



FCRN

Changing what we eat

A call for research & action on widespread adoption of sustainable healthy eating

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Summary

The multiple environmental, health and societal challenges caused by, and facing the food system are well known – and the need to act acknowledged.

This report has four main aims. **First:** to make the case for a serious policy and research focus on food *consumption*. We show that a focus on *sustainable healthy eating*, as much as on efficient food production, is essential if we are to meet our public health and environmental goals, reduce the economic costs of unsustainability and ensure a more resilient food system. **Second** to set out a proposed research agenda: effective action on shifting to more sustainable, healthier eating patterns requires more, and more integrative knowledge. Three broad themes are identified. **Third** to emphasise the need for greater policy leadership on, and commitment, to advancing action on sustainable healthy eating. And **fourth**, to invite collaboration with the Food Climate Research Network in driving forward investment and research activity in this area.

Our document is based on the discussions and insights generated at a two day workshop held on 22-23 April 2014 and organised by the Food Climate Research Network (FCRN). This event, supported by the Wellcome Trust and the UK's multi-agency Global Food Security Programme, brought together 34 stakeholders, including academic researchers from diverse disciplines, and representatives from the business and NGO communities, to help shape a policy relevant research agenda for action on sustainable healthy eating. This document has been written in collaboration with all these participants (see Appendix 1). For more about the FCRN see Appendix 4.

1. Sustainable healthy eating: the case for action

The food system is degrading the environment upon which its future depends. At the same time, political and economic inequities in the system mean that people are not being fed effectively, with around half the global population underfed, overfed or suffering from micronutrient deficiencies. If we are to address our environmental problems, adapt to climate change, reduce the economic costs of unsustainability and create a more food-secure, fairer and nutritionally adequate food future then the current system needs to adapt and change.

While this much is recognised, the political response so far has been inadequate while most industry efforts have focused on improving the efficiency of production: on producing more food, with less environmental impact. Evidence is mounting that **while ‘production-side’ approaches may be necessary, they do not represent a sufficient response to the multifaceted nature of the problem.** To address a wide range of environmental concerns effectively, while tackling inequities in the system and the twin problems of dietary insufficiency and excess, **three additional approaches are needed.**

First there is a need to create a more equitable balance of power in the food system, both at the national and international levels.

Second, we need to reduce the amount of food that is lost or wasted along the whole supply chain.

Third, eating patterns will need to change. What, and how much we eat is directly related to what, how much and in what ways it is produced. We therefore need to consume more ‘sustainably’ – we need to adopt eating patterns that have lower environmental impacts, that deliver broader societal benefits, and support good health.

Our focus here is on sustainable healthy eating patterns. We need action from policy and business where we know enough to warrant intervention, and investment in relevant research in areas where it would be helpful to know more.

2. An agenda for research on sustainable healthy eating

Much evidence already exists and there is more that policy can do on the basis of existing evidence. But we also recognise that to advance effective action on shifting to healthier, more sustainable eating patterns there is a need for more knowledge in three key interconnected research areas. These are:

1. **Research theme 1: What are healthy sustainable eating patterns?** What is the direction we need to be going in as regards consumption and underpinning production/provisioning practices? What does ‘good’ look like?
2. **Research theme 2: How do we eat now, why, and what are the health and sustainability implications?** What social, economic and political influences shape current consumption and production patterns? Which of them have the most critical implications for health and sustainability? How do practices differ by population groups and why?
3. **Research theme 3: How do we achieve change?** Drawing upon insights gained from Research Themes 1 and 2, can we formulate, design and test appropriate strategies aimed at shifting consumption in more sustainable and healthy directions?

3. The need for policy leadership and support

While a growing number of stakeholders are engaged one way or another in the sustainable healthy eating agenda, there is no clear strategic framework for this. Action is necessarily a shared responsibility spread across industry, academics, civil society and consumers as well as government – but there is an urgent need for **policy leadership to set the direction of travel and to provide support**. Linked to this there is a need for **policy-backed investment in research** focused on systematically exploring and advancing knowledge and practice in this area.

4. An invitation to collaborate on next steps

To conclude: the sustainable healthy eating issue needs to be taken seriously; substantial support is needed to build a robust, policy relevant evidence base; and leadership, backed by resources is urgently needed.

We present this document as a first attempt to catalyse action. It should be seen, however, as work in progress and as such we invite: **a.** comments and criticisms on the report’s substance; **b.** suggestions as to what should happen next; and **c.** your views on how diverse stakeholders might collaborate. Given the interdisciplinary and intersectoral nature of the research and policy challenge, it is proposed that **d.** the **Food Climate Research Network**, with its track record of engaging diverse stakeholders, acts as a convening organisation for coordinating and advancing activity in this area. **We welcome your views on all these matters.**

Main report

The case for research & policy action on defining & shifting to sustainable healthy eating patterns

The report is structured as follows: **Part 1** provides background, summarising the purpose, focus and make-up of the workshop on which this report is based. **Part 2**, its main substance, is divided into three parts: **2.a.** summarises the rationale for focusing on sustainable healthy eating, **2.b.** articulates what we feel to be the priority areas for research while **2.c.** makes the case for leadership in this area. **Part 3** actively invites others to comment on our proposals and to suggest what the Food Climate Research Network and other actors might do next, with a view to building momentum for work in this area and stimulating the necessary research and action.

1. Background

In April 2014 the [Food Climate Research Network](#) organised a workshop, funded and hosted by the [Wellcome Trust](#) with additional support from the UK's multi-agency [Global Food Security programme](#). Its aim was to bring together academic researchers spanning diverse disciplines, as well as stakeholders from business & civil society to **a.** consider the state of thinking on sustainable healthy eating and food systems and **b.** to begin scoping a research agenda on how our eating practices might be shifted in healthier and more sustainable directions. Particular emphasis was placed on animal source foods as an exemplar of an important, yet difficult aspect of our consumption practices, and one with both positive and negative implications for health and sustainability.

The workshop spanned two days and involved 34 participants listed in Appendix 1. The workshop addressed the following questions (see Appendix 3 for a detailed agenda):

- How do different disciplines and sectors think about consumption practices and behaviours – about why people consume the way they do?
- How do these disciplines and sectors think about altering consumption - what theories of change do they use, implicitly or explicitly?
- What values and frames underpin these approaches?
- What evidence do they bring in support of their approach? How robust is that evidence?
- Where do these different disciplinary approaches agree and where do they disagree? What are the knowledge and evidence gaps?
- And, on the basis of all these discussions, can we define what research is needed that would help us (begin to) answer the following key question: “How can mainstream eating patterns in a high income country such as the UK become healthier and more sustainable?”

Preliminary discussion papers written for the workshop participants, as well as the workshop presentations can all be found on the FCRN website [here](#).

This report is based on the discussions arising from the workshop and has been produced in collaboration with workshop participants.

2. Sustainable healthy eating: The case for action

2.a. Why is a focus on *consumption* necessary?

The food system today is undermining the environment upon which future food security depends. It contributes to some 20-30% of anthropogenic greenhouse gas (GHG) emissions, is the leading cause of deforestation, land and soil degradation and biodiversity loss; accounts for 70% of all human water use and is a major source of water pollution (Smith and Bustamente 2014; Vermeulen et al 2012).^{1 2} Unsustainable fishing practices deplete aquatic species beyond recovery and cause wider disruption to the marine environment. Post farm-gate, considerable energy is used in the manufacture, transport, retailing, cooking and refrigeration of foods. In high income countries these activities contribute to about 50% of the food system's total GHG emissions. Food is also wasted: one estimate puts the figure at between 30-50% of all food produced globally. This loss not only undermines food security but represents a waste of land, water and other inputs as well as the generation of 'unnecessary' emissions (IMECHE 2013; Bond et al 2013).^{3 4} Compounding the situation, the impacts of climatic and environmental change are making food production more difficult and unpredictable in many regions of the world, affecting the poor and disenfranchised disproportionately.

Both crop and livestock production generate environmental costs and associated policy challenges. Recent years, however, have seen the focus of attention falling particularly on livestock, borne of the realisation that the rearing of livestock for meat, eggs and dairy products generates some 15% of total global GHG emissions and utilises 70% of agricultural land, including a third of arable land, potentially also competing with crop production needs (Gerber et al 2013,FAO 2006).^{5 6} Grazing livestock, and less directly, the production of feed crops are together key agricultural drivers of deforestation, biodiversity loss and land degradation.

While the food system generates enough food energy for our population of over 7 billion it does not deliver adequate and affordable nutrition for all. Political and economic inequities give rise to a situation in which about half the global population is inadequately nourished, once the combined burdens of hunger, micronutrient deficiencies and obesity are taken into account (Swinburn et al 2011; FAO 2011; Tulchinsky 2010).^{7 8 9} And although food production and distribution contributes economic value both at a national and international level, the distribution of that value is not even. Many of the world's 1.3 billion smallholders and landless agricultural workers live on or below the poverty line of less than \$2/day. (World Bank 2008; Renwick et al 2012).^{10 11}

¹ Smith and Bustamente (2014). Chapter 11: Agriculture, Forestry and Other Land Use (AFOLU) in Climate Change 2014: Mitigation of Climate Change. Intergovernmental Panel on Climate Change, Geneva.

² Vermeulen, S. J., Campbell, B. M., Ingram, J. S.I. (2012). Climate Change and Food Systems. Annual Review of Environment and Resources, 37, 195-222. DOI: 10.1146/annurev-environ-020411-130608

³ IMECHE (2013). *Global food: Waste not, want not*, Institute of Mechanical Engineers, London, UK

⁴ Bond, M., Meacham, T., Bhunoo, R. and Benton, T.G. (2013) *Food waste within global food systems*. A Global Food Security report (www.foodsecurity.ac.uk)

⁵ Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. & Tempio, G. 2013. Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Food and Agriculture Organization of the United Nations (FAO), Rome.

⁶ FAO (2006) *Livestock's Long Shadow*. Rome: Food and Agriculture Organisation

⁷ Swinburn, B.A., Sacks, G., Hall, K.D., McPherson, K., Finegood, D.T., Moodie, M.L., Gortmaker, S.L., 2011. The global obesity pandemic: shaped by global drivers and local environments. *The Lancet* 378 (9793), 804e814.

⁸ FAO, 2011. *The State of Food Insecurity in the World*. Food and Agriculture Organisation, Rome.

⁹ Tulchinsky TH. 2010. Micronutrient deficiency conditions: global health issues. *Public Health Reviews*; 32:243-255.

¹⁰ World Bank, *World Development Report 2008: Agriculture for Development*, Washington DC, 2007, 135 – 136.

¹¹ Renwick A, Islam M and Thomson S (2012). *Power in Agriculture*. Resources, Economics and Politics. A Report Prepared for the Oxford Farming Conference, UK

The determinants of poverty, hunger, inequity combined with the interacting problems of climate change and environmental degradation are complex and the approaches needed to prevent or mitigate these concerns are necessarily diverse and complicated. Without action however, all these problems are set to become acute. As our global population grows, urbanises and becomes wealthier, it is demanding more resource-intensive foods – notably animal products - potentially stressing the environment further. From a health perspective, while animal products are rich in protein and micronutrients, and as such have a positive nutritional role to play, they are also implicated – alongside other foods and lifestyle changes - in growing problems of obesity and chronic diseases.

These problems are well recognised. Policy makers, NGOs and the business community all agree that if we are to address our environmental problems, adapt to climate change and create a more food secure, nutritionally adequate and resilient food future, the current system needs to change.

There is less agreement on what, exactly, should be done. From a policy and industry perspective most of the focus is on improving the environmental efficiency of production so as to produce more food with less impact. This entails using inputs more effectively, managing resource use and addressing deforestation. However, mounting evidence finds that **while ‘production-side’ approaches may be necessary, they do not represent a sufficient response to the multifaceted nature of the problem.** Given the complexity of the ‘food problem’ and the dynamic interplays of cause and effect, simple technical solutions may not always be appropriate or effective. Hence the need for systemic approaches that draw upon the insights and expertise of diverse disciplines and sectors.

To make a start, therefore, at addressing this wide range of environmental concerns sufficiently while tackling inequities in the system and the twin problems of dietary insufficiency and excess, **three additional approaches are needed.**

First there is a need to address power imbalances in the food system both at national and international levels: growing more food will not solve all the problems of affordability, access and poor nutritional quality. Essential actions will therefore include efforts to address price and subsidy distortions, incentivise the production of more nutritious foods, support and empower poor producers and consumers, agree better working conditions and fairer terms of trade, and- in many regions of the world- improve transport, storage and market infrastructure.

Second, we need to reduce the amount of food that is lost or wasted along the supply chain.

Third, eating patterns will also need to change. What, and how much we eat is directly related to what, how much and in what ways it is produced. We therefore need to consume more ‘sustainably’ – adopt eating patterns that have lower environmental impacts, that deliver broader societal benefits, and are healthier.

The drive for sustainable food consumption and underpinning food systems is the focus of this call to attention. We need action – from policy makers and business - where we know enough to warrant intervention, and investment in relevant research in areas where it would be helpful to know more.

2.b. Research priorities to support sustainable healthy eating

The workshop participants concluded that, if we are to advance effective action there is a need for more knowledge in three key and interconnected areas. The particular focus here is on high income contexts, such as the UK, although there may be scope for adapting this approach to the needs and contexts of middle and low income countries.

1. **Research theme 1: What are healthy sustainable eating patterns?** What is the direction we need to be going in as regards consumption and underpinning production/provisioning practices? What does ‘good’ look like?
2. **Research theme 2: How do we eat now, why, and what are the health and sustainability implications?** What social, economic and political influences shape current consumption and production patterns? Which of them have the most critical implications for health and sustainability? How do practices differ by population groups and why?
3. **Research theme 3: How do we achieve change?** Drawing upon insights gained from Research Themes 1 and 2, can we formulate, design and test appropriate strategies aimed at shifting consumption in more healthy and sustainable directions?

Put more simply: Where do we want to go? Where are we now and why? How do we get to where we want to go?

The remainder of this paper scopes out these questions in more detail. Before starting, two points are worth mentioning.

First - our call for more research in this area **does not preclude action now and should not be used to justify policy inaction**. As summarised below and discussed in more detail elsewhere (Garnett 2014a)¹² there is much we already know about the broad characteristics of sustainable healthy eating patterns. The imperative therefore is to implement, monitor and assess the impact of practical changes that have potential for ‘scaling up’ and that themselves support the case for broad policy direction.

Second, while the focus of our call here is on sustainable healthy *eating* - since this tends to be neglected by policy and research funders as well as the traditional disciplines of nutrition, medicine and health – **this clearly needs to be underpinned by a focus on sustainable provisioning**. **Provisioning is here defined** as the set of practices, processes, structures and relationships that together constitute the production, manufacturing, distribution, procurement and marketing of food. The health and sustainability of what we eat is the outcome not only of what sorts of foods we eat but also *how* those foods are produced. The ‘*how*’ includes not just the physical inputs to production but also the distribution of effort, benefits and risks among the actors involved. The interconnectedness between provisioning and consumption is implicit in everything that follows.

RESEARCH THEME 1: What are sustainable healthy eating patterns?

The last few years have seen a proliferation of research focusing on understanding the relationship between the nutrition of individuals and populations, and the environment.

In summary, studies generally find that low environmental impact eating patterns - as measured by GHG emissions and land use - are centred on a diverse range of minimally processed tubers, whole grains, legumes and fruits and vegetables, with animal products eaten sparingly. They also find that such consumption patterns can be consistent with good nutrition, although there may be some trade offs and general principles may not be applicable to all individuals (Vanham et al 2013; Stehfest et al 2009; Van Kernebeek et al 2014; Van Dooren and Kramer 2012; Brunner et al 2009; Pairotti et al 2014).^{13 14 15 16 17 18} The lower the intake of meat, fish and dairy, the lower the GHG and land use

¹² Garnett T (2014). *What is a sustainable healthy diet? A discussion paper*. Food Climate Research Network – Oxford Martin School – ECI - CCAFS

¹³ Vanham D, Hoekstra A Y, Bidoglio G (2013). Potential water saving through changes in European diets Environment International 6145–56

¹⁴ Stehfest E, Bouwman L, van Vuuren DP et al.(2009) Climate benefits of changing diet. Climatic Change, 95, 1–2.

impact – but since these foods are also rich in essential micronutrients, the more important it will be that reduced meat intakes are compensated for with increases in the quantity and diversity of whole grains, legumes, fruits and vegetables, to ensure adequate nutritional intakes (WWF 2011; Van Dooren and Kramer 2011).^{19 20} Box 1 sets out the current state of knowledge on the key characteristics of lower GHG impact, and healthier eating patterns.

Box 1: Characteristics of healthier and less GHG- and land-intensive eating patterns

Healthier diets with lower GHG and land use impacts have the following characteristics:

- Diversity – a wide variety of foods eaten
- Balance achieved between energy intake and energy needs
- Based around: minimally processed tubers and whole grains; legumes; fruits and vegetables - particularly those that are field grown, ‘robust’ (less prone to spoilage) and less requiring of rapid and more energy-intensive transport modes
- Meat eaten sparingly if at all – and all animal parts consumed
- Dairy products or alternatives eaten in moderation eg. fortified milk substitutes and other foods rich in calcium and micronutrients
- Unsalted seeds and nuts
- Small quantities of fish and aquatic products sourced from certified fisheries
- Very limited consumption of foods high in fat, sugar or salt and low in micronutrients e.g. crisps, confectionery, sugary drinks
- Oils and fats with a beneficial Omega 3:6 ratio such as rapeseed and olive oil
- Tap water in preference to other beverages – particularly soft drinks

Note that these are general principles: more detailed guidelines will need to take account of cultural and geographical contexts as well as individual nutritional requirements and preferences.

Adapted from reviews summarised in Garnett 2014a

These findings have been broadly incorporated into the recommendations of a few forward-thinking official policy bodies. These include the Health Council of the Netherlands, Sweden’s National Food Agency and the recently published 2012 New Nordic Recommendations (HCN 2011; National Food Agency, undated; Norden 2014),^{21 22 23} all of whom have published advice for those interested in consuming healthily and with low environmental impacts. For the development of the 2015 United States Dietary Guidelines, a sub-committee has been set up to focus on food systems sustainability, with a call for public comment on various issues, including the development of appropriate metrics.

These emerging guidelines are broad and different population groups differ in their nutritional requirements and preferences. But in general, eating patterns consistent with these recommendations

¹⁵ Pairotti M B, Cerutti A K, Martini F, Vesce E, Padovan D and Beltramo R (2014) Energy consumption and GHG emission of the Mediterranean diet: a systemic assessment using a hybrid LCA-IO method. *Journal of Cleaner Production* xxx 1e10

¹⁶ Van Kernebeek HRJ, Oosting SJ, Feskens EJM, Gerber PJ and De Boer IJM (2014). The effect of nutritional quality on comparing environmental impacts of human diets, *Journal of Cleaner Production* xxx 1e-12

¹⁷ Van Dooren C and Kramer G (2012). Food patterns and dietary recommendations in Spain, France and Sweden, www.livewellforlife.eu

¹⁸ Brunner E, Jones P, Friel S, Bartley M. Fish, human health and marine ecosystem health: policies in collision. 2009. *International Journal of Epidemiology*,; 38: 93-100

¹⁹ WWF UK (2011). *Livewell: a balance of healthy and sustainable food choices*, WWF UK, Godalming, UK

²⁰ Van Dooren C and Kramer G (2012). Food patterns and dietary recommendations in Spain, France and Sweden, www.livewellforlife.eu

²¹ Norden (2014). *Nordic Nutrition Recommendations 2012*, Nordic Council of Ministers, Copenhagen

²² National Food Agency, undated <http://www.slv.se/en-gb/Group1/Food-and-environment/>

²³ HCN (2011) Guidelines for a healthy diet: the ecological perspective. Health Council of the Netherlands, The Hague

represent an improvement in the way most people in developed (and developing) countries, on average, eat. **We know enough to engage with consumers, producers and manufacturers and opinion formers in developing supportive policy action in this area.** There is already considerable policy action in relation to nutrition (WCRF, undated)²⁴ and while the history here is crowded with failures as much as successes, the lessons learned could be used to inform policies that encourage more sustainable as well as healthier eating patterns.

There are, however, still uncertainties. To support policy action, at least five critically important areas need investigating if we are to have a more complete and accurate definition of sustainable eating – one that encompasses a range of environmental priorities and also incorporates the non-environmental dimensions of sustainability including cost, culturally acceptability, nutrition and health.

First, there is the choice of environmental metrics to consider. How is impact and progress to be measured? Taking meat as an example, there are many positives and negatives associated with different livestock types and production systems. A narrow focus on GHG intensity, say, might suggest that poultry meat is preferable to ruminant meat. On the other hand an emphasis on the conservation of traditional landscapes, or the use of rainfall rather than irrigation water may suggest a role in some contexts for extensively reared sheep and cattle. Much therefore depends not only on the system under analysis, on how environmental outcomes are prioritised (biodiversity, GHGs) but also, critically, on one's assumptions about demand trajectories – on whether growth in demand is seen to be inevitable or modifiable, given the right policies and actions – since these have an influence on land availability and how we might want to utilise it.

Second, analysis of what constitutes low environmental impact eating patterns (leaving aside nutrition and other non-environmental sustainability considerations) needs to take account of not what we eat, but *how* these foods are produced. The method of production - including both the farming systems and the level of processing - will determine how much food output is possible for a given level of environmental cost. Adding on health dimensions will require greater understanding of the relationship between production method - including crop and livestock breeds, use of inputs, level of post-farm gate processing and so forth - and the food's nutritional and other health properties. For example there is already work underway that uses agri-technology to investigate ways of enhancing the nutritional properties of fruit and vegetables (UKTI 2014; Northcroft 2014).²⁵ ²⁶ For livestock, different systems of production will have differing impacts on animal welfare as well as on the nutritional content of animal products.

Third, while knowledge of the link between nutritional objectives and environmental sustainability is advancing, we know far less about the complex relationship between these and other social and economic goals. However environmentally low-impact it might look on paper, a system of production and consumption that does not reward producers fairly, that consumers cannot afford or accept, or that causes suffering to farmed animals cannot be judged to be sustainable. Yet many social and economic objectives are extremely hard to agree upon and measure. For example: food should be affordable, but does that mean that cheap food is good? Is small scale or large scale production to be preferred? Is equality an end in itself or can its pursuit stifle innovation? How do we define good animal welfare? There may well be synergies between nutritional adequacy, environmental sustainability, ethical and certain economic goals, but there are also likely to be trade-offs. How should these be balanced? How do we trade off present gains against future losses, and vice versa? How far can or should we actually alter the workings of the global economy – is radical change actually possible or desirable?

²⁴ http://www.wcrf.org/policy_public_affairs/nourishing_framework/

²⁵ UKTI (2014). Agri-tech in the UK: iInvestment opportunities. UK Trade and Investment. <https://www.gov.uk/government/publications/agri-tech-in-the-uk-investment-opportunities/agri-tech-in-the-uk-investment-opportunities>

²⁶ Northcroft D (2014). *How farming can learn from science to optimise the nutritional value of food produced*. Arden Report, Nuffield Farming Scholarships Trust. http://www.nuffieldinternational.org/rep_pdf/1398327656David-Northcroft-2012-report.pdf

Fourth, there are rebound and leakage effects to consider. For example, if everyone in the UK were to consume along the lines suggested, this might lead to an overall reduction in environmental impacts – or it might not. In principle, UK producers could continue farming livestock and increase their exports - thereby increasing global availability, driving down prices and stimulating consumption. Or they may switch to producing other foods. Or they may exit the sector altogether. These are just hypothetical scenarios, but each potentially leads to different environmental and socio-economic consequences. This is an area that requires further research. It also underlines the point that production and consumption are linked, that food markets are now globalised and that food and eating patterns need to be seen in the context of broader consumption practices – from buying shoes to holidaying overseas - and their environmental impacts.

Fifth, most of the discourse on sustainable eating centres on high-income countries. Yet most of the growth in food-related environmental impacts from animal production and consumption, and most of the rise in obesity and chronic diseases, are taking place in developing countries, particularly in the rapidly industrialising and urbanising economies of South and South East Asia, South America and the Middle East. If we are to address the social, health and environmental problems inherent in our food system, then food consumption practices in these regions need to be sustainable. This adds to the sensitivity of the discussion given the historical responsibility of rich countries for the environmental problems we face today and for the inequities in the global food economy; and that, while obesity and chronic diseases are on the rise, the problems of hunger, malnutrition and food insecurity have by no means gone away. The challenge here is to consider how sustainable eating goals might interface with broader developmental and societal objectives, and more particularly how development might be oriented along lower impact, more nutritious pathways, so as to avoid the need for ‘retrofitting’ policies once the health and environmental damage has been done.

To summarise, our understanding of what ‘good’ looks like – the key elements of sustainable healthy patterns – is increasing by the day. There is sufficient evidence to justify the need to change the way we eat, and the beginnings of an evidence base that indicates the desired direction of travel. However, there is still much more we need to know. Priority issues for research here are likely to include a focus on the following:

Theme 1: Key research questions

What environmental, health, social and economic metrics do we need to develop to measure the sustainability of food systems and to monitor progress? How should we think about and choose among trade-offs across different objectives and at different spatial and temporal scales? How do we understand and manage rebound and leakage effects?

How does production method influence the sustainability and nutritional quality of foods?

What do sustainable healthy eating patterns look like in low and middle income countries?

How does the ‘sustainable healthy eating’ agenda narrowly defined sit within **broader sustainable production and consumption practices beyond the food arena?**

RESEARCH THEME 2: How do we eat now, why, and what are the health and sustainability implications?

Once we have worked out what environmentally sustainable, nutritious, affordable and equitable eating patterns look like – how do we create a supportive environment that encourages and enables providers (retailers, institutions, caterers) to provide it and people to eat it?

This is the key question that constitutes Research Theme 3. Answering it however requires us first to understand what and why we eat the way we do right now, and what the implications are. Therefore Research Theme 2 concerns itself with reviewing and synthesising the social, economic, psychological and other influences that shape the practices of food producers, manufacturers, distributors, retailers and consumers – both as individual entities and as interacting groups – and **identifying key influences that have an important bearing on health and sustainability.**

Advancing knowledge here requires analysis of current trends - what people eat and how this is changing – as well as the health, societal and environmental implications of those changes. It requires a review of the drivers underpinning current and changing consumption patterns at multiple levels and from multiple angles. Examples include: macro-economic drivers and policies; the balance of incentives and disincentives underpinning current food industry practices; the evolution of societal norms, routines, habits and ‘defaults’; the role of opinion formers and social networks; as well as individual preferences and genetic predispositions. We need also to consider how norms and patterns differ by socio-economic group, by ethnicity, by age, gender or region, and across time and space, and where and why we find both ‘positive’ and ‘negative’ deviation – why some groups consume more healthily or sustainability than the average, and others less so. We need to consider how practices differ when thinking about consumption at the individual, population group, institutional or societal level, and about the meanings we as *individuals*, as *groups* and as a *society* attach to foods that have particularly important implications for environmental sustainability or for health.

There is in fact a vast body of work on behaviours, consumption patterns and practices (Darnton 2008a; Darnton 2008b; Jackson 2004; Jackson 2005).^{27 28 29 30} Some of it is academic, concerned with theory or simply with understanding why people do what they do. There is also an extensive literature driven by government policy and public interest organisations and priorities, focusing on practices with implications for health (smoking, drug addiction, weight management), society (voting practices, organ donation) or the environment (transport, food waste, energy use). And then there is industry-led work: insights into people’s behaviours, motivations, habits and practices are central to the development of effective marketing strategies. Underpinning this, in the UK and many other developed countries can be found survey data which tracks and analyses current food consumption patterns, such as the National Diet and Nutrition Surveys, Family Food Surveys and so forth.

Stakeholders tend to consider the issues through their particular disciplinary or ideological lens and indeed the workshop discussions benefitted hugely from the insights of researchers who came at the issues from their diverse stand points. In addition to disciplinary bias, discussions about ‘behaviour’ or ‘practice’ and what to do about changing it are also strongly influenced by values and ideologies. This, among other things, gives rise to different views on where the locus of responsibility is seen to lie - with the individual or with the socio-economic system as a whole. Further discussion of these issues can be found in Garnett 2014b.³¹

While environmental and health policies to date span a range of approaches including taxes and standards, there has been a particularly strong focus on individual ‘behaviour.’ Interventions have tended to orient themselves around the provision of information, and on appeals to reason, and are based on the assumption that the individual makes conscious and rational decisions. However, not all

²⁷ Darnton A. 2008a. Behaviour Change Knowledge Review. Practical Guide: An overview of behaviour change models and their uses. Government Social Research Unit, UK

²⁸ Darnton A. 2008b. Behaviour Change Knowledge Review. Reference Report: An overview of behaviour change models and their uses. Government Social Research Unit, UK.

²⁹ Jackson, T. (2004) *Models of Mammon: A Cross-Disciplinary Survey in Pursuit of The “Sustainable Consumer”*, Working Paper Series, Nr 2004/1, Centre for Environmental Strategy, University of Surrey, Guildford, United Kingdom.

³⁰ Jackson T (2005). *Motivating Sustainable Consumption: a review of evidence on consumer behaviour and behavioural change. A report to the Sustainable Development Research Network*, Centre for Environmental Strategy, University of Surrey, Guildford, United Kingdom.

³¹ Garnett T (2014b). Shifting towards sustainable healthy diets: A discussion paper. Food Climate Research Network.

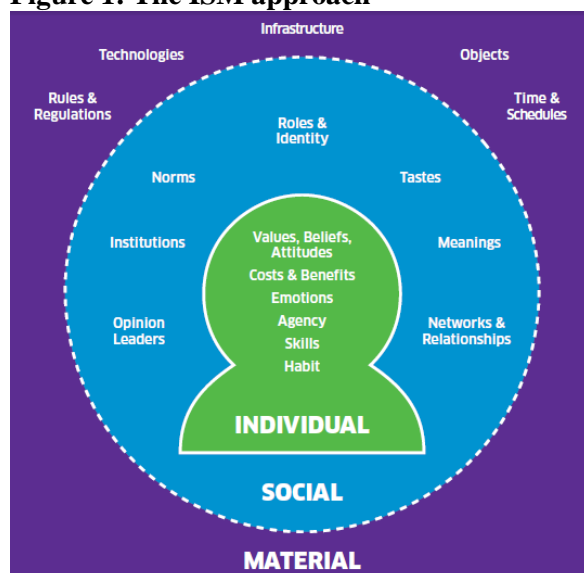
decisions may be conscious – habits, routines and external shaping influences play an important part – and decisions may or may not be ‘rational’ when judged in terms of health or environmental priorities. Attributes such as taste, convenience, ‘coolness’ or price may well be prioritised over these other considerations.

So far, these individualistic approaches have seen limited success. They have been challenged by theorists from other disciplines who point to the non-conscious influences on people’s individual ‘choices’ and more fundamentally to the way in which the physical and socio- economic structuring of society creates norms and defaults, locking people into certain practices and routines. They may also critique individualistic perspectives from an ethical perspective, arguing that these approaches unfairly place the blame on the individual – and often on the ‘irresponsible’ behaviour of the poorest and most vulnerable within society.

Individual-oriented approaches still have something to offer, but there is increasing recognition that a greater emphasis on social, economic and technological influences on consumption is needed, as is a shift of focus to the practices of groups and institutions rather than just the individual. More integrative approaches, that draw upon the insights of diverse disciplines offers potential. The experience of the UK’s Waste Resources Action Programme in successfully reducing household food waste is a practical case in point (Britton et al 2014).³²

From a theoretical perspective, the Individual, Social Material (ISM) model below (Darnton and Evans 2013)³³ provides an illustrative example of this more integrative approach, although there are others. Here, the *individual* remains present but the specific determinants of individual practices (emotions, knowledge, agency and so forth), are framed within a broader and dynamic *social* context (the networks, interpersonal relationships and opinion leaders that influence consumption norms) and more widely still within a *material* context – populated by, among other things, the rules and regulations that govern the supply, price and availability of foods and the functioning of markets, planning policies that determine the location of food outlets, the technologies that make certain production and consumption practices possible (refrigeration, for example) and the timings of a ‘normal’ day. Policies and politics arguably pervade and influence all three layers of context. Other models being explored more explicitly place the group at the centre of attention.

Figure 1: The ISM approach



Source: Darnton A and Evans D (2013). *Influencing behaviours: A technical guide to the ISM tool*, The Scottish Government.

³² Britton E, Brigdon A, Parry A and LeRoux S (2014) *Econometric modelling and household food waste*. Waste Resources Action Programme, Project number CFP101-008. UK.

³³ Darnton A and Evans D (2013). *Influencing behaviours: A technical guide to the ISM tool*, The Scottish Government.

What can we conclude so far? At present there is a large literature on consumption in general, including of food consumption, but it is somewhat inchoate. For a start much of the literature is discipline or 'issue' specific. A comprehensive and systematic understanding of how the insights of different disciplines intersect is largely lacking.

To start, therefore, there is a need for an integrative review of the social, cultural, economic and political influences on current food consumption, on emerging trends and analysis of the implications for health and sustainability in its broadest sense. Such an approach has been attempted in other country contexts, such as China (Garnett and Wilkes 2014)³⁴ – but a similar and much more fine-grained approach is necessary and possible for the UK. Such an approach will require the bringing together of disciplines and sectors to define the right questions and engage in practical policy relevant research.

Next, while there is a large literature on food consumption practices, on how these differ by population groups, and the implications for health, we know much less about all this in relation to the environment and other aspects of sustainability. We need more synthetic analysis that considers the implications of food provisioning and consumption practices for environmental and social sustainability and clearer analysis of how practices with implications for these dimensions relate to health. Where are the points of intersection? Can we identify win-win and lose-lose consumption/provisioning practices, habits, routines and norms? We also need to know more about populations that show 'positive' or 'negative' deviation from the average: why do some groups consume more or less sustainably and/or healthily than others? How do their food consumption practices interface with other activities with implications for health and sustainability, such as transport or home energy use? What can we learn from analysis of these groups and of what shapes their practices? Can we use these insights to devise strategies for changing mainstream consumption (Research Theme 3)?

In short, there is a need for a research programme that **a.** delivers a systematic understanding of the interlayered influences on food consumption and underpinning systems of food provisioning, at multiple scales and for different population groups; **b.** identifies influences with key implications for health and sustainability and **c.** identifies practices – among groups, individuals or institutions - that have particularly positive (or negative) health and sustainability characteristics. The individual research questions that might populate this agenda will be legion but are likely to fall into the following broad categories:

Theme 2: Key research questions

What influences food consumption and underpinning provisioning practices, and how is this changing?

- What are past and emerging trends in consumption (what people eat, how, when) over the last 20-30 years and what are the social, economic, environmental and other forces influencing these processes?
- How does all the above differ by economic status, ethnicity, gender, age, psychographic group and region?
- How and why are the underpinning food production, distribution, retailing and catering sectors changing? What are the emerging trends and what are the social, economic, environmental, technological and other influences on these?
- Who are the key actors (institutions, groups, individual opinion formers) who influence our consumption practices and supporting production processes?

³⁴ Garnett T and Wilkes A (2014). *Appetite for Change: Social, economic and environmental transformations in China's food system*. Examination of China's changing food system, the emerging socio-economic, health, environmental, socio-cultural trends and their shaping drivers; challenges for coming years. Food Climate Research Network – Oxford Martin School

Which of the current and emerging trends in production and consumption have particularly critical implications for health and sustainability? Analysis here will need to include:

- Eating patterns with strong impacts; production processes and practices with strong impacts
- Societal meanings, practices, norms and attitudes around foods and food practices that are particularly significant for health and/or sustainability
- How the structuring of time influences production and consumption practices and the impacts in turn for health and sustainability. On the production side examples might include: globalised supply chains and seasonality; 24 hour opening times, just-in-time logistics, shift working. For consumption these might include: working patterns, childcare, weekend versus weekday food practices, life stages; journeys to and from work, habit
- Socio-technical innovations (ranging from refrigeration to mobile Apps)

Which groups or institutions show positive or negative deviance?

- What are the characteristics of populations and groups who have managed to minimize their environmental footprint while optimizing their nutritional wellbeing? How far do their eating patterns relate to existing cultural norms and what are the economic implications? Are there examples of synergies in all areas?

RESEARCH THEME 3. How do we achieve change?

Research Theme 2 is concerned with understanding why we produce and consume the foods and drinks we do, what the future might bring if current trends continue and what the implications are for health and sustainability. Research Theme 1 focuses on defining what ‘good’ looks like, and on developing metrics against which real life practices and trends can be assessed. The purpose of Research Theme 3 is to combine the insights gained from the first two themes and use these to formulate, design and test strategies for achieving change.

There is already a very large literature on interventions. Some of it is concerned with conceptualising, testing and evaluating particular approaches; others take the form of advocacy (proposing certain types of interventions); and there is also a substantial focus on trying to systematise interventions by type – for example by level of coerciveness (however defined), or by target population group. The design of interventions is strongly shaped by the disciplinary mindsets from which they originate (Darnton and Evans 2013).³⁵ Different disciplines have different scales of reference (the individual through to the ‘system’), adopt different temporal emphasises (how society organises time versus how an individual might create and sustain a positive new habit), and place differing weight on the various influences - economic, biological, moral, cultural - that shape current, past and future eating practices. To these disciplinary differences can be added ideological differences. These, taken together, affect the way in which interventions are thought about: which are even conceived of, the extent to which a given intervention is judged to be legitimate, morally justified or publicly acceptable, how interventions are categorised or ranked in relation to one another, and ultimately which intervention strategies are deemed to be practicable.

Table 1 suggests a few lenses through which opportunities for intervening might be viewed. One might, for example consider its target focus (individuals, farmers, retailers); the actor who delivers the intervention (government, food retailer); different contexts for intervening (schools, workplaces, fast-food outlets); or even the flow of timings and routines that may need to be redirected. It is important to emphasise that these are by no means exhaustive and the purpose of Research Theme 2 (above) will be to suggest additional approaches that have not been considered here.

³⁵ Darnton A and Evans D (2013). *Influencing behaviours: A technical guide to the ISM tool*, The Scottish Government.

Table 1: Ways of categorising interventions

Categorisation lens	Example
Actor (ie. change agent)	Farmers, food industry, media, public institutions, social network/group (eg. transition towns group, weight-watcher group) national, international and local level policy makers)
Target group (ie. group whose behaviour is to be changed)	Food producers, food manufacturers and retailers, and eaters (defined variously as individuals, families, consumers, citizens)
Value frame	Health, environment, animal welfare, price, coolness, parental instincts; or more generally: intrinsic values versus extrinsic motivations, altruism versus self interest; citizen vs consumer; individual fulfilment versus societal goals
Space & place	Place of production - farm, factory; place of retail - shops; place of consumption - canteens, restaurants, home; place of confinement -schools, offices, hospitals, prisons; journey to work; location of food provision
Timing - life course	Life stage - starting school, pregnancy, marriage, retirement
Timing - eating occasion	Breakfast, lunch, dinner, snacks, celebration meals, on the go eating
Intervention framework	4Ps of marketing theory, UK's Department for the Environment, Food & Rural Affairs 4 Es framework, Michie and West behaviour change wheel, Nuffield Ladder, Nudge, Nourishing Framework
Transparency to end consumer	Product reformulation (where the consumer may not even realise they are consuming differently) through to rationing
Coerciveness	Education, pricing changes, regulation

To a certain extent, these lenses can be overlaid in order to generate matrices. Table 2 suggests one approach but it could equally be reconfigured so that the left-most column lists different actors, meal occasions, or value-sets. Different approaches may need to be investigated since categorising interventions in different ways could yield insights into how interventions could be designed and tested and multiple interventions might work together.

Table 2: Intervention measures

Intervention type	Example	Actors*	Target group*	Context	Value frame	Timing
Education, information & awareness raising and social marketing	Product labelling (eg. GHGs, nutrition – including innovative forms), media articles, TV food shows; websites, viral marketing, school and university teaching; meat free Mondays	Food industry (manufacturers, retailers, public and private sector food service, NGOs, media, teachers; dieticians Transition Towns movements	Producers; food industry (producers, caterers; retailers; individuals, journalists	Supermarkets, workplaces, restaurants & canteens, community centres, health centres, media	May variously speak to people's (lifestyle, health, aspirations, money saving) self interest or people's more altruistic values (our children's future, the planet etc.)	May target people at different <i>life stages</i> , or on different <i>eating occasions</i> (mid-week dinners, breakfast on the go, celebration meals)
Changing the choice architecture	Gondola aisle offers & store layout, attractive branding & marketing of vegetarian foods; canteen layouts, opt-ins to meat when listing dietary preferences; vegetarian meal deals	Food industry (manufacturers, retailers, public and private sector food service	Individuals; catering buyers?	Shops, workplaces (including conferences, restaurants etc.	Does not rely on overt messaging although choice of wording (eg. referring to people as citizens or parents rather than as 'consumers' – or vice versa)	As above – focuses at times when people are at their most unreflective (eg. shopping on the way home from work, choosing a sandwich at lunch)

					may also have a 'nudge' effect	
Enabling & supporting	Support groups eg. in work places, local environmental groups, Transition Towns movement; increasing range of vegetarian foods in catering outlets; meat free Mondays	Employers, voluntary organisations or public institutions	Individuals; catering sector	work places, schools, community centres, health centres etc.	Will depend upon approach taken	People gravitate towards different groups at different <i>times in their life</i> (eg. mother & baby groups); support needed at times when people are most 'vulnerable' to unsustainable <i>food practices</i> eg. when time pressured or on low income
Fiscal measures (producer & consumer focused) including pricing	Environment-linked production incentives & disincentives (eg taxes & subsidies) Environment-linked consumption incentives & disincentives. Personal carbon budgeting. Carbon trading schemes. Livestock headage tax; food industry pricing policies	Government; food industry	Food producers (farmers); individuals	Will influence costs of production and price of food in stores, restaurants etc.	Introduction of fiscal measures will need to be seen as legitimate by those affected so framing will be important – need to understand stakeholder values	Different prices at different times of year; subsidies for different population groups at different life stages or in different situations
Regulation & legislation (producer & consumer focused)	Public procurement specifications; rationing; bans; emission caps; planning restrictions on location of outlets; mandatory targets	Government	Food producers, retailers and Individuals	May be introduced at local government or national level	Introduction of regulations will need to be seen as legitimate by those affected so framing will be important - need to understand stakeholder values	

*Target group and actors may sometimes be one and the same – for instance journalists may need to be made aware of the issues in order to inform the general public.

NB: interventions can be filed in a number of ways – for example supermarket meal deals can be seen as a voluntary measure but they also count as a fiscal intervention.

With any intervention there is always the possibility that unforeseen and unwanted side effects might arise. Table 3 lists just a few that might, singly or in combination, follow a hypothetical intervention aimed at reducing meat consumption. Stakeholders who are wary of the 'less meat' agenda may play up these risks. Advocates will argue that with good planning and an integrated policy approach, they can be avoided. In the absence of evidence we simply do not know. The danger is that without policy,

business and other stakeholder commitment to devising, exploring and monitoring interventions, these hypothetical risks can be played up in order to justify inaction.

Table 3: Hypothetical unwanted side effects arising from interventions aimed at reducing meat consumption.

Intervention effect	Change in practice	Outcome
Doughnut effect	People eat less meat but more refined, processed carbohydrates	These foods have low GHG emissions but are poor nutritionally and have other environmental downsides too
Blueberry effect	People eat less meat but eat more high impact fruits and vegetables (air freighted beans, berries and cherries, hothoused ratatouille vegetables)	Possibly good for health but potentially even higher GHG emissions than meat
Sausages effect	Higher meat prices cause people to cut down on their meat spending but maintain quantity by eating less healthy meats such as sausages or fatty mince.	The impacts on GHG emissions are unclear; there will be benefits for resource efficiency; impact on health negative
Red to white effect	GHG oriented policies lead to people shifting from red meat to poultry and pork	GHG reductions are reduced, impacts on health likely to be mixed, potentially negative implications for resource efficiency, land use effectiveness & biodiversity, and for soy dependence; potentially negative (on balance) for animal welfare
Meat-shoring effect	Higher meat prices cause people to increase spending on meat (maintaining consumption) but cut down on their fruit and vegetable consumption instead.	Negative outcomes for health and for the environment.
Welfare effect	People maintain their regular levels of meat consumption but buy lower welfare meat instead.	The impacts on the environment will be mixed, impacts on health may be neutral or negative, impacts on welfare across many (not all) welfare indicators poor
Halo effect	People shift towards more sustainable eating but feel justified in buying a new gadget or flying off on holiday.	Impacts on health positive, impacts on environment will depend on the consumption practice that is substituted
Bin-it effect	People buy the 'right' foods but end up not eating them and throwing them away	Increase in food waste and in the environmental costs associated with that waste
Leaky system effect	People in the UK consume a healthier more sustainable eating patterns but farmers increase their exports; or farmers in the UK reduce their production but imports of meat simply increase	No net benefit - impact swapping
Employment effect	People eat a more sustainably; livestock farmers go out of business and either remain unemployed or are employed in other sectors (eg. rural tourism, service industries)	Net impacts on health and the environment depend on a. health impacts of changes in employment b. environmental impacts of substitute activity.

Evidence on the effectiveness of these interventions to change consumption towards more sustainable and healthier eating patterns is therefore needed, along with evidence as to the wider impacts, including unintended consequences. Most of what is currently available is on voluntary measures, and on individual behavioural interventions and information provision. There are also some model-based studies which examine (for example) the implications of price changes on consumption but these will necessarily simplify the situation and will be based on a series of assumptions. Empirical evidence on the effectiveness of more robust interventions spanning (for example) land use planning, regulations, and fiscal levers is scantier – and this is because there is less political appetite to intervene in these ways. This creates a 'chicken and egg' cycle of lack of evidence leading to lack of will to intervene. Setting a very high standard of evidence for intervention - for instance from controlled trials - acts as

a constraint to progress. There is a need to build a richer evidence base using more diverse types of evidence (HM Treasury 2011; Cabinet Office 2013).^{36 37}

As for the other Research Themes, the range of important questions that need to be investigated is vast, but at minimum is likely to include the following:

Theme 3: Key research questions

Taking stock: What do we know about the effectiveness of existing interventions? There is a need for a preliminary multi-disciplinary literature review which:

- Maps a range of food-related interventions, assesses their effectiveness and draws out key insights
- Maps a range of non-food but potentially relevant interventions (including in the field of environmental sustainability) and assesses and analyses their effectiveness
- Provides a synthetic overview of what works and what doesn't work, and why.

How can critical insights from Research Theme 2 be used to identify new areas for and modes of intervention? Insights may include identification of the following where there is potential for intervening: eating practices; habits, routines and temporal patterns; attitudes and values; norms and defaults; socio-technical innovations; institutional practices; economic and pricing policies; planning policies and spatial configurations; target groups; or key actors.

On this basis can we develop a suite of interconnected research projects? These will need to:

- Span both theoretical models and empirical interventions
- Include both 'soft' and 'robust' interventions
- Consider interventions at the group/institutional as well as at the individual level
- Hypothesise and build into the investigation the risk of unwanted side effects

3. Observations & next steps

Our observations are as follows.

First, achieving **sustainable, health enhancing food systems requires action to improve what and how much we eat, as much as how we produce it**. There is mounting evidence to support the broad changes needed to move towards sustainable healthy eating patterns. As such, we already know enough to justify a policy start on shifting consumption, by engaging consumers, producers and the policy/regulatory community.

Second, to stimulate action commensurate with the importance of the issue and the challenges it presents however, **a much more robust and comprehensive evidence base is required**. While we know enough to instigate broad action, we need to improve our knowledge of what sustainable healthy eating patterns look like and how far we are from eating in this way. We also need to know more about *why* we are so far from eating sustainably and healthily today and what could be done to achieve a shift in our eating patterns. These questions need to be explored at the population, sub-group as well as the individual level.

Third, while a growing number of stakeholders are engaged one way or another in the sustainable healthy eating agenda, there is no clear strategic framework for this. Action is necessarily a shared responsibility spread across industry, academics, civil society and consumers as well as government –

³⁶ HM Treasury (2011). *The Magenta Book: Guidance for evaluation*. Her Majesty's Treasury.

³⁷ Cabinet Office (2013). *What Works: evidence centres for social policy*, Her Majesty's Government.

but there is an urgent need for **policy leadership to set the direction of travel and to provide support**. Linked to this there is a need for **policy-backed investment in research** focused on systematically exploring and advancing knowledge and practice in this area.

In short: the sustainable healthy eating issue should no longer be seen as a niche concern - it needs to be taken seriously. Substantial support is required to build a robust, policy relevant evidence base. And policy leadership to promote, support and coordinate work in this area and to engage and support the research, NGO and business community, is essential.

Fourth, and finally, the points made in this report have been drafted in **collaboration with all the participants** who attended the Food Climate Research Network workshop and who are listed in Appendix 1. Participants agreed that there is a need to take forward work in this area and that the **FCRN is well placed to serve as a convening organisation** for advancing, galvanising and coordinating the next stage of work. Our intentions in publishing this report are to start this process by:

- Inviting **critical appraisal** of our analysis of the situation and our arguments for action – so as to refine and improve them.
- Presenting a **robust case to policy makers and research funders** for taking a lead in this area and investing in and supporting further activities – both research and practical action.
- Providing an **intellectual basis for further activity** by other stakeholders, be they researchers, businesses or non governmental organisations.
- **Inviting collaboration with the Food Climate Research Network (FCRN)** in developing further activity in this area. The FCRN welcomes your thoughts on what we should do next and how it might engage constructively with other stakeholders from diverse sectors and disciplinary backgrounds.

Specifically we are inviting a conversation on the following key questions:

1. What can be done now?

The sustainable healthy eating issue demands serious attention from policy makers and research funders alike. What is the role of different actors – **government policy makers, NGOs, researchers, industry** - in driving forward action and creating an enabling environment for change?

2. What sort of knowledge do we need to have?

The three priority Research Themes we have identified are as follows:

4. **Research theme 1: What are healthy sustainable eating patterns?** What is the direction we need to be going in as regards consumption and underpinning production/provisioning practices? What does ‘good’ look like?
5. **Research theme 2: How do we eat now, why, and what are the health and sustainability implications?** What social, economic and political influences shape current consumption and production patterns? Which of them have the most critical implications for health and sustainability? How do practices differ by population groups and why?
6. **Research theme 3: How do we achieve change?** Drawing upon insights gained from Research Themes 1 and 2, can we formulate, design and test appropriate strategies aimed at shifting consumption in more healthy and sustainable directions?

More detailed sub-questions for each of these themes can be found in Section 2 above and in Appendix 2 below. Are these appropriate and sufficient? Are there other overarching themes that also need to be included? Within each of Research Themes 1, 2 and 3, are the specific questions listed

appropriate and sufficient? Can you suggest others that need to be included, bearing in mind that at this stage we are looking for question ‘typologies’ rather than for specific detailed research projects?

3. What should the Food Climate Research Network do next to promote more activity in this area?

The workshop participants felt that the [Food Climate Research Network](#) is well placed to serve as an initial convening organisation for advancing, galvanising and coordinating the next stage of work in this area. Our questions are:

- What do you think it should do?
- How could this work be resourced?
- Who else should be involved?
- Might you be interested in engaging further in these issues?
- If so what expertise can you bring and how do you envisage collaborating with the FCRN?
- What are some of the current initiatives or movements underway with which a collaboration or convergence would animate and accelerate action?

Please send your comments and responses to Tara Garnett at taragarnett@fcrn.org.uk

Appendix 1: Participants

Tim	Benton	Global Food Security Programme
Riaz	Bhunoo	Global Food Security Programme
Bruce	Cogill	Bioversity International
Tom	Crompton	WWF
Andrew	Darnton	AD Research & Analysis Ltd
Karen	Davies	Triniti Marketing
Richard	Dent	Avatar Alliance Foundation
Sue	Dibb	Eating Better Alliance
Zoe	Donkin	Department for the Environment, Food and Rural Affairs
Ben	Essen	Iris Worldwide
Tara	Garnett	University of Oxford
Corinna	Hawkes	World Cancer Research Fund International
Saskia	Heijnen	Wellcome Trust
Moira	Howie	Waitrose
Helen	Hunt	Economic and Social Research Council
Susan	Jebb	University of Oxford
Tim	Kasser	Knox University
John	Krebs	University of Oxford
Andrew	Kuyk	Food and Drink Federation
Tim	Lang	City University
Jennie	Macdiarmid	University of Aberdeen
Sara	Molton	Wellcome Trust
Andrew	Parry	Waste Resources Action Programme
Toby	Pickard	IGD
Monique	Raats	University of Surrey
Mike	Rayner	University of Oxford
Hannah	Rowlands	University of Oxford
Pete	Scarborough	University of Oxford
Dale	Southerton	University of Manchester
Gunhild	Stordalen	Stordalen Foundation
Richard	Tiffin	University of Reading
Daniel	Vennard	Mars Incorporated
Alan	Warde	University of Manchester
Christiana	Wyly	Avatar Alliance Foundation

Appendix 2: Research themes

Theme 1: Key research questions

What environmental, health, social and economic metrics do we need to develop to measure the sustainability of food systems and to monitor progress? How should we think about and choose among trade offs across different objectives and at different spatial and temporal scales? How do we understand and manage rebound and leakage effects?

How does production method influence the sustainability and nutritional quality of foods?

What do sustainable healthy eating patterns look like in low and middle income countries?

How does the ‘sustainable healthy eating’ agenda narrowly defined sit within **broader sustainable production and consumption practices beyond the food arena?**

Theme 2: Key research questions

What influences food consumption and underpinning provisioning practices, and how is this changing?

- What are past and emerging trends in consumption (what people eat, how, when) over the last 20-30 years and what are the social, economic, environmental and other forces influencing these processes?
- How does all the above differ by economic status, ethnicity, gender, age, psychographic group and region?
- How and why are the underpinning food production, distribution, retailing and catering sectors changing? What are the emerging trends and what are the social, economic, environmental, technological and other influences on these?
- Who are the key actors (institutions, groups, individual opinion formers) who influence our consumption practices and supporting production processes?

Which of the current and emerging trends in production and consumption have particularly critical implications for health and sustainability? Analysis here will need to include:

- Eating patterns with strong impacts; production processes and practices with strong impacts
- Societal meanings, practices, norms and attitudes around foods and food practices that are particularly significant for health and/or sustainability
- How the structuring of time influences production and consumption practices and the impacts in turn for health and sustainability. On the production side examples might include: globalised supply chains and seasonality; 24 hour opening times, just-in-time logistics, shift working. For consumption these might include: working patterns, childcare, weekend versus weekday food practices, life stages; journeys to and from work, habit
- Socio-technical innovations (ranging from refrigeration to mobile Apps)

Which groups or institutions show positive or negative deviance?

- What are the characteristics of populations and groups who have managed to minimize their environmental footprint while optimizing their nutritional wellbeing? How far do their eating patterns relate to existing cultural norms and what are the economic implications? Are there examples of synergies in all areas?

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Taking stock: What do we know about the effectiveness of existing interventions? There is a need for an preliminary multi-disciplinary literature review which:

- Maps a range of food-related interventions, assesses their effectiveness and draws out key insights
- Maps a range of non-food but potentially relevant interventions (including in the field of environmental sustainability) and assesses and analyses their effectiveness
- Provides a synthetic overview of what works and what doesn't work, and why.

How can critical insights from Research Theme 2 be used to identify new areas for and modes of intervention? Insights may include identification of the following where there is potential for intervening: eating practices; habits, routines and temporal patterns; attitudes and values; norms and defaults; socio-technical innovations; institutional practices; economic and pricing policies; planning policies and spatial configurations; target groups; or key actors .

On this basis can we develop a suite of interconnected research projects? These will need to:

- Span both theoretical models and empirical interventions
- Include both 'soft' and 'robust' interventions
- Consider interventions at the group/institutional as well as at the individual level
- Hypothesise and build into the investigation the risk of unwanted side effects

Appendix 3: Workshop agenda

AGENDA

Day One: 22nd April

- 10.00** **Welcome, participant introductions**
- 10.30** **Introduction: food, the big picture and towards sustainable eating**
Tara Garnett 15 minutes
- 11.00** **How do people eat today?**
Sue Dibb, 10 minutes
- 11.30** **Models of behaviour & theories of change: an overview**
Andrew Darnton – 15 minutes

Discussion to lunch
- 13.00-13.45** **Lunch**
- 13.45-15.15** **Disciplinary/stakeholder perspectives on food, behaviour, practice & the opportunities / processes for achieving change – as well as the risks of perverse outcomes**

Presentations (10-15 minutes each)
1. The sociological approach. *Dale Southerton & Alan Warde*
 2. The economic approach. *Richard Tiffin*
 3. The health psychology approach. *Monique Raats and Jennie Macdiarmid*
 4. A values based approach *Tom Crompton & Tim Kasser*
 5. A marketing approach *Ben Essen*
 6. The policy approach *Corinna Hawkes & Tim Lang*
- 3.15** **Tea**
- 3.30-17.00** **Discussion**
- 17.00** **Reflections on day one**
Susan Jebb and Tim Benton (10 minutes each)
- 17.30** **Close**
- 19.00** **Dinner at the Grain Store**

Day Two: 23rd April

- 9.00** **Taking stock of Day 1.**
Participant reflections and general discussion
- 9.45** **Planning interventions**
Moira Howie (10 minutes)
Daniel Vennard and Karen Davies (10 minutes each)
Discussion
- 10.45** **Tea**
- 11.00-12.45** **Defining research questions - designing research proposals**
Participants to split into five break-out groups, organised in ways that ensure disciplinary/sectoral diversity across groups.
Groups led by *Pete Scarborough, Mike Rayner, Susan Jebb, Tim Benton and Bruce Cogill.*
- 12.45-13.00** **Each group to read out their 3-5 one-line headline research questions.**
No further elaboration at this stage.
- 13.00-13.45** **Lunch**
- 13.45-14.10** **Proposal voting**
- 14.10-15.45** **Project development**
- 15.45-16.00** **Round up, reflections, close**

Appendix 4: About the Food Climate Research Network

The Food Climate Research Network (FCRN) is an interdisciplinary, intersectoral and international network focused on food systems, climate and sustainability. Our vision is for a **nutrition-driven, ethically mindful food system that sits within environmental limits**. To achieve this we need to know more about the multifaceted challenges we face and the solutions that are possible, and we need to work together – across sectors, disciplines and perspectives – to build mutual understanding and collaborate for change. To this end, the FCRN works to: produce and disseminate integrative, accessible, trusted and policy relevant research; broker dialogue between stakeholders with very different specialisms and views; and in so doing to catalyse action for change.

For more information contact Tara Garnett taragarnett@fcrn.org.uk or see www.fcrn.org.uk