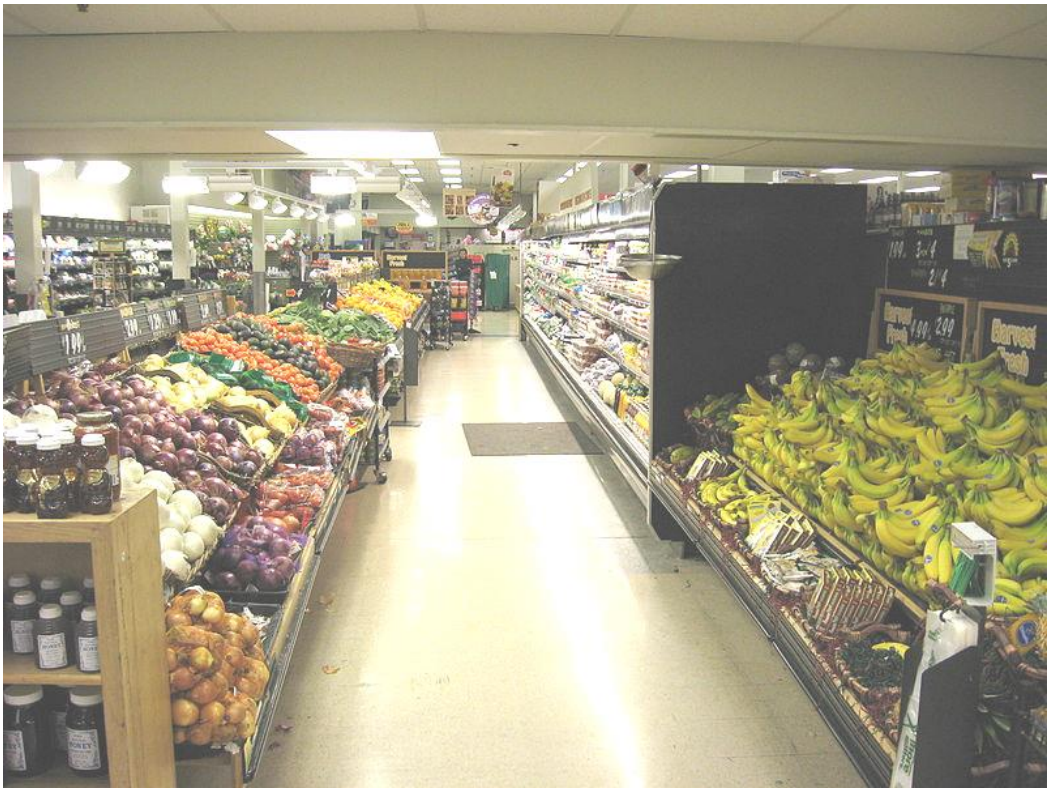
Changing consumption:
How can we change the way we eat?

A discussion paper



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Preface

In April 2014 the Food Climate Research Network organised a workshop, funded and hosted by the Wellcome Trust with additional support from the Food Security programme of the UK research councils. It brought together an interdisciplinary, intersectoral group of about 30 people to develop a research agenda on how our eating practices might be shifted in healthier and more sustainable directions. Particular emphasis was placed on meat eating as an exemplar of an important, yet difficult aspect of our consumption practices, and one with a strong bearing on health and sustainability. This discussion paper was written ahead of the workshop and circulated in advance to participants as a contribution to the discussions.

A follow-on report which summarises the outcome of the workshop discussions and suggests what might be done next, will be published in due course.

Introduction: Why focus on sustainable healthy diets?

The issues are well recognised. Report after report has been published, conference after conference convened. 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, nutrition-enhancing food future, then the current food system needs to change.

Most of the focus in recent years has been on improving the environmental efficiency of production, so as to produce more food with less impact. This will entail the more efficient use of inputs to the production process: fertilisers, pesticides, energy and water. It will require smarter plant and livestock breeding strategies so that we can increase productivity in the face of increasingly more challenging growing conditions, such as drought, flooding, soil salinity, and temperature increases. We will also need to deal with the 'waste' outputs – such as manure and crop residues - more effectively, by treating them as valuable inputs to a more circular, resourcing conserving system of agriculture. And, critically, we will need to halt deforestation.

However, there is increasing evidence that while these 'production-side' approaches may be necessary, they are not sufficient. To tackle our environmental problems adequately, while also dealing with the twin problems of dietary insufficiency and excess, four additional approaches will also be needed. First, we need to address power imbalances in the food system. Essential actions will therefore include efforts to address price and subsidy distortions, support and empower smallholder farmers and landless workers, agree on better working conditions and fairer terms of trade, and improve transport, storage and market infrastructure. Second, actions to improve the reproductive rights of women support justice and equality for women while reducing the rate of population growth and lightening humanity's planetary footprint. Third we need to reduce the amount of food that is lost or wasted along the whole supply chain. All these are essential. But also – and fourth - diets will need to change. What, and how much we eat directly affects what, and how much is produced, as well as who gets to benefit from its production. We therefore need to move towards consuming more 'sustainable diets.'

1. What is a sustainable healthy diet?

Answering this question will depend of course, on how one defines sustainability and whether 'health' is considered at an individual or at a population level.

Definitions of sustainability vary. For some stakeholders, the word encompasses social and economic dimensions, where environment, economy and society (incorporating health and ethics) together constitute the 'triple pillars of sustainability.' However others equate the word more narrowly with environmental objectives. More narrowly still, sustainability may be used as a synonym for just one environmental goal, such as GHG reductions.

There is a growing body of work that focuses on the concept of a sustainable diet and how it interfaces with health and nutrition. Much of the impetus comes from the environmental community – particularly environmental and welfare NGOs – who tend to emphasise the environmental dimensions of sustainability as well as a selection of ethical considerations, such as fair terms of trade or working conditions, and animal welfare.[1] [2] [3] [4] [5]

1 CIWF (2009). *Eating the Planet: How we can feed the world without trashing it*. Compassion in World Farming and Friends of the Earth, UK.

2 CAT (2013). Zero Carbon Britain: Rethinking the Future, Centre for Alternative Technology, Wales

There is also a growing body of academic research focused on characterising sustainable diets. The motivation is often environmental, but the research process tends to involve nutritionists too. Generally studies find that a low environmental impact diet is one centred on a diverse range of tubers, whole grains, legumes and fruits and vegetables, with animal products eaten sparingly. They also find that such a diet is broadly consistent with good nutrition.[6] [7] [89] [10] The lower the meat, fish and dairy content, the lower the environmental impact - and the more important it will be that reduced meat intakes are compensated for with increases in the quantity and diversity of whole grains, fruits and vegetables, and legumes.[11] [12] [13] There may also be some trade offs -fish, for example, is good for health but many stocks of many fish species are depleted, and overfishing harms not only the viability of target species but also the marine ecosystem more generally. From a global perspective there is simply not enough fish for everyone on the planet to consume as much as government health guidelines recommend.[14]

Moving from research to policy, a few official bodies have attempted to provide more detailed guidance on consuming healthily and with a lower environmental impact. The Health Council of the Netherlands, for example (HCN 2011),[15] provides a detailed review of the relationship between health and sustainability. It identifies areas of synergy and conflict and instances where impacts are neutral. Overall, it finds a clear win-win in a shift to a less animal- and more plant-based diet. For the overweight, lower intakes of energy in general and of confectionary-type foods in particular would yield double benefits. It notes the trade offs around fish consumption.[16] Sweden's National Food Agency and the recently published 2012 New Nordic Recommendations find broad environmental-nutritional compatibilities and offer similar guidance: eat less meat, choose fish from sustainable or certified stocks (slightly

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3 EWF (2011). Meat Eater's Guide to Climate Change and Health. Environmental Working Group, US.

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

5 SDC (2009) Setting the table. Advice to government on priority elements of sustainable diets. Sustainable development Commission, UK.

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

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

8 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

9 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

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

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

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

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

14 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

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

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

fudging the issue), store vegetables that store well and consume perishable produce in season, eat fewer cakes and so forth and minimise food waste. [17] [18]

Three definitions of sustainable diets

"*… diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources*."(FAO 2010).[19]

"*Eat food, mainly plants, not too much."* (Michael Pollan, author)

"*A little bit of this, and a little bit of that. Enough to make you happy, but not to make you fat*." (Ben Glasstone, musician)

This is currently the state of play as regards knowledge and recommendations. However there at least four critically important questions that still need answering if we are to have a more complete and accurate definition of a sustainable diet.

1. First, there is the choice of environmental metrics to consider. How is impact and progress to be measured? Taking meat as an example, if the priority environmental focus is on reducing GHG emissions, then poultry production represents a better option than lamb or beef, and intensive systems are more GHG efficient than extensive systems. However, if the focus is on optimising use of different qualities of land and resources, then an alternative conclusion might be drawn. Extensively reared sheep and cattle can be reared on land unsuited to other agricultural purposes and consuming pastures that tend to be rainfed rather than reliant on irrigation water. Well managed herds can help maintain biodiverse landscapes; and, by consuming coarse agricultural byproducts are potentially less dependent on soy and other grain inputs than poultry, whose production requires good quality, and now scarce, arable land (UNEP 2009).[20] That said, grazing livestock are also linked to deforestation, for example in the Amazon region and to land degradation, while intensively reared beef and dairy cattle are also fed grain and soy inputs, and consume them at a lower feed conversion efficiency than their monogastric counterparts. Much therefore depends not only on the system under analysis but also, critically, on one's assumptions about demand trajectories. If a substantial global increase in demand for meat is judged to be inevitable, then feeding grains to poultry in intensive systems may be preferable since this 'damage limitation' approach requires less land and emits fewer GHGs. However, if demand is viewed as modifiable, and policies are put in place to circumscribe its growth, then an alternative approach may be preferred. Here cereal crops are grown only for human consumption and farm animals are confined to grazing on pasture and to consuming byproducts. This 'livestock for resource efficiency' scenario could yield genuine ecosystem benefits but the amount of meat and dairy products available for consumption will be low.

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

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

19 FAO (2010). Final document: International Scientific Symposium Biodiversity and Sustainable Diets: United against Hunger. 3-5 November 2010, Food and Agriculture Organisation, Rome

20 UNEP (2009). *The environmental food crisis: The environment's role in averting future food crises*, Nairobi, United Nations (2012) *FAO, partners, urge greater push to reduce food losses and waste*, 13 June 2012, Food and Agriculture Organisation, Rome http://un-foodsecurity.org/node/1345

2. Second, the relationship between production and consumption needs to be better understood. Analysis of what constitutes an environmentally 'sustainable diet' needs to take account of not only what we eat, but also *how* these foods are produced. The method of production will determine how much food output is possible for a given level of environmental cost.

The flip side of the coin is that the production method can influence a food's nutritional and other health properties, although the issues are complex. For example, recent years have seen the spotlight falling variously on organic production, on pasture-fed livestock and/or on local sourcing, with advocates arguing that foods produced in these ways are not only more environmentally sustainable but (in the case of the first two) deliver health benefits. Taking organics first: systematic reviews undertaken so far find no evidence that organic foods confer better nutrition. [21] [22] But there are other non-nutrition related issues to consider whose importance will depend on the context. While use of pesticides and fertilisers is regulated in countries such as the UK, elsewhere their overuse generates not just serious environmental problems but also health risks, including food contamination and the pollution of water sources. In these circumstances, a switch to organic and lower input production will likely deliver gains from a health and environmental perspective. However, in regions such as Sub Saharan Africa, where hunger is prevalent, the soils are degraded and inputs - either organic or inorganic - are minimal, judicious use of fertilisers can help replenish soils and raise yields, while pesticides can help counter crop losses from pests and disease. By maintaining or increasing production on existing land, farmer incomes and food security can be improved and there is less need to convert additional land – including forest - to compensate for low and dwindling yields. Thus there can be important benefits associated input use, provided they are not excessively applied. Regarding grass-fed production, some evidence suggests that grass-fed animals are leaner, and such fat as there is contains higher concentrations of beneficial Omega 3 fatty acids than grainfed animals.[23] [24] Studies also document increases in the fat content of our now predominantly grain- and soy-fed poultry meat over the last thirty years, and a decline in the omega 3:6 balance, suggesting that the drive towards ever increasing productivity has been at the expense of nutritional quality.[25] As for local sourcing, the merits or otherwise need to be assessed on a case by case basis. Since the environmental impacts at the agricultural stage are often so significant, more efficient agricultural production in a more distant location can sometimes compensate for longer transport distances. [26] Some research finds that global food trade can also optimise water use, with water-abundant countries exporting produce to those that are water scarce but this is not the case for all countries, particularly those in Southern Europe. [27]

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21 Smith-Spangler C, Brandeau M L, Hunter G E, Bavinger J C, Pearson M, Eschbach P J, Sundaram V, Liu H, Schirmer P, Stave C, Olkin I, Bravata D M (2012). Are Organic Foods Safer or Healthier Than Conventional Alternatives? A Systematic Review. Annals of Internal Medicine;157(5):348-366.

22 Dangour, A. D., Lock, K., Hayter, A., Aikenhead, A., Allen, E. & Uauy, R. (2010), Nutrition-related health effects of organic foods: a systematic review. *Am J Clinical Nutrition* 92, 203-210, published online doi:10.3945/ajcn.2010.29269

23 Nuernberg K, Dannenberger D, Nuernberg G, Ender K, Boigt J, Scollan N D, Wood J D, Nute G R and Richardson R I (2005). Effect of a grass-based and a concentrate feeding system on meat quality characteristics and fatty acid composition of longissimus muscle in different cattle breeds, *Livestock Production Science* 94 137– 147

24 Daley C A, Abbott A, Doyle P S, Nader G A and Larson S (2010). A review of fatty acid profiles and antioxidant content in grass-fed and grain-fed beef, *Nutrition Journal*, 9:10

25 Wang Y, Lehane C, Ghebremeskel K, Crawford M.A. 2010, Modern organic and broiler chickens sold for human consumption provide more energy from fat than protein, Public Health Nutr. doi: 10.1017/S1368980009991157

26 Webb J, Williams A G, Hope E, Evans D and Moorhouse E (2013). Do foods imported into the UK have a greater environmental impact than the same foods produced within the UK? Int J Life Cycle Assess (2013) 18:1325–1343

27 Biewald A., Rolinski S., Lotze-Campen H., Schmitz C., Dietrich J. P., Valuing the impact of trade on local blue water. Ecological Economics, 2014, DOI: 10.1016/j.ecolecon.2014.02.003

3. Third, 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 simply ratchet up 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. At present, we do not understand fully what might happen, but all of these possibilities will have varying environmental 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 dietary patterns need to be seen in the context of broader consumption practices – from buying shoes to holidaying overseas - and their environmental impacts.

4. Fourth, while knowledge about 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 pay producers adequately or that consumers cannot afford can hardly be judged to be sustainable. At present, most of the work on sustainable diets has been driven by the environmental agenda – understandably so, in view of the massive environmental problems we face. However the environmental focus may also reflect the fact that social and economic objectives are extremely hard to agree upon. 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? There may well be synergies between nutritional adequacy, environmental sustainability and certain economic goals, but there are also likely to be costs. 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?

5. Fifth, most of the discourse on sustainable diets centres on rich-world, developed country contexts. Yet most of the growth in food-related environmental impacts from meat and dairy 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, and South America. The reasons are simple: these regions are home to most of the world's agriculture, most of the world's population, and most of the growth in living standards. There are more people, their populations are growing faster and their diets are shifting more rapidly than people in the less populous, less economically dynamic developed world. The implications are unarguable: if we are to address the social, health and environmental problems inherent in our food system, then diets in low and developing countries need to be sustainable. This observation potentially raises many hackles given the historical responsibility of rich countries for the environmental problems we face today and for the inequities in the global food economy; and the fact 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 diets 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.

There are, then, many questions that remain unanswered, and there is clearly a need for more work in this area. To summarise, such work will need (among other things) to look more closely at:

- The development of environmental and metrics that consider the multiple functions, impacts and roles of food (both tangible and intangible) – and ways of thinking about trade offs

- The relationship between production and consumption – so as to avoid leakage and rebound effects and to understand how production influences nutrition as well as health more generally
- The socio economic dimensions of sustainability
- What constitutes a sustainable healthy diet in low income and developing countries
- How 'diets' narrowly defined sit within broader sustainable production and consumption practices both within and beyond the food arena.

This said, the evidence as it stands probably allows us to identify general direction of travel, at least as regards the relationship between nutrition and environmental impact. Broadly speaking a diet that is *more* environmentally sustainable than the status quo probably includes the following defining characteristics:

- Diversity – a wide variety of foods eaten
- In energy balance
- Based around: tubers and whole grains (but not rice); legumes; fruits and vegetables - particularly those that are field grown and robust
- Meat eaten sparingly if at all – and all animal parts consumed
- Dairy products or fortified plant-substitutes eaten in moderation and other calcium-containing foods also consumed
- Unsalted seeds and nuts included
- Some fish and aquatic products sourced from certified fisheries, although less frequently than advised by the Eatwell Plate
- Limited consumption of sugary and fatty sweets, chocolates, snacks and beverages
- Tap water in preference to other beverages

This diet is likely to deliver 'good enough' rather than individually optimal nutrition - it represents a compromise position between human requirements and environmental goals. Sustainable levels of fish consumption are lower than Eatwell guidelines, while the recommendation to eat all animal parts – not just lean muscle but also offal and the fattier cuts and formats – may raise some nutritional hackles even though a sometimes higher fat content will be compensated for by substantially reduced overall intakes not just of meat but other 'high risk' foods high in sugar, fat and refined carbohydrates.

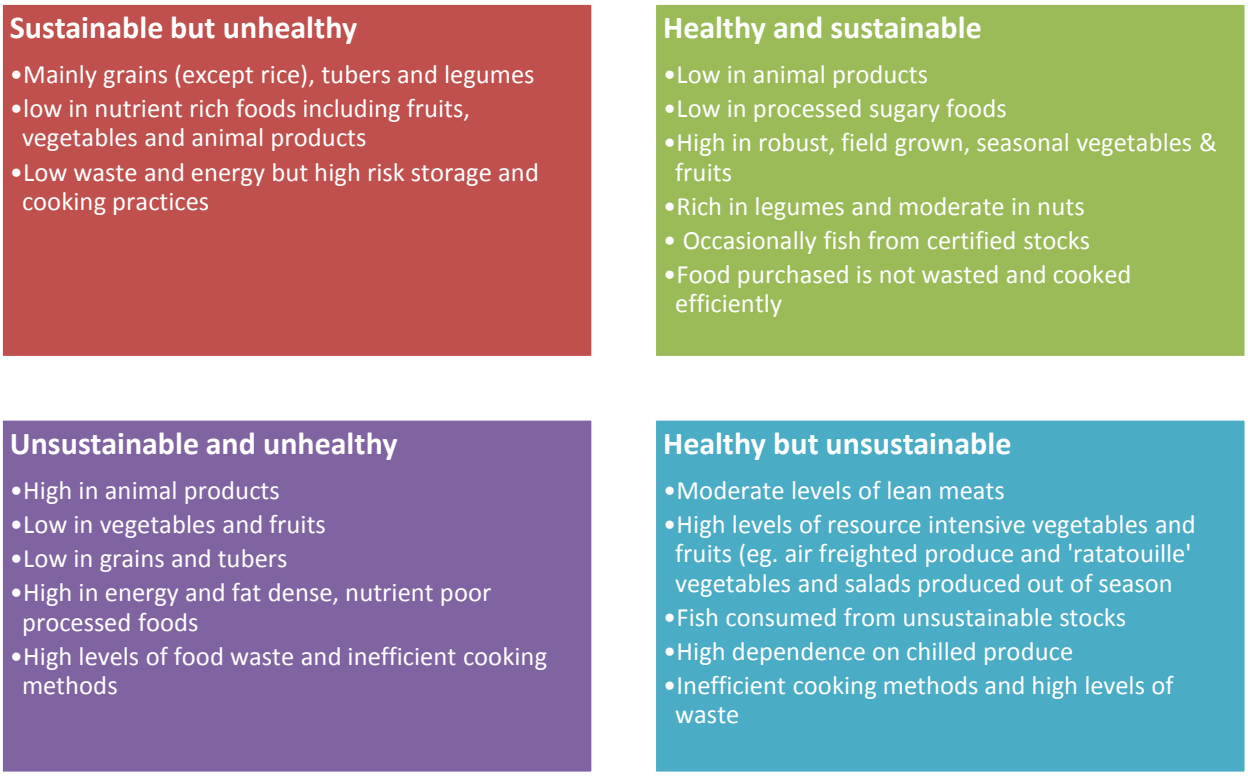
Achieving a low environmental impact diet that is compatible with health may also require greater emphasis on other non-food issues that bolster the nutritional quality of the diet: for example the influence of physical activity and sunlight on bone health, or the role of food fortification.

Clearly these guidelines are broad; it would be misleading to put a figure on how much or which kind of meat, for example, is either environmentally or nutritionally optimal, given the multiple variables discussed above –and as noted, the more that can be achieved on the production side the less that needs to change on the consumption side. Moreover, different population groups differ in their nutritional requirements and preferences – some may need or want to eat more meat or less than the average. Rather than one definitive dietary template, a range of more sustainable diets are possible.

Finally and to reiterate the point made earlier, it is entirely possible to consume an unhealthy albeit low environmental impact diet, or vice versa. The relationship between health and environmental sustainability can best be viewed as an arranged marriage, rather than a love match.

Figure 1 highlights four dietary patterns differing in their health and environmental sustainability profiles.

Figure 1: Different types of diets in relation to their nutrition and environmental sustainability implications



2. Changing consumption

Once we have worked out what an environmentally sustainable, nutritious, affordable and equitable diet looks like – how do we get people to eat it?

Answering this question requires us to understand: why people buy what they buy and eat what they eat; and what changes in relation to individuals themselves and/or the structuring of society and 'normal' practice might be effective in getting them to buy and eat differently.
At this stage a short word on terminology may be helpful. A great deal of the literature in this area uses the terms 'behaviour' and 'behaviour change.' However more sociological perspectives might consider these terms to be misleading since they imply that the appropriate locus of attention is the individual – when from these perspectives, it is not. Words such as 'practice,' 'routines' or 'habits' may be more appropriate since they denote activity without necessarily implying deliberate intention. Another word, often used in the environmental literature, is consumption; for instance 'sustainable consumption' or 'unsustainable consumption.' This too has its limitations. For a start, while it may cover a number of practices or behaviours the word does not cover them all – walking, say. More particularly, the word suggests certain assumptions about our roles and identities as humans. If everything is about 'consumption' then is the individual only a 'consumer'? Where does this leave us as citizens, or parents, or workers? With these provisos in mind, this paper uses the words, 'behaviour,' 'practice' and 'consumption' fairly interchangeably, reflecting the fact that words of some kind have to be used, and that this paper does not come from any particular disciplinary angle.

2.a Theories of behaviour, practice and change

There is a vast body of work on behaviours, consumption patterns and practices and on how these might be changed. Some of it is academic, concerned with theory or simply with understanding why people do what they do. There is also a very extensive literature driven by public interest organisations and priorities, focusing on behaviours that have implications for health (smoking, drug addiction, obesity, alcohol), society (voting practices, organ donation) or the environment (transport, food, energy use). The aim of this work is to understand behaviour in order to change it. And then there is industry-led work: here insights into people's behaviours, motivations, habits and practices are central to the development of effective marketing strategies.

Valiant attempts have been made to cluster and categorise this vast and inchoate literature.[28] [29] [30] [31] While there is inevitably a great deal of overlap, broadly speaking the focus of these analyses falls into three categories: work that tries to understand why people do or behave or consume what they do; work that considers how changes in those practices come about; and work that considers what interventions might be effective in achieving those changes.

Taking models of behaviour/practice first, stakeholders tend to consider the issues through their particular disciplinary or ideological lens (discussed further below). A psychological perspective may place stronger emphasis on the individual, considering factors such as knowledge, attitudes, motivations (conscious and unconscious), norms, habits and genetic make up, although they can also include societal influences too. A sociological perspective may pay more attention to the social context, that is, the economic, cultural, physical, familial, temporal and normative influences that shape the practices - including habits and routines - of an individual or group of people. From an economic perspective, behaviour is once again located in the individual. A person balances the benefits and costs, both monetary and non monetary, of a given practice; any subsequent action reflects a more or less rational choice undertaken to improve her or his wellbeing.

Second, there are the theories of change – how to get from behaviour A to behaviour B – from eating too much, to eating less, from smoking to not smoking. These theories are very much informed by particular models of behaviour/practice (above). As such they vary in their specificity, focus and scale of attention (the individual versus the societal context; the behaviour itself versus the norms, routines and meanings that produce that behaviour) and in the extent to which they incorporate temporal elements and constructive or destructive feedback loops. [32] [33] [34] [35]

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

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

30 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.

31 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.

32 Prochaska, J., Johnson, S., & Lee, P. (1998). The transtheoretical model of behavior change. In S. Schumaker, E. Schron, J. Ockene & W. McBee (Eds.), *The Handbook of Health Behavior Change*, 2nd ed. New York, NY: Springer.

33 Lewin, K 1951. *Field Theory in Social Science: Selected Theoretical Papers*. D Cartwright (ed.). New York, NY: Harper & Row.

And finally, there are the interventions themselves – the suite of approaches that might conceivably give rise to altered practice/behaviour. The options might span education and information provision, social marketing approaches, fiscal incentives and disincentives and regulation. They may focus on the individual or on the context within which a behaviour takes place (school, supermarket, journey to work and so forth). The options for achieving change are often represented in visual forms such as ladders[36] wheels[37] and diamonds.[38]

How do these overlapping theories and models play themselves out in relation to food? And to what extent do the theories of behaviour/practice influence which interventions are chosen for consideration?

If one were to simplify somewhat, an economics based, rational choice perspective will see the individual as balancing the monetary, health, taste, convenience and other costs of a particular food against the benefits as they are perceived to be. Where consumption leads to undesirable consequences, such as GHG emissions or poor health, then several policy approaches are possible, all of which are based on the notion that people will act to improve their wellbeing. One approach is to inform people, through labelling for example, about the consequences of their purchasing decisions. These informed people can therefore choose to buy healthier or greener products, if they think there is a benefit in doing so. The benefit may be personal (improved health) or societal (environmental sustainability). If the societal gain comes at some apparent economic or other cost to the individual the decision to do the 'right thing' can still be rationalised as one of personal gain too – the 'benefit' here may be a sense that one's children will inherit a better world, the assuaging of personal guilt or simply the glow of self-approbation. Another rationalist-based approach is to tax the food in question or subsidise more desirable alternatives. This is an over simplistic account of the rational consumer model and has been heavily criticised by economists themselves.[39] Nevertheless the assumptions underlying this approach still underpin a great many public health[40] and environmental information and labelling campaigns as well as campaigns by NGOs and others for health or environment taxes on foods.

An alternative approach rejects this rational consumer model. Here, the individual is 'locked in' to particular diets and practices around food because of the way (for example) the city is planned, the timings and structure of the day, the foods that are available, the relationship between genders and generations, and the unevenness with which our educational system and the workings of the economy distribute knowledge, agency, income and ability. From a health or sustainability perspective problem lies not with the individual but with how society at different levels is organised. The individual is to a certain extent a victim of circumstances and individual choice can be seen to be illusory, particularly for those who are poor and less-educated. The inference is of course that, if the system changes, so too will our practices. All this may suggest a stronger role for regulation, planning, and for changing the

34 Rogers, E 1995. *Diffusion of Innovation* (5th edition). New York: Free Press.

35 Defra 2008. *A Framework for Pro-Environmental Behaviours. Annexes.* Department for the Environment, Food and Rural Affairs London

36 Chapter 3: Policy process and practice in Nuffield (2007). *Public health: ethical issues*, Nuffield Council on Bioethics, London.

37 Michie, S., Van Stralen, M.M. & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science,* 6.

38 Michie S, van Stralen M, West R (2011) The Behaviour Change Wheel: A new method for characterising and designing behaviour change interventions. Implementation Science, 6, 42.

39 Kahneman D . 2012. Thinking, fast and slow, Penguin, UK.

40 http://www.nhs.uk/Change4Life/Pages/why-change-for-life.aspx

organisation of institutions and in what they deliver – this might include anything from the core syllabus taught in schools and universities, to the food on offer in hospital or school canteens.

A third model of consumption focuses on desire, impulses, instincts, inertia and contexts. This model is based on the idea that, far from being rational, most of our decisions are based on impulses, on how a situation is framed or a product positioned. We eat more on bigger plates than on smaller plates,[41] we eat more when we are presented with more choice – or even the illusion of more choice[42] and we respond to advertisements that explicitly link the product in question (chocolates, alcohol, coffee, ice-cream) with power, say, or seductiveness. From this perspective, interventions are about nudging people into more sustainable practices by changing the default, or by playing around with the 'choice architecture' – actions might include anything from asking people to 'opt into' eating meat when specifying dietary preferences, to changing supermarket store layouts. Social marketing approaches provide a bridge between rational consumer choice and nudge type perspectives.[43] Habit and automaticity have strong roles to play in both the second and third theories of consumption. We consume the way we do because we always have – we are habituated.[44]

However, a fourth and possibly less passive or deterministic model of consumption sees people consuming not just for reasons of self-interest, or because they are at the mercy of 'the system', or of their hormones, or because of inertia, but because, through consumption they are actively trying to construct identity for themselves, form relationships with others, and create meaning in their lives. Eating at MacDonald's or drinking at the pub is actually about the process of forging and maintaining friendships; baking bread or – alternatively – eating junk food can be expressions of agency or resistance to the status quo -whether this be the food industry or one's lentil loving eco-parents. Consumption is variously an embodiment of creativity, love, and commonality – or of rebellion and opposition. Since this consuming creativity, or creative consumption, is a fundamental part of human nature, we should seek to promote conditions in which people can flourish – that is, fulfil their basic urges – without causing damage to the environment.[45] [46] This perspective touches upon all the others above. As such, a range of interventions may be needed; these may include measures to change the socio-economic context which shapes the way in which identity expresses itself, societal-level challenges to prevailing norms, aspirations and expectations - as well as more fine grained approaches to address attitudes and values at the individual level.

As noted, there is substantial overlap between and across models of consumption, theories of change and packages possible interventions. No one theory, model or package provides a perfect and complete representation of reality. Most of them reflect the biases of a particular disciplinary background.

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41 Wansink B van Ittersum K (2013). Portion size me: Plate-size induced consumption norms and win-win solutions for reducing food intake and waste. Journal of Experimental Psychology: Applied, 19(4), 320-332

42 Kahn, B. E. and Wansink, B. (2004). The Influence of Assortment Structure on Perceived Variety and Consumption Quantities. *Journal of Consumer Research*, Volume 30

43 http://www.fooddudes.co.uk/

44 Warde, A., J Gronow. 2001. *Ordinary Consumption.* Routledge, London

45 Max-Neef M A; Elizalde A, Hopenhayn M (1991). *Human Scale Development*. The Apex Press, New York, United States of America.

46 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.

An important question to consider is how far insights gained from analysing and intervening in one area (intravenous drug use, say) might be applicable to another – in this case, a shift towards more sustainable eating practices. [47] Even within the narrower field of food and eating, do interventions that successfully lead to healthier eating practices at an individual or community level have anything to offer the sustainable diets agenda?

In addition to disciplinary bias and the problems of cross-transferability, discussions about behaviour and what to do about changing it are also strongly influenced by values and ideologies. As noted, there are different views on, for example, where the locus of responsibility is seen to lie- with the individual or with the socio-economic system as a whole. And of course others still might ask 'is practice *x* really a problem, who says it is, and why do they say so?' Take for example the much lamented loss of the family meal and our increasing reliance on convenience food. What, exactly, is the nature of the problem - are the concerns to do with moral decline and the breakdown of family values, or are they about disempowerment, corporate take-over and capitalist enslavement? Or – actually - is this not really a problem at all but simply a morally neutral consequence of the fact that people have more exciting things to do than eat and women better things to do than cook?

2.b. Interventions: lenses, categories and risks

All these different values and ideologies feed into ideas about what sorts of interventions are possible, effective and legitimate. For some, taxing certain foods is an obvious way to modify consumption. For others, it is either unacceptable (nanny state interventionism) or misguided (people do not respond in predictable ways to price changes). For some people product reformulation (less salt, fewer calories, more vegetables) represents an effective and painless way of achieving improved health outcomes while for others this approach simply perpetuates unequal and disempowering systems of production and consumption that are ultimately controlled by a powerful food industry. Many argue that we should market sustainable food as the new aspirational lifestyle must-have – while for others, this *me-myself-I* approach is emblematic of the selfish consumerism that lies at the root of our environmental problems. It is an obvious, but nevertheless important point, that whoever dominates the policy discourse sets the boundaries of the discussion about interventions – and this is a source of immense frustration for those who come from a different perspective.

People's different disciplines and ideologies tend to influence not just what interventions are seen to be desirable but also the way in which they are categorised and thought about. The well-known Nuffield ladder of interventions adopts a fairly conventional hierarchical approach, categorising approaches according to their perceived degree of coerciveness.[48] For others, the lens through which opportunities for achieving change are viewed might be something else - perhaps the agent of change (government, food retailer), the target group (individual, farmer), the context (school, workplace) or the temporal organisation of meals, or even of life.

Table 1 gives just a few examples.

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

48 Chapter 3: Policy process and practice in Nuffield (2007). *Public health: ethical issues*, Nuffield Council on Bioethics, London.

Table 1: Ways of categorising interventions

Categorisation lens	Example
Actor (ie. change agent)	eg. 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)	eg. Food producers, food manufacturers and retailers, and eaters (defined variously as individuals, families, consumers, citizens)
Value frame	eg. Health, environment, animal welfare, 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	eg. 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	eg. Life stage - starting school, pregnancy, marriage, retirement
Timing - eating occasion	eg. Breakfast, lunch, dinner, snacks, celebration meals, on the go eating
Intervention theory	eg. 4Ps of marketing theory, Defra's 4 Es framework, Michie and West behaviour change wheel, Nuffield Ladder, Nudge
Transparency to end consumer	eg. Product reformulation (where the consumer may not even realise they are consuming differently) through to rationing
Coerciveness	eg. Education, pricing changes, regulation

To a certain extent, these lenses can be laid over one another to generate matrices. Table 2 is organised along the lines of the Nuffield approach but it could be reconfigured so that the left-most column lists different actors, different meal occasions, or different value-sets. Different approaches to categorising interventions may yield new insights into what is possible or how interventions work together, and from a research perspective, may prompt new ways of conceptualising and designing research projects.

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, retailers, caterers; 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 *life stages*, or on different *eating occasions* (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	Food industry (manufacturers, retailers, public and private sector food service	Individuals; catering buyers?	Shops, workplaces (including conferences , conferences, restaurants	Does not rely on overt messaging although choice of wording (eg. referring to people as	As above – focuses on times when people are at their most unreflective (eg. shopping on the way

	layouts, opt-ins to meat when listing dietary preferences; vegetarian meal deals			etc.	citizens or parents rather than as 'consumers' – or vice versa) may also have a 'nudge' effect	home from work, choosing a sandwich at lunch)
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, 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 *times in their life* (eg. mother & baby groups); support needed at times when people are most 'vulnerable' to unsustainable *food practices* 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.

Moving on from the types of interventions that are possible, there are also the risks to consider. Disagreements about what ought to be done are often based on stakeholders' perceptions not just of their effectiveness, but of the unwanted consequences that might ensue. Table 3 below lists just a few that might arise from an intervention aimed at reducing meat consumption. These are hypothetical, but one or a combination of them are possible, depending on the type of intervention, and of course they affect different sections of society differently. Stakeholders who are wary of the 'less meat' agenda may play up these risks. Advocates, on the other hand, may argue that with good planning and an integrated policy approach, they can be avoided.

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 a more sustainable diet but feel justified in buying that new iPad or flying off on holiday.	Impacts on health positive, impacts on environment will depend on the consumption practice that is substituted
Leaky system effect	People in the UK consume a healthier more sustainable diet but farmers increase	No net benefit - impact swapping

	their exports; or farmers in the UK reduce their production but imports of meat simply increase	
Employment effect	People eat a more sustainable diet; 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.

At present evidence and policy alike are lacking and we are left with claims and counterclaims, with advocacy on the one hand, and inaction on the other.

3. Conclusion

This discussion paper has summarised what we know so far about the characteristics of healthy and more environmentally sustainable diets. There is clearly much more that needs to be understood, but a general direction of travel is becoming clearer.

It has also sought to provide an overview of the main theories of behaviour and behaviour change and has discussed some of the disciplinary and ideological influences on these theories. It has emphasised that ideologies and disciplinary biases likewise influence stakeholders' views on what courses of action are appropriate, desirable and legitimate. It points out that there are diverse ways of categorising and thinking about interventions and suggests that by shuffling the pack in different ways, new ideas about which approaches might be possible and researchable could be generated, to help advance understanding in this area. It also highlighted some of the hypothetical risks arising from ill-considered interventions, risks that stakeholders will weight differently depending on their standpoints and that give rise to advocacy both for and against action. Critically, it noted that insufficient knowledge leads to, helps perpetuate, or even justify, inaction. There is clearly a need for more evidence to support action. But the nature of this knowledge and its relationship with policy also needs to be considered since some evidence requires the implementation of policies whose impacts can then be monitored – a form of action research.

The purpose of this workshop is to take a first step in thinking more systematically about how a societal shift towards more sustainable diets might be achieved. Its goals are to make a start in articulating answers to the following five questions: **a.** what do we know? **b.** what don't we know? **c.** where do we know enough to justify action now? **d.** where is more understanding is needed? And **e.** what sort of research would help improve the evidence base needed for effective policy making?