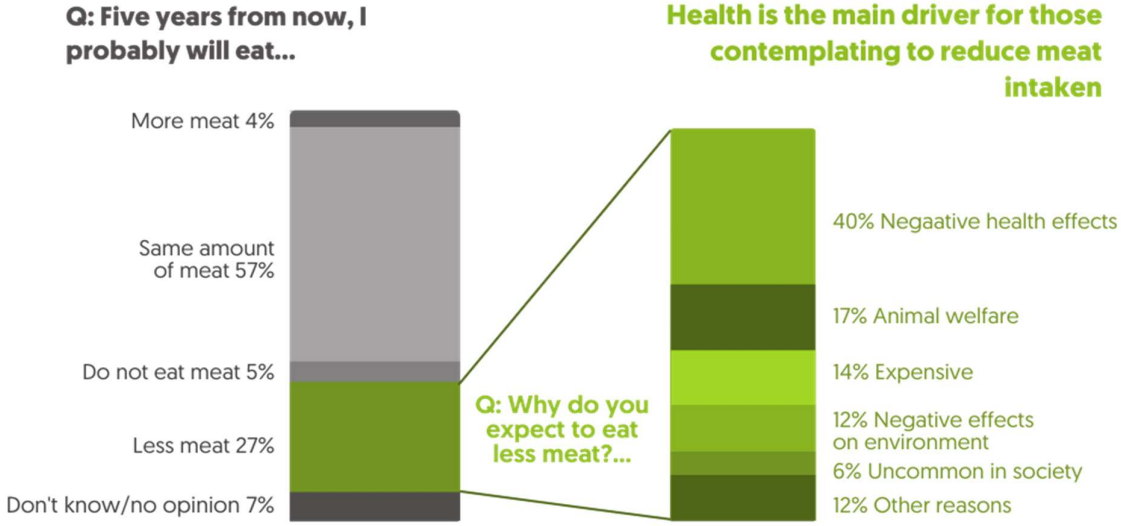


FIGURE 2. INTENSIONS TO CHANGE MEAT CONSUMPTION IN EUROPEAN CONSUMERS

Adapted from: ING 2017, European consumer poll (n=13,00)[28]

Do you intent to reduce your consumption of meat in the coming four weeks?

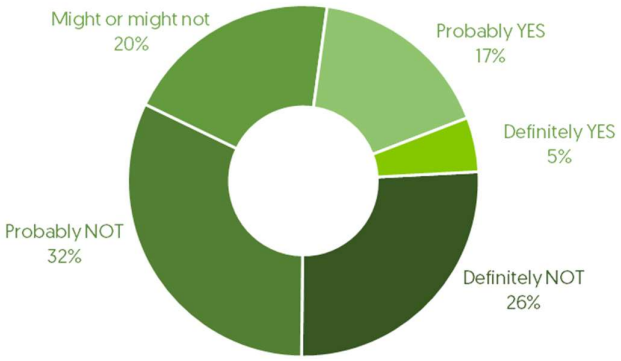


FIGURE 3. INTENSIONS TO REDUCE MEAT CONSUMPTION IN 1,316 UK ADULTS

Do you intent to reduce your consumption of dairy in the coming four weeks?

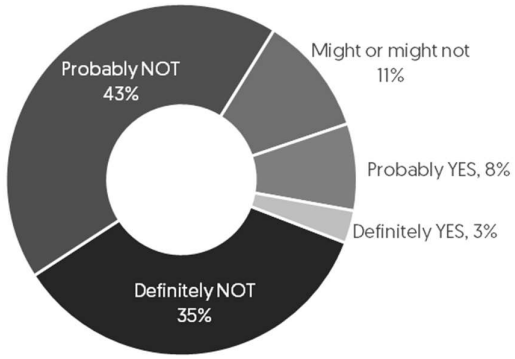


FIGURE 4. INTENSIONS TO REDUCE DAIRY CONSUMPTION IN 1,433 UK ADULTS

PRELIMINARY FINDINGS FROM DR LAFFAN'S CURRENT RESEARCH[30]

Dr Laffan presented her current and on-going work funded by the Alpro Foundation, a **longitudinal study of UK adults**. She has explored **how to promote dietary change by examining the context in which consumption of meat and dairy occurs and the related correlates of intention behaviour gaps for the adoption of healthier and more sustainable diets**.

Her research uses the Day Reconstruction Method (DRM) which she has adapted along with her co-authors (Dr Leonhard Lades and Professor Liam Delaney), to provide a systematic reconstruction of a day to explore how people's dietary behaviour relate to a variety of individual and situational factors.[30,31]

Preliminary findings show **22%** of the sample **intends to reduce meat** (primarily red meat) with intention being **strongest in women** and **older adults**. (See figure 3)

Intention behaviour gaps in meat consumption are most likely to emerge:

- On Sundays
- When eating out at a restaurant or café
- At dinner time
- When eating with others (especially friends)
- When consumers are hungry in the lead up to a meal

Intention behaviour gaps in dairy consumption were most likely to emerge:

- At breakfast
- When they were unhappy or bored and when they were thirsty

Formulating specific plans to deal with high-risk situations when intention behaviour gaps emerge

- When convenience, nutrition and environment are not key decision factors
- When taste and craving Are reported as decision factors in the moment

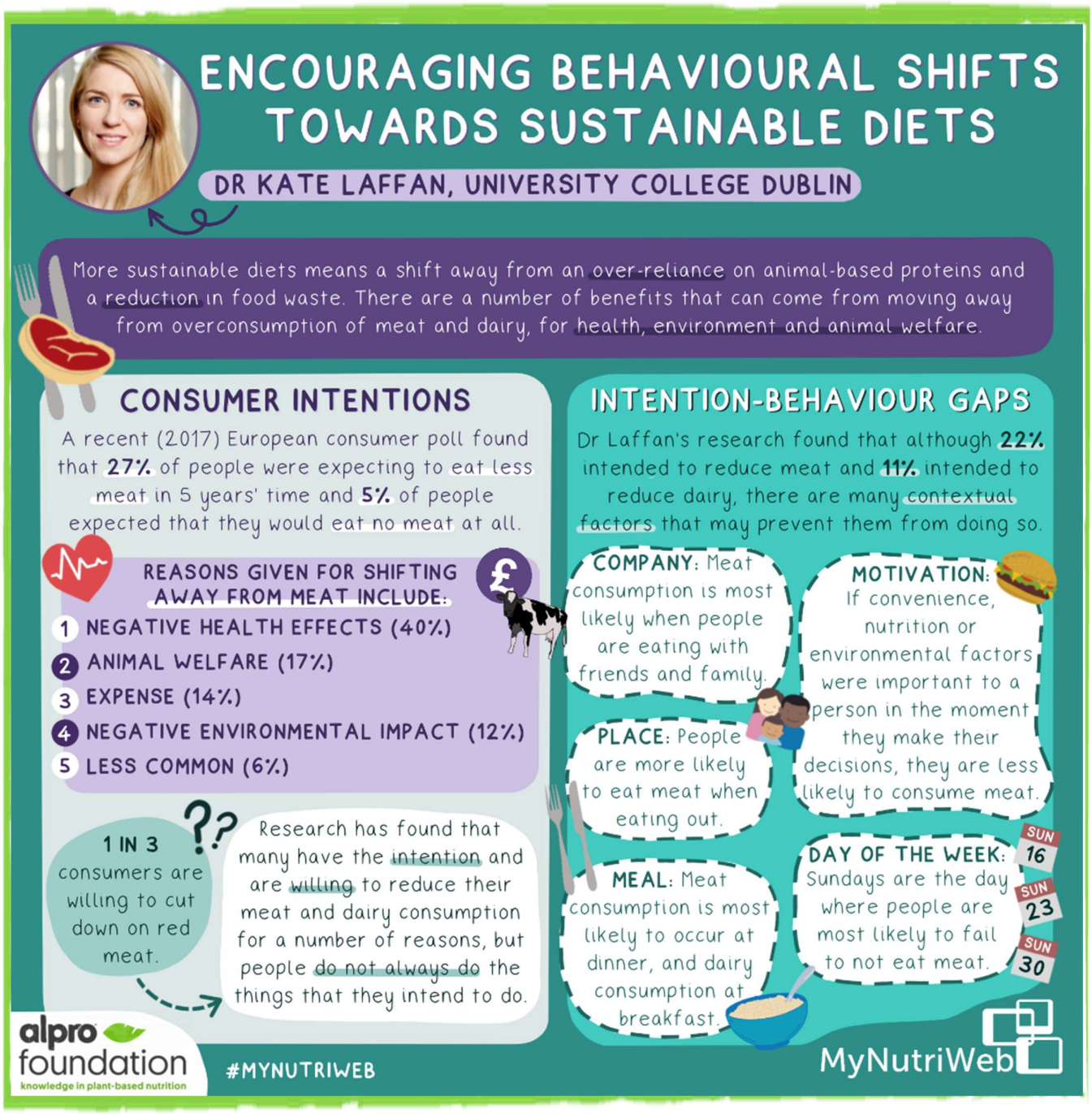
Around **11%** of those sampled **intended to reduce dairy** intake and these intentions were more prevalent among **young adults** (see figure 4).

Dairy intake was found to be less closely associated with contextual factors than meat consumption.

(their danger spots) and ways to avoid or handle these could be useful in helping consumers who want to convert their intentions into action. Her future work in this area will further explore interactions between individual and contextual characteristics that lead to intention behaviour gaps, and more closely examine the roles of the social context and craving.[32]

Key points

- Across Europe a proportion of consumers are looking to reduce their consumption of both meat and dairy
- Central to helping consumers achieve this intended dietary change is an understanding of the context in which meat and dairy consumption occur and a better understanding of the correlates for intention behaviour gaps



INFOGRAPHIC SUMMARISING THE SPEAKER'S PRESENTATION. MYNUTRIWEB 2021.

CLICK HERE

WATCH THE PRESENTATION

FRONT-OF-PACK NUTRITION LABELLING AND HEALTHY FOOD CHOICE: OPPORTUNITIES AND DIFFICULTIES

Dr Iina-Maija Ikonen, Lecturer in Marketing from the University of Bath, explored the opportunities from **"point of purchase" information on food products for influencing and supporting consumers in following healthy and environmentally sustainable diets**.

A **variety of formats for providing front-of-pack** (FOP) food labelling is in use worldwide including both voluntary and mandatory approaches, but use continues to be controversial.

Many countries are struggling to find the best method to implement FOP labelling for their populations and it **remains unclear which is the best method with a trade-off between ease of use and detail provided**.

"**Reductive**" FOP labels are the most objective format but offer little or no degree of context and meaning of the information for the consumer. "**Interpretive**" FOP labels add context and meaning either on specific nutrients or as an overall summary for a food product (usually relating to health) but can lead to oversimplification of the nutrient science and interpretation for individual needs.[33-35] (See figure 5)

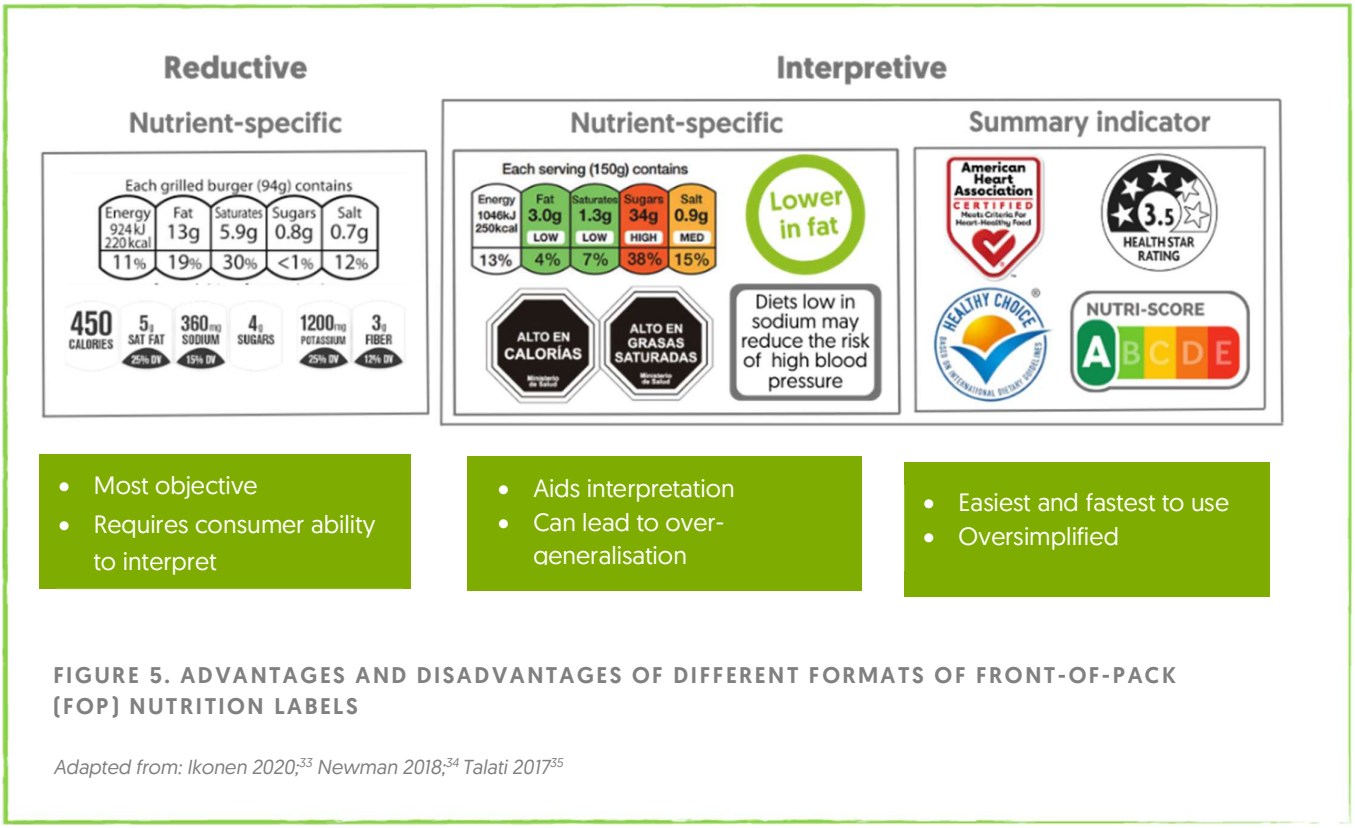


FIGURE 5. ADVANTAGES AND DISADVANTAGES OF DIFFERENT FORMATS OF FRONT-OF-PACK (FOP) NUTRITION LABELS

Adapted from: Ikonen 2020;[33] Newman 2018;[34] Talati 2017[35]

To date, **limited research** has been carried out to assess individual responses in the use and **effectiveness of FOP labelling**, but findings suggest:

- Individual variations in motivation, knowledge and goals have some influence on effectiveness with consumers using health as a driver better able to identify suitable options[32]
- Consumers are generally better able to identify healthier options when FOP labels are present, but the effect on choice are much smaller. Positive logos and warning labels help consumers choose between options within food categories[36,37]
- Existing expectations on the healthfulness of a food influence the interpretation of nutrition information. For example, the same information on a cereal or nut bar may be interpreted more favourably than that on a biscuit or cake[38]

Despite these behavioural influences, **research has shown minimal effects on actual consumption of foods**. For FOP labelling to be effective there needs to be not only a focus on increasing consumer health motivation but also **a consideration of other drivers for food choice**.[39-41] (See figure 6)

For instance, there is a **risk that food labelling focussing on health alone** may inadvertently lead **consumers to believe these foods will be less tasty** or **more expensive** even where this is not objectively true. A range of other aspects of healthy food may also need to be promoted to effectively influence choice. FOP labelling relating to sustainability such as local production or efficient use of imperfect quality fruit and vegetables for reducing food waste may also be of value. However, as for FOP nutrition labelling, these will be most effective if they relate to the drivers and motivation of consumers.

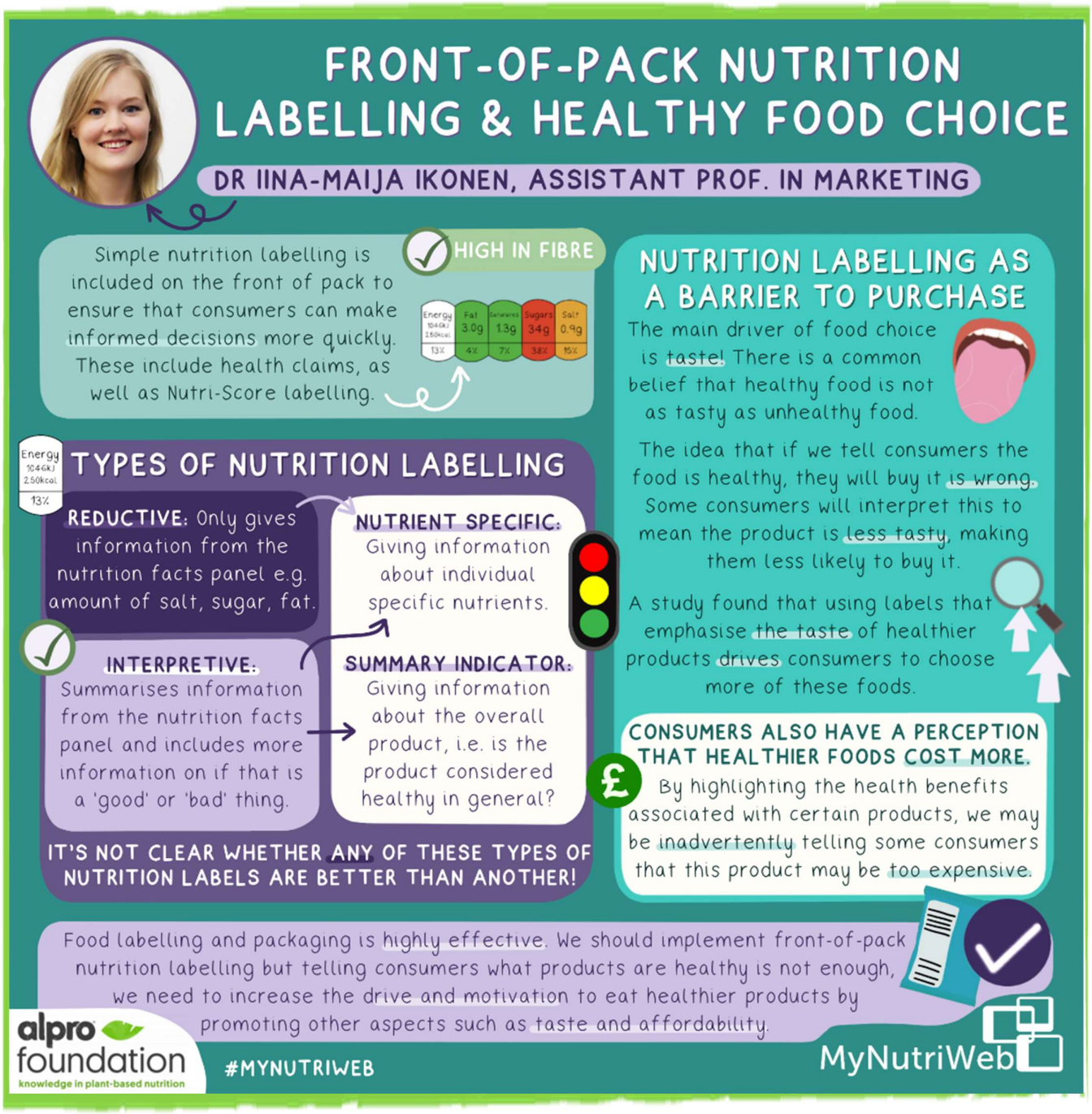
.

FIGURE 6. THE MULTIPLE DRIVERS OF FOOD CHOICE

Adapted from: EUFIC 2006[41]

Key points

- The effects of FOP nutrition labels used at the point of purchase on actual food consumption appear to be small and there is no current consensus on the best way to implement them
- FOP labelling does however have the potential to help consumers choose healthy and environmentally sustainable diets, especially where attitudes and beliefs around these aspects are key drivers for food choice
- Increasing health motivation is important as a driver for food choice, but it is important to consider the influence of other drivers such as taste and affordability of food



INFOGRAPHIC SUMMARISING THE SPEAKER'S PRESENTATION.
PRODUCED BY MYNUTRIWEB 2021.

CLICK HERE

WATCH THE PRESENTATION

COMMUNICATING THE ENVIRONMENTAL IMPACT OF RECIPES: THE POTENTIAL OF APPS AND ECOLABELS

Dr Christian Reynolds, Senior Lecturer in the Centre for Food Policy at City University, London, continued the theme of consumer-facing information around sustainability.

We now have a wealth of open access ingredient level data for the impact of foods on the environment.[8,42] In optimisation studies such as EAT Lancet,[15] dietary guidance is given on food level e.g., increasing fruit and vegetables and decreasing animal proteins. However, in practice consumers typically think about food in terms of meals and recipes**. Consideration of the environmental impacts of how we cook food is important and information on sustainable recipes may be a way to help and empower practical consumer behaviour change**.[43,44]

Dr Reynolds and colleagues, in research supported by the Alpro Foundation, are using a new technology to calculate **environmental impacts of digital recipes** using ingredient level data to create practical tools for consumer communication.[44-46]

Analysis of recipes shows unsurprisingly that **plant-based recipes have a lower environmental footprint** than those with animal products (e.g., tofu vs beef recipes). However, generalisations become more difficult within more complex food categories such as salads and cakes depending on the type of ingredients used.

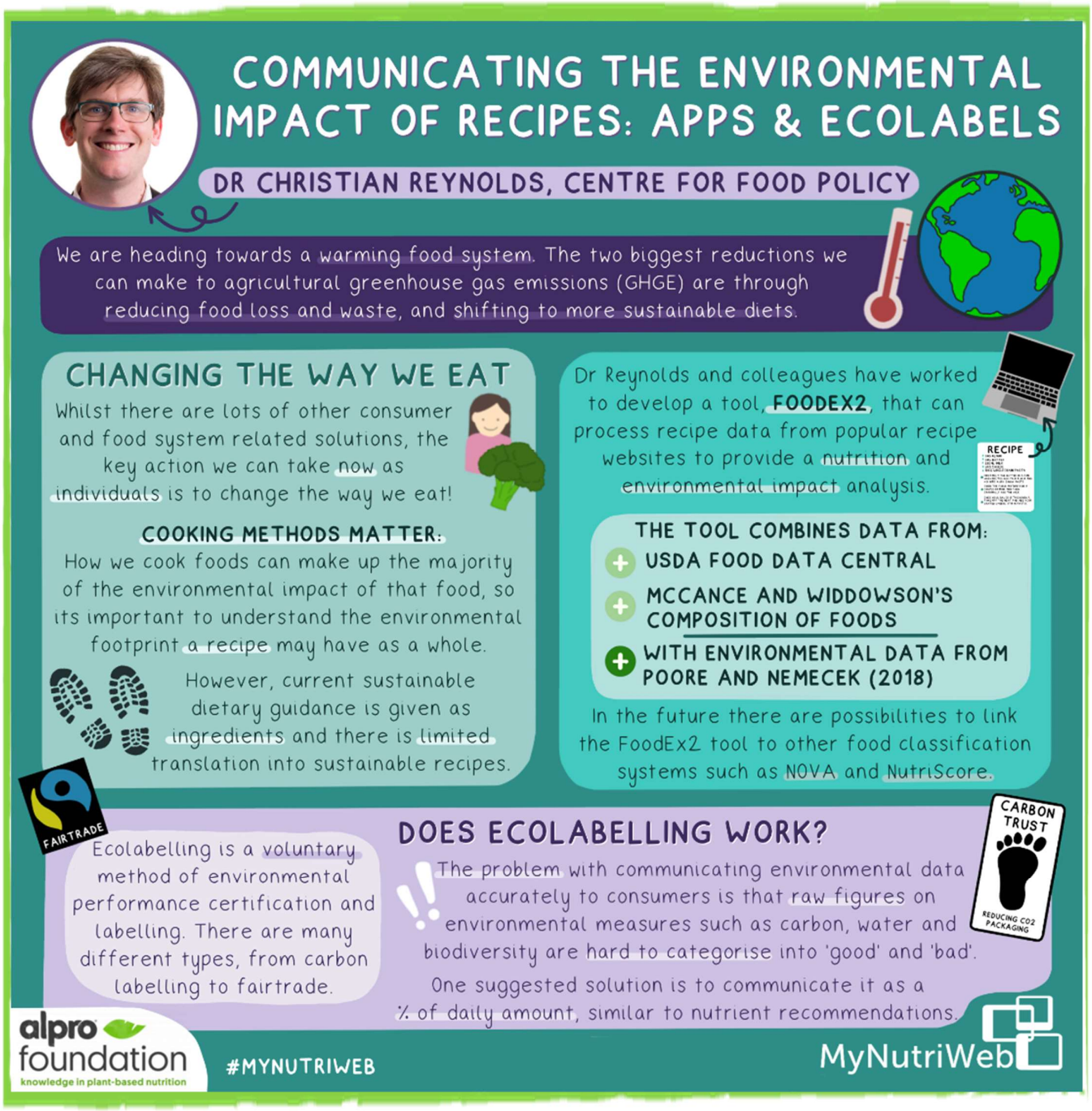
As with FOP food labelling, difficulties arise in considering how best to communicate this information to consumers. One solution is to communicate carbon footprint per serving as a percentage of the daily amount of GHG emissions.

Another way to cut through this complexity may be via the use of environmental performance certification and labelling such as ecolabels. In much the same way as FOP labelling, multiple formats are possible using a range of designs and scoring systems.[47]

There is a clear need to develop reference values for the classification of sustainability to enable standardised ecolabelling and to expand tools to include other metrics such as water use and biodiversity impacts. Ecolabels could be used to highlight sustainable recipes in multiple consumer settings including menus in hospitality alongside FOP and allergen labelling.

Key points

- When planning diets consumers think in terms of recipes and portions rather than individual foods
- It is now possible to calculate the environmental impacts of recipes using a variety of apps and technological solutions but communicating this information to the public is challenging
- Ecolabels could have a great potential to be used in dietary advice to shift eating patterns but finding the best method of communicating this complex information needs to be addressed in future research



INFOGRAPHIC SUMMARISING THE SPEAKER'S PRESENTATION.
PRODUCED BY MYNUTRIWEB 2021.

CLICK HERE

WATCH THE PRESENTATION

PROMOTING SUSTAINABLE HEALTHY EATING AMONG FAMILIES: FOCUS ON FOOD WASTE

In the final session **Dr Jess Haines**, Professor of Applied Nutrition at the University of Guelph, Canada, returned to the important environmental consideration of food waste. She shared the stark statistic that **around 30% of avoidable food waste in the United States occurs at the household level**.[48]

She presented preliminary findings from 100 families enrolled in the Family Food Skills Study.[49] Families were found to have an average of 3kg of avoidable food waste per week with associated economic, nutritional and environmental impacts. (See figure 7).

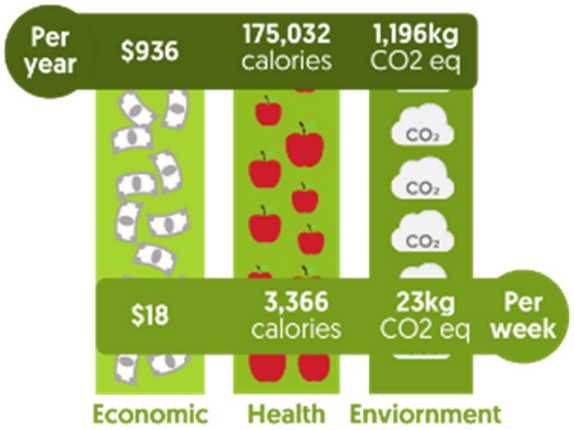


FIGURE 7. MULTIPLE VALUATIONS OF AVOIDABLE HOUSEHOLD FOOD WASTE IN THE FAMILY FOOD SKILLS STUDY

Adapted from: von Massow[49]

Dr Haines presented interesting data showing the **most wasted foods were fruits and vegetables** followed by **bread** and **cereals** with lower levels of animal foods being wasted. (See figure 8).As with FOP food labelling, difficulties arise in considering how best to communicate this information to consumers. One solution is to communicate carbon footprint per serving as a percentage of the daily amount of GHG emissions.

She showed how consumer-level approaches involving the whole family can be effective in reducing household food waste.[50] Her team partnered with Love Food Hate Waste Canada (https://lovefoodhatewaste.ca/) to create and implement a home-based family-based intervention covering **3 key behaviours**:

1. Meal planning including shopping with a list and portion control
2. Efficient food storage
3. Using leftovers and understanding date labels

The intervention included the provision of **practical tools** such as **recipes**, **cooking classes**, a vegetable scrubber to reduce peelings and an "**eat first container**" to help efficient cycling of food by date.[50]

This food waste intervention proved **acceptable and popular with families**, **increased awareness** of key issues and **led to significant reductions in waste**, especially in fruit and vegetables. Future work will look at whether this type of intervention can be applied to larger population groups and explore the degree to which behaviour change is maintained after the intervention.

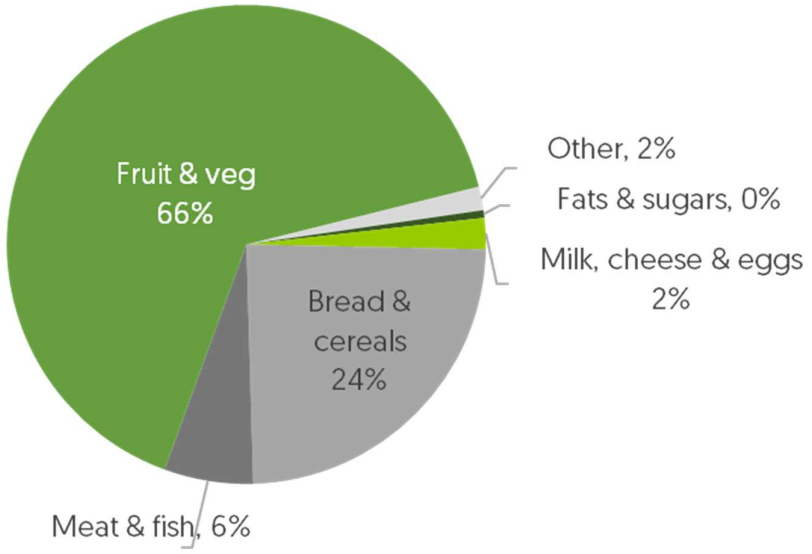


FIGURE 8. PROPORTIONS OF AVOIDABLE HOUSEHOLD FOOD WASTE BY CATEGORY IN THE FAMILY FOOD SKILLS STUDY

Adapted from: UN Environmental Programme[48]

Key points

- Food waste is an important consideration for healthier and more sustainable diets. In many developed countries, a significant proportion of avoidable food waste occurs at household level: in the United States this is around 30%
- Interventions dealing with the planning, storage and preparation of food have potential to substantially reduce household food waste

Further information about this research, including the recipe book used, can be found at: www.guelphfamilyhealthstudy.com

INFOGRAPHIC SUMMARISING THE SPEAKER'S PRESENTATION.
PRODUCED BY MYNUTRIWEB 2021.

CLICK HERE

WATCH THE PRESENTATION

CONCLUSION

In their concluding remarks the chairs thanked the speakers for the wealth of innovative and evidence-based take home messages. They had shown the **value of collaboration between different organisations and branches of science** as well as the **importance of practical translation of messages around food purchasing, cooking and taste to reach those population groups most resistant to change**.

Although some shifts in dietary behaviour have been made, the chairs emphasised the consistent message from many of the speakers that **not only do diets need to shift significantly more towards healthful plant-based foods, but there are many challenges to overcome for consumers**. For individuals to make the shift, focusing on **taste cues** and providing **simple and easy solutions** is paramount.

Of particular concern for the chairs, was the **power of (social) media to influence food choices and excess intakes** especially with regard to children and adolescents. With consumers unable to distinguish between the different quality of the sources of information, it is important for credible communicators to be more active in the media space.

The chairs ended with **a call to action to all professionals to help drive the shift** in individuals' dietary behaviour as one of the most effective and accessible actions to influence both health and the environment.

REFERENCES

1. Crippa M, Solazzo E, Guizzardi D, et al. Food systems are responsible for a third of global anthropogenic GHG emissions. Nat Food. 2021; 2: 198–209. doi.org/10.1038/s43016-021-00225-9
2. The EU Commission. Farm to fork strategy for a fair, healthy and environmentally friendly food system. https://ec.europa.eu/food/system/files/2020-05/f2f_action-plan_2020_strategy-info_en.pdf. Published 2020. Accessed 30 November 2021
3. Food 2030 pathways for action - Research and innovation policy as a driver for sustainable, healthy and inclusive food systems. https://ec.europa.eu/info/publications/food-2030-pathways-action-research-and-innovation-policy-driver-sustainable-healthy-and-inclusive-food-systems_en Published 2020.Accessed 30 November 2021
4. Building alternative protein-friendly, sustainable and healthy food environments. https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl6-2022-farm2fork-01-07 Published 2020.Accessed November 25, 2021
5. Randers J, Rockstrom J, Stoknes P, et al . Achieving the 17 sustainable development goals within nine planetary boundaries. Global Sustainability. 2019 ; 2: E24. doi:10.1017/sus.2019.22
6. Sandstrom V, Valin H, Kristin T, et al. The role of trade in the greenhouse gas footprints of EU diets. World Food Security. 2018;19:48-55. doi.org/10.1016/j.gfs.2018.08.007.
7. Springmann M, Clark M, Mason-D'Croz D, et al. Options for keeping the food system within environmental limits. Nature. 2018;562:519–525. doi.org/10.1038/s41586-018-0594-0
8. Poore J and Nemecek T. Reducing food's environmental impacts through producers and consumers. Science. 2018;360(6392):987-992. doi.org/10.1126/science.aaq0216
9. Ritchie H and Roser M. Environmental Impacts of Food Production. OurWorldInData.org 2020. https://ourworldindata.org/environmental-impacts-of-food
10. Bar-On YM, Phillips R and Milo R. The biomass distribution on Earth. Proceedings of the National Academy of Sciences. 2018;115(25):6506-6511
11. IUCN Red List. Summary statistics. IUCN 2019. https://www.iucnredlist.org/resources/summary-statistics#Summary%20Tables
12. The UN Food and Agriculture Organization (FAO) global statistics on crop and food production, supply chains, and food available for human consumption
13. World Bank. World development report: development and climate change. E-book. World bank, 2010. Accessed 30 November 2021. https://elibrary.worldbank.org/doi/pdf/10.1596/978-0-8213-7987-5
14. Myers SS, Smith MR, Guth S, et al. Climate Change and Global Food Systems: potential impacts on food security and undernutrition. Annu Rev Public Health. 2017;38:259-277. doi: 10.1146/annurev-publhealth-031816-044356
15. Willett W, Rockström J, Loken B, et al. Food in the anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet. 2019;393(10170):447-492. doi: 10.1016/S0140-6736(18)31788-4
16. Springmann M, Spajic L, Clark M A, et al. The healthiness and sustainability of national and global food based dietary guidelines: modelling study BMJ. 2020;370:m2322. doi:10.1136/bmj.m2322
17. Scheelbeek P, Green R, Papier K , et al. Health impacts and environmental footprints of diets that meet the Eatwell Guide recommendations: analyses of multiple UK studies. BMJ Open. 2020;10:e037554. doi: 10.1136/bmjopen-2020-037554
18. Scheelbeek P, Moss C, Kastner T et al. UK's fruit and vegetable supply increasingly dependent on imports from climate vulnerable producing countries. Nat Food. 2020;705-712. doi: 10.1038/s43016-020-00179-4

19. Colombo P, Milner J, Scheelbeek P, et al. Pathways to “5-a-day”: modeling the health impacts and environmental footprints of meeting the target for fruit and vegetable intake in the United Kingdom. Am J Clin Nutr. 2021;114(2):530–539. https://doi.org/10.1093/ajcn/nqab076

20. Neyens E, Aerts G and Smits T. The impact of image-size manipulation and sugar content on children's cereal consumption. Appetite. 2015;95:152-157. doi: 10.1016/j.appet.2015.07.003

21. Aerts G and Smits T. Do depicted suggestions of portion size on-pack impact how much (un)healthy food children consume? Int J Consum Stud. 2018;43(3):237-244 .doi: 10.1111/ijcs.12503

22. Aerts G and Smits T. The package size effect: how package size affects young children’s consumption of snacks differing in sweetness. Food Qual Prefer. 2017;60:72-80. doi: 10.1016/j.foodqual.2017.03.015

23. Kahneman D. Thinking, fast and slow. New York: Farrar, Straus and Giroux;2011

24. Boyland E J, Nolan S, Kelly B, et al. Advertising as a cue to consume: A systematic review and meta-analysis of the effects of acute exposure to unhealthy food and non-alcoholic beverage advertising on intake in children and adults. AJCN. 2016;103(2):519-533. doi: 10.3945/ajcn.115.120022

25. Qutteina Y, De Backer C and Smits T. Media food marketing and eating outcomes among pre-adolescents and adolescents: A systematic review and meta-analysis. Obes Rev. 2019;20(12):1708-1719. doi: 10.1111/obr.12929

26. Qutteina Y, Hallez L, Mennes N, et al. What do adolescents see on social media? A diary study of food marketing images on social media. Front Psychol. 2019;10:2637. doi: 10.3389/fpsyg.2019.02637

27. Qutteina Y, Hallez L, Raedschelders M, et al. Food for teens: how social media is associated with adolescent eating outcomes. Public Health Nutr. 2021;1-13. doi: 10.1017/S1368980021003116. Epub ahead of print

28. ING Economics Department. The protein shift: will Europeans change their diet. ING 2017. https://www.ing.nl/media/ING_EBZ_-the-protein-shift-will-Europeans-change-their-diet_tcm162-136110.pdf. Accessed 30 November 2021

29. BEUC - The European Consumer Organisation. One bite at a time: consumers and the transition to sustainable food. BEUC; Brussels 2020. Accessed 30 November 2021. https://www.beuc.eu/publications/one-bite-time-consumers-and-transition-sustainable-food.

30. Laffan K, Delaney L and Lades L. Preliminary findings presented at the symposium in November. Encouraging behavioural shifts towards sustainable diets through understanding and closing intention-behaviour gaps in the consumption of animal-based proteins. In progress.

31. Kahneman D, Krueger AB, Schkade DA, et al. A survey method for characterizing daily life experience: the day reconstruction method. Science. 2004;306(5702):1776-80. doi: 10.1126/science.1103572

32. Mind the Gap. Exploring intention-behaviour gaps in environmentally significant consumption behaviours. Mind the Gap (project website). Accessed 30 November 2021. https://www.mindthegapresearch.com/

33. Ikonen I, Sotgiu F, Aydinli A and Verlegh PWJ. Consumer effects of front-of-package nutrition labelling: an interdisciplinary meta-analysis. J Acad Mark Sc. 2020;48(2):360-383. doi.org/10.1007/s11747-019-00663-9

34. Newman CL, Burton S, Andrews JC, et al. Marketers’ use of alternative front-of-package nutrition symbols: An examination of effects on product evaluations. J Acad Mark Sc. 2018;46(3):453-476. doi.org/10.1007/s11747-017-0568-z

35. Talati Z, Norman R, Pettigrew S, et al. The impact of interpretive and reductive front-of-pack labels on food choice and willingness to pay, Int J Behav Nutr Phys Act. 2017; 14(1):171-181. Doi:org/10.1186/s12966-017-0628-2

36. Maesen S, Lamey L, ter Braak A, et al. Going healthy: how product characteristics influence the sales impact of front-of-pack health symbols. J Acad Mark Sc. 2022;50:108-130. doi. https://doi.org/10.1007/s11747-021-00796-w

37. Taillie L, Bercholz M, Popkin B, et al. Changes in food purchases after the Chilean policies on food labelling, marketing, and sales in schools: a before and after study. The Lancet Planetary

Health. 2021;5(8):e526-e533. doi: 10.1016/S2542-5196(21)00172-8

38. Ikonen I & Buehler F. Category bias and front-of-package labelling. Author communication as yet unpublished. A working paper awaiting submission

39. Andrews JC, Netemeyer R, Burton S, et al. What consumers actually know: The role of objective knowledge in processing stop sign and traffic light front-of-pack nutrition labels. J Bus Res 2021;128(1):140-155. doi: 10.1016/j.jbusres.2021.01.036

40. Haws K, Walker Reczek R & Sample, K. Healthy diets make empty wallets: the healthy = expensive intuition. J Cons Res. 2017;43(6):992-1002. DOI 10.1093/jcr/ucw078

41. EUFIC . The factors that influence our food choices. EUFIC 2006. Accessed 30 November 2021. https://www.eufic.org/en/healthy-living/article/the-determinants-of-food-choice

42. Clark MA, Springmann M, Hill J, et al. Multiple health and environmental impacts of foods. Proc Nat Acad Sci. 2019;116(46):23357-23362. https://doi.org/10.1073/pnas.1906908116

43. Frankowska A, Rivera XS, Bridle S, et al. Impacts of home cooking methods and appliances on the GHG emissions of food. Nat Food. 2020;1:787–791. https://doi.org/10.1038/s43016-020-00200-w

44. Take a bite out of climate change. Accessed 30 November 2021. https://www.takeabitecc.org/.

45. van Erp M, Reynolds C, Maynard D, et al. Using natural language processing and artificial intelligence to explore the nutrition and sustainability of recipes and food. Front Artif Intell. 2021;3:article 621577. https://doi.org/10.3389/frai.2020.621577.

46. Communicating the environmental impact of plant-based recipes. Accessed 30 November 2021. https://dhlab-nl.github.io/sustainable-recipes/

47. Bunge AC, Wickramasinghe K, Renzella J, et al. Sustainable food profiling models to inform the development of food labels that account for nutrition and the environment: a systematic review. The Lancet Planetary Health. 2021;5(11):e818-e826. https://doi.org/10.1016/S2542-5196(21)00231-X

48. UN Environment Programme. Worldwide Food Waste. Accessed 25 November 2021 https://www.unep.org/thinkeatsave/get-informed/worldwide-food-waste..

49. von Massow M, Parizeau K, Gallant M, et al. Valuing the multiple impacts of household food waste. Front Nutr. 2019;6:143. doi.org/10.3389/fnut.2019.00143

50. Laila A, Gallant M, Bain M, et al. Feasibility and acceptability of the Weeknight Supper Savers study, a pilot food literacy and food waste intervention. Canadian Nutrition Society Annual Conference. May 7, 2021. Virtual conference, Canada. https://conference2021.cns-scn.ca/speakers/view_details/21

MORE INFORMATION ON

WWW.ALPROFOUNDATION.ORG

LinkedIn@AlproFoundation

alpro foundation

knowledge in plant-based nutrition