Chatham House Report

Laura Wellesley, Catherine Happer and Antony Froggatt

# Changing Climate, Changing Diets

## Pathways to Lower Meat Consumption


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The Royal Institute of International Affairs

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*Grand Central Market, Los Angeles, October 2015.*

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# Acronyms and Abbreviations

| | |
|---|---|
| AICR | American Institute for Cancer Research |
| ARS | Agricultural Research Service (US) |
| CCTV | China Central Television |
| CDC | Centers for Disease Control and Prevention (US) |
| CNN | Cable News Network |
| DEFRA | Department for Environment, Food and Rural Affairs (UK) |
| EUFIC | European Food Information Council |
| FAO | Food and Agriculture Organization |
| FDA | Food and Drug Administration (US) |
| GDP | gross domestic product |
| GHG | greenhouse gas |
| GLEAM | Global Livestock Environmental Assessment Model |
| GUMG | Glasgow University Media Group |
| GWP | global warming potential |
| IARC | International Agency for Research on Cancer |
| IFPRI | International Food Policy Research Institute |
| INDCs | Intended Nationally Determined Contributions |
| IPCC | Intergovernmental Panel on Climate Change |
| LCA | life-cycle assessment |
| NCD | non-communicable disease |
| NGO | non-governmental organization |
| NDRC | National Development and Reform Commission (People's Republic of China) |
| NSDGs | National Sustainable Dietary Guidelines |
| PPP | purchasing power parity |
| R&D | research and development |
| SDG | Sustainable Development Goal |
| SSBs | sugar-sweetened beverages |
| UNFCCC | United Nations Framework Convention on Climate Change |
| USDA | United States Department of Agriculture |
| WCRFI | World Cancer Research Fund International |
| WHO | World Health Organization |

# Executive Summary and Recommendations

Demand for animal protein is growing. Global consumption of meat is forecast to increase 76 per cent on recent levels by mid-century. A 'protein transition' is playing out across the developing world: as incomes rise, consumption of meat is increasing. In the developed world, per capita demand for meat has reached a plateau, but at excessive levels. Among industrialized countries, the average person consumes around twice as much as experts deem healthy. In the United States, the multiple is nearly three times.

This is not sustainable. A growing global population cannot converge on developed-country levels of meat consumption without huge social and environmental cost. Overconsumption of animal products, in particular processed meat, is associated with obesity and an increased risk of non-communicable diseases (NCDs) such as heart disease, type-2 diabetes and certain types of cancer. Livestock production is often a highly inefficient use of scarce land and water. It is a principal driver of deforestation, habitat destruction and species loss.

Crucially, these consumption trends are incompatible with the objective of avoiding dangerous climate change. The livestock sector is already responsible for 7.1 $GtCO_2e$ a year of greenhouse gas (GHG) emissions – just under 15 per cent of the global total, and equivalent to tailpipe emissions from all the world's vehicles. Rising demand means emissions will continue to rise. Even with best efforts to reduce the emissions footprint of livestock production, the sector will consume a growing share of the remaining carbon budget. This will make it extremely difficult to realize the goal of limiting the average global temperature rise to 2°C above pre-industrial levels, agreed in 2010 by parties to the UN climate change conference in Cancún.

As countries prepare to agree a new international deal at the UN climate change conference in Paris in December 2015, there remains a significant gap between the emissions reductions countries have proposed and what is required for a decent chance of keeping temperature rise below 2°C. Governments need credible strategies to close the gap, and reducing meat consumption is an obvious one: worldwide adoption of a healthy diet would generate over a quarter of the emission reductions needed by 2050.

There is therefore a compelling case for shifting diets, and above all for addressing meat consumption. However, governments are trapped in a cycle of inertia: they fear the repercussions of intervention, while low public awareness means they feel no pressure to intervene.

This report offers a challenge to the received wisdom that these obstacles are insuperable. Drawing on original research, including an innovative survey of public attitudes in 12 countries and extensive focus groups and stakeholder consultations in Brazil, China, the United Kingdom and the United States, it suggests how the cycle of inertia can be broken and a positive dynamic of government and societal action created. It argues that although reducing meat and dairy consumption is far from straightforward, it is neither an insurmountable task nor more challenging than other climate imperatives, such as decarbonizing power, industry and transport.

## Key findings

### Governments must lead

Governments are the only actors with the necessary resources and capacities to redirect diets at scale towards more sustainable, plant-based sources of protein.

- **The market is failing.** Without government intervention at national and international level, populations are unlikely to reduce their consumption of animal products and there is insufficient incentive for business to reduce supply. Global overconsumption will bring increasing costs for society and the environment.
- **Publics expect government leadership.** Focus groups conducted during the research across four countries with varying political, economic and cultural conditions all demonstrated a general belief that it is the role of government to spearhead efforts to address unsustainable consumption of meat. Government inaction signals to publics that the issue is unimportant or undeserving of concern.
- **Governments overestimate the risk of public backlash.** Soft interventions to raise awareness among consumers or 'nudge' them towards more sustainable choices, for example by increasing the availability and prominence of alternative options at the point of sale, are likely to be well received. More interventionist – but necessary – approaches such as taxation do risk public resistance, but focus group respondents thought this would be short-lived, particularly if people understood the policy rationale.

### Raising awareness is the first step, not the solution

There is a considerable awareness gap regarding the links between livestock, diet and climate change. While awareness-raising alone will not be sufficient to effect dietary change, it will be crucial to ensuring the efficacy of the range of government policy interventions required.

- **Public understanding of livestock's role in climate change is low** relative to that for comparable sources of emissions. This finding was repeated across all surveyed countries and in all focus groups. People have generally not read or heard about the connection, and may struggle to reconcile it with their own understanding of how emissions occur.
- **The impact of increased awareness on behaviour is intricate.** Increased understanding of the link between livestock and climate change is associated with greater willingness to reduce consumption. At the point of purchase, however, more immediate considerations – both conscious and subconscious – have more sway over consumer decisions. Price, health and food safety have the greatest bearing on food choices, while subconscious cues offered by the marketing environment influence an individual's automatic decision-making. Consequently, strategies focused only on raising awareness will not result in societal behaviour change.
- **Raising awareness can bolster support for government action.** Although raising awareness is unlikely to have a marked impact on individual behaviour, it may make publics more supportive and accepting of policy intervention. Focus group discussions revealed that people were more likely to back government action after being exposed to information about the role of livestock in climate change. Public information campaigns were perceived as a necessary first step in any wider strategy to reduce consumption.

### The issue is complex, but the message must be simple

Publics respond best to simple messages. Efforts must be made to develop meaningful, accessible and impactful messaging around the need for dietary change.

- **Emissions vary by animal and production system.** Broadly speaking, emissions from ruminant animals – cows, sheep and goats – are higher than for monogastric animals such as chickens or pigs, and emissions from animal products more generally are considerably higher than those associated with plant-based foods. However, significant variation can result from differences in production system and life-cycle assessment methodologies.
- **Trade-offs abound.** What is best for the climate may not be best for animals or other aspects of the environment. For example, emissions from intensively reared beef tend to be lower than from pasture-fed beef, but the practice raises other problems relating to animal welfare, inefficient use of crops for feed, water pollution and antimicrobial resistance from overuse of antibiotics. The picture is complex.
- **The risk of confusion is high.** Complexity presents an opportunity for interest groups to cloud the issue and create doubt or uncertainty in the minds of consumers, for example by conflating direct and life-cycle emissions or blaming the problem on unsustainable production practices in other countries.
- **However, the overall message is clear: globally we should eat less meat.** Global per capita meat consumption is already above healthy levels; critically so in developed countries. We cannot avoid dangerous climate change unless consumption trends change.

### Trusted sources are key to raising awareness

Unless disseminated and supported by trusted sources, new information that encourages shifts in meat-eating habits is likely to be met with resistance. Identifying trusted information-providers and adopting cooperative approaches among them will be critical to raising awareness and engaging the public in this issue.

- **This may not always mean governments.** Survey data indicate that trust in government as a source of information on livestock and climate change varies considerably between countries. Climate change was perceived as a politicized issue, particularly in the US and UK focus groups where public debates were understood to be framed by political ideologies and economic interests.
- **Experts are the most trusted source.** Although trust in experts varies between countries too, within countries they are always considered the most reliable source of information on climate change and livestock. Environmental NGOs are also often seen as a reliable source of information.
- **Social media hold less sway than may be expected.** Despite the rapid rise of social media and a shift in the way that many around the world access news and share information, mainstream media outlets continue to set the agenda and direct public engagement and opinion. An awareness of financial and political influence over these media outlets and widespread acknowledgment of pervasive bias across many major news agencies has not eroded an implicit trust in mainstream media to bring to light issues of public concern.

## Recommendations

Action is needed on three fronts.

### Build the case for government intervention

A compelling evidence base that resonates with existing policy objectives such as managing healthcare costs, reducing emissions and implementing international frameworks will help mobilize policy-makers.

- **Evaluate the economic grounds for change.** The social and environmental costs of meat overconsumption are significant, in terms of a growing NCD burden, obesity, climate change and natural capital depletion. An international taskforce could undertake a first assessment of these costs and quantify the potential economic gains from reduced consumption.
- **Align with the broader sustainability agenda.** Strategies to effect dietary change and to address unsustainable meat production and consumption could form a core component of the post-2015 development agenda. As the international community moves to realize the Sustainable Development Goals (SDGs), policy-makers should capitalize on this moment of change and emphasize the importance of a global reduction in meat consumption to fostering sustainable, equitable resource use across all sectors.
- **Establish international norms for a sustainable, healthy diet.** International recommendations are needed to help governments elaborate and integrate environmental standards into dietary guidelines. These could be developed among relevant international bodies such as the World Health Organization, Food and Agriculture Organization or Intergovernmental Panel on Climate Change, and would provide a benchmark against which national plans and consumption patterns can be assessed.
- **Build the evidence base for policy-makers.** A lack of evidence on the efficacy of different interventions to change diets inhibits government action. More research and piloting is needed to identify transferable lessons from health and nutrition interventions. Systematic, independent evaluation processes should be designed into intervention strategies. While evidence for the climate impact of meat and dairy consumption is strong, current approaches to national GHG accounting encourage a focus on supply-side mitigation. A more comprehensive approach that measures all emissions associated with national consumption practices would further strengthen the policy rationale for much-needed demand-side measures.
- **Work across government.** The issues associated with overconsumption of animal products are potentially relevant to various ministries including environment (and/or climate change), health, education, business and agriculture. A joined-up approach will require mobilization across government, for example through a taskforce or inter-ministerial working group.

### Initiate national debates about meat consumption

Increasing public awareness about the problems of overconsumption of animal products can help disrupt the cycle of inertia, thereby creating more enabling domestic circumstances and the political space for policy intervention. Governments have a role to play here, as do the media, the scientific community, civil society and responsible business.

- **Tailor strategies to national contexts.** Attitudes to meat and climate change vary considerably by country and are shaped by a variety of political, social and cultural factors. Any intervention strategies must therefore be sensitive to these factors.
- **Broaden the message.** Climate change is generally subordinate to other more personal considerations such as price, health, food safety and localized environmental concerns. Messages should focus on the co-benefits of reduced consumption.
- **Ensure the message is accessible.** The complexity of the links between overconsumption of animal products and health and environmental impacts will be difficult to convey to publics whose existing levels of understanding and interest are low. In order for communication campaigns to be accessible, meaningful and impactful, they will need to focus on hard-hitting facts and visual linkages between meat, dairy products and climate change.
- **Mobilize mainstream media.** Mainstream media coverage signals importance. Governments, academic institutions and civil society groups should forge links with relevant journalists, specialist communication agencies and non-partisan experts such as scientists.
- **Engage independent and surprising communicators.** Non-partisan experts will be most trusted by publics and should be central to any awareness-raising campaigns. In some national contexts, celebrities may also have an important role to play in establishing and promoting social norms of reduced consumption. Unusual or unexpected actors – for example, a major retailer promoting plant-based alternatives – could have particular impact.

### Pursue comprehensive approaches

The evidence indicates that shifting diets will require comprehensive strategies drawing on all components of the intervention toolkit. Such strategies will amount to more than the sum of their parts by sending a powerful signal to consumers that reducing meat consumption is beneficial and that government takes the issue seriously. Successful policies will be tailored to national contexts, and may benefit from framing government-led dietary guidance around a positive message of cultural preservation and the promotion of gastronomic diversity.

- **Expand choice.** It needs to be easier for people to shift their purchasing behaviour, whether consciously or automatically, through improved availability and promotion of non-meat alternatives; a wider choice of vegetarian or low-meat options among pre-prepared meals in retail environments, for example, or greater prominence of vegetarian options in cafeterias.
- **Capitalize on public procurement.** Particular opportunities for policy-makers exist in public institutions such as schools and hospitals, and governments may also implement regulations or agree targets with businesses. In many countries, the public sector accounts for an important share of food procurement. Governments would therefore be able to reach a large section of the population and to drive wider change if businesses harmonize supply chains to save costs. Such measures would also enable them to demonstrate commitment to the issue.
- **Use price.** Interventions to change the relative prices of foods are likely to be among the most effective in changing consumption patterns. Opportunities include removal of direct or indirect subsidies to the livestock sector, subsidization of plant-based alternatives, or interventions to increase the price of meat and other unsustainable products, such as a carbon tax.
- **Learn by doing.** There is a need for more evidence about the efficacy of different interventions and how this is affected by contextual factors. Some interventions may have unintended consequences. Governments should test strategies, building in strong monitoring and evaluation processes, and be prepared to modify and refine approaches as they move forwards.
- **Support innovation.** The absence of a strong signal from government to promote low-meat diets discourages private investment in research and development (R&D) for alternatives, and may be a disincentive to industry action to increase the range and share of plant-based options on offer. Despite this, efforts are under way to develop new plant-based meat alternatives and 'lab grown' meat, though these innovations remain some way from commercialization. Policies to support R&D and help 'pull' promising technologies to market should be explored.
- **Promote and protect diversity.** As the protein transition advances, traditional diets recede and consumption of processed and pre-prepared food increases. This report identifies low levels of understanding about what constitutes a balanced diet, and the relative shares of animal versus plant-based products within this. Education campaigns to promote balanced diets and preserve knowledge about food preparation and cooking present an opportunity to address these problems.

It is time for governments to revisit assumptions that reducing meat consumption is too difficult or too risky. As the global burden of NCDs and obesity grows, policies aimed at reducing the intake of salt, sugar and unhealthy fats are proliferating. Government capacity to influence diets is expanding and publics are becoming increasingly accepting of the role of government in this area.

Including meat in such efforts would help deliver on the public health agenda while also meeting environmental objectives. In particular, as the international community prepares to move forward with implementation of the SDGs and closing the emissions gap after the Paris conference, governments need to be able to offer credible policies. Reducing meat consumption should be high on the list.

# 1. The Meat of the Problem

## Introduction

Agriculture is a major driver of climate change. Globally, food systems are responsible for up to 30 per cent of all human-driven greenhouse gas (GHG) emissions. The production of animals and of crops for feed alone accounts for nearly a third of global deforestation and associated carbon dioxide emissions: it is a primary source of methane and nitrous oxide, two of the most potent GHGs; and in terms of water, land and energy use it is highly resource-intensive.[1, 2]

Emissions from the livestock sector – primarily from cattle and sheep, but also from chickens, pigs and other animals – account for as great a share of global GHGs as tailpipe emissions from fuel burnt in all the world's vehicles; each contributes around 14.5 per cent of total emissions.[3] Methane, nitrous oxide and carbon dioxide are released along the length of the value chain, from the production of crops and the conversion of new land necessary to meet growing demand for animal feed, through the heating and cooling of farm buildings and the processing of animal products, to emissions from the digestive processes and manure of the animals themselves, and the transport of products to the consumer (see Box 1).

### Box 1: Assessing the carbon footprint of meat and alternatives

Estimating an average emissions intensity of meat by livestock species is a calculation requiring many assumptions and caveats, which bring a degree of uncertainty both within and between studies. There can also be a large degree of variation in emissions intensities between types of livestock production systems and the regions in which they occur. Generalizations must therefore be treated with caution.

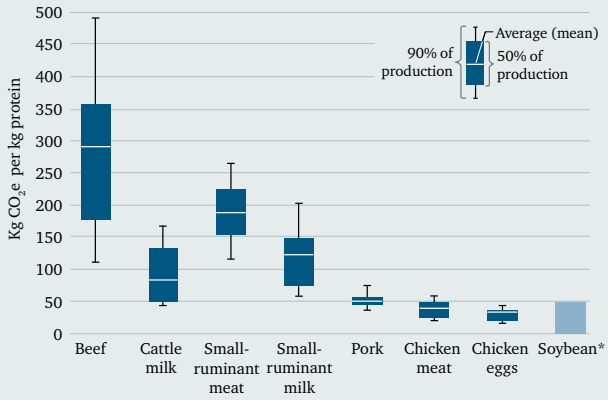
While a number of recent studies have assessed the relative emissions intensity of different meat- and plant-based protein sources and efforts are under way to encourage the harmonization of life-cycle assessment (LCA) methodologies,[a] there remains no definitive method for direct comparison across crop and animal products. Despite this, the overall patterns are clear.

Between animal products there are striking differences in average emissions intensity. Broadly speaking, meat from ruminant animals – cows, sheep and goats – tends to be far more emissions-intensive than meat from monogastric animals – poultry and pigs. Beef is, on average, around eight times more emissions-intensive on a per-kilo-of-product basis than chicken and over six times more emissions-intensive than pork.[b]

The reasons for this are well established: the digestive system of ruminant animals produces significant volumes of methane; feed conversion rates tend to be lower; and both generational and reproductive cycles are much longer, meaning that a greater share of energy and feed inputs is consumed in simply maintaining the animals rather than in producing outputs.[c]

Comparison between meat and dairy products also raises difficult methodological questions. Owing to the relatively high water content of milk, for example, emissions associated with one kilo of milk are low relative to those from the same amount of beef.[d] Nevertheless, cattle milk accounts for a level of GHG emissions that is twice as high on a per-kilo-of-protein basis as that of chicken meat (see Figure 1). And on a per-species basis, dairy cattle contribute a similar share of global livestock emissions to that of beef cattle.[e]

Figure 1: Global emissions intensities by commodity




*Soybean data: soybean emission intensity range for various production conditions in Latin America; Chatham House analysis based on data from Castanheira and Freire (2013); raw soybean protein content data from USDA National Nutrient Database for Standard Reference Release 28.
Sources: Adapted from FAO (2013) and Castanheira and Freire (2013).

[1] Emissions resulting from the entire food supply chain, see Vermeulen et al. (2012); Chatham House analysis based on embodied deforestation estimates for 1990–2008 (European Commission (2013)).
[2] Each greenhouse gas has a different global warming potential (GWP). Gases with a high GWP relative to other GHGs will result in a greater degree of warming over a given time period (with the most common reference period being 100 years). The measure takes carbon dioxide ($CO_2$) as a reference, its GWP being 1. Methane ($CH_4$) and nitrous oxide ($N_2O$) have much higher GWPs (28 for the former and 265 for the latter, though these values are highly uncertain). Although both remain in the atmosphere for less time than $CO_2$, they absorb much more energy and so have a considerably greater warming effect. See Myhre et al. (2013) in IPCC (2014).
[3] The UN Food and Agriculture Organization (FAO) estimates emissions attributable to the livestock sector amount to 7.1 $GtCO_2$ per annum. This encompasses emissions associated with activities along the value chain, including feed production, livestock production, slaughter, processing, transport and retail; see FAO (2013). The Intergovernmental Panel on Climate Change estimates direct emissions from global transport amounted to 7.0 $GtCO_2$ in 2010; see IPCC (2014).

Table 1: Emissions intensity and protein content of selected animal products and soybeans

| | Average $CO_2$e kg/kg protein | Average protein content g/100g product | Average $CO_2$e kg/kg product |
|---|---|---|---|
| **Beef** | 291.2 | 19.4 | 56.6 |
| **Small-ruminant meat*** | 189.2 | 16.6 | 31.3 |
| **Pork** | 51.9 | 16.9 | 8.8 |
| **Chicken meat** | 40.3 | 17.4 | 7.0 |
| **Eggs** | 31.4 | 12.6 | 3.9 |
| **Cattle milk** | 83.6 | 3.2 | 2.6 |
| **Soybean**** | 48.8 | 36.5 | 17.8 |

Source: $CO_2$e kg/kg protein data for animal products from United Nations Food and Agriculture Organization (FAO) GLEAM 1.0, reference year 2005 (beef, small-ruminant meat, pork, chicken meat, chicken eggs, cattle milk); $CO_2$e kg/kg product for soybean from Castanheira and Freire (2013). Analysis from Chatham House based on protein content data from United States Department of Agriculture's Agricultural Research Service (USDA ARS) National Nutritional Database (raw products: ground beef, ground lamb, ground pork, ground chicken, egg, soybeans, whole milk).
*FAO GLEAM 1.0 data are for small-ruminant meat; average protein content given above is for lamb.
**Soybean life-cycle GHG balance for the maximum emissions intensity scenario: no-tillage cultivation in tropical rainforest. For no-tillage cultivation in moderately degraded savannah – the mid-level emissions intensity in the range of soybean production scenarios for Latin America, as in Castanheira and Freire (2013) – $CO_2$e kg per kg product is 5.0, and the $CO_2$e kg per kg protein is 13.7. This is less emissions-intensive on a per-kilo-of-product basis than all meats above.

LCA methodologies provide a means of comparing embedded emissions of products with varying input requirements, direct emissions intensities and supply chain complexity. While there has been no comprehensive study yet to estimate global average life-cycle emissions across both animal and plant products, comparison between similar LCA approaches provides a valuable indication of the emissions intensity of meat products (including emissions relating to the production of soy- and grain-based animal feed) relative to soybeans for human consumption.

From this comparison, it is clear that, even when produced in the most emissions-intensive of systems, soybeans account for a minimal volume of GHG emissions per kilo of product relative to beef, while offering a more efficient source of protein (see Table 1) and comparable levels of micronutrients.[f] At the very upper end of the emissions intensity range, life-cycle emissions from soybeans are around six times lower per kilo of protein than the average emissions intensity for the same amount of beef.

[a] See, for example, the Livestock Environmental Assessment and Performance (LEAP) Partnership, www.fao.org/partnerships/leap.
[b] FAO GLEAM 1.0, reference year 2005 (beef, chicken meat, pork, chicken eggs, cattle milk).
[c] Steinfeld and Gerber (2010).
[d] de Vries and de Boer (2010).
[e] FAO (2013).
[f] USDA ARS National Nutritional Database (iron and zinc content values for cooked beef steak and roasted soybeans).

## Global resource constraints

Addressing unsustainable consumption is a strategic necessity if we are to feed nine billion people by the end of the century while averting dangerous climate change. Consumption of meat and dairy produce is expected to rise by 76 per cent and 65 per cent respectively by the middle of the century,[4] driven by a rising population and a shift in dietary preferences towards protein-rich foods. Our growing global appetite for these products will see emissions from the sector continue to increase, and will exert ever more pressure on scarce natural resources.

Growth in GHG emissions associated with meat and dairy consumption on this scale cannot be contained by supply-side mitigation alone. The emissions and resource intensity of feed and animal production systems, and of different animal products (see Box 1), varies greatly at regional, national and farm level:[5] considerable opportunity exists for encouraging a shift away from the least climate-friendly products and for improving the efficiency of production. But even if livestock producers the world over were to shift to the most efficient practices currently available, this move would not be enough to stave off an untenable upward trend in livestock-sector emissions.[6]

[4] Bailey et al. (2014), based on FAO projections for 2050 against a baseline of 2005–07 from FAO (2012).
[5] Eshel et al. (2014).
[6] FAO (2013); Bailey et al. (2014).

Heightened demand for meat and dairy products is putting pressure on agricultural land, two-thirds of which is already used for grazing or to produce crops destined for animal feed.[7] Livestock production has dominated land-use change,[8] pushing crop production and pastures onto marginal lands and into areas of high conservation or biodiversity value.[9] The resulting damage to and loss of habitats is contributing to species extinction at an alarming rate: up to 100,000 species are lost each year.[10]

One-third of the calories produced worldwide, and half of all plant protein, is fed to animals.[11] Directly or indirectly, the production of animals accounts for around 27 per cent of global consumption and pollution of freshwater resources.[12] While geographical conditions and production practices vary considerably, the conversion of these inputs into meat and dairy produce can be remarkably inefficient.[13]

With approximately five billion people expected to be affected by water stress by 2050,[14] and the need for annual cereal production to rise by 900 million tonnes by 2050 to meet global demand,[15] the continued diversion of finite land, water and food resources to meat and dairy production will become increasingly hard to justify.

## Public health concerns

Moreover, and perhaps most importantly for many, the excessive amount of meat and dairy produce we are eating globally is unsustainable not only for the environment, but also for our health.[16] Overconsumption of red and processed meat is directly associated with increased risk of non-communicable diseases (NCDs): a recent WHO report found that 50 grams of processed meat a day can

### Box 2: What is a healthy diet?

There is no single definition of a healthy diet. Nutritional needs vary from person to person, and the choices available to an individual depend on a range of socioeconomic, geographical and cultural factors. There are, however, a number of characteristics common to healthy dietary patterns.[a]

From a public policy perspective, a healthy dietary pattern is one that protects against hunger and malnutrition in all its forms, and that minimizes the risk of diet-related health problems.[b] In this sense, it is diverse and balanced, providing sufficient calories, macronutrients and micronutrients while not exceeding maximum recommended levels.

In order for a healthy diet to be available to all in the long term, consumption patterns must also be sustainable and equitable: they should not undermine current or future populations' capacity to produce and to access sufficient, nutritious food.

For the purposes of this report, a healthy diet is therefore understood to be one that meets nutritional requirements while also being environmentally sustainable, in accordance with a set of general principles laid out in a recent review of the literature.[c] These principles include – but are not limited to – the following:

- diets are diverse, comprising a wide variety of foods;
- diets are balanced in terms of the energy intake and energy needs of the individual, avoiding overconsumption;
- diets are based around a wide range of minimally processed plant-based foods, including plentiful fruits and vegetables, pulses and legumes, grains, roots and tubers;
- dairy products are eaten in moderation;
- meat, if included, is eaten sparingly.

At a national, local and individual level, these guiding principles require adjustment and tailoring in line with cultural and geographical contexts, as well as the preferences and requirements of the individual.[d]

[a] Katz and Meller (2014).
[b] WHO (2015).
[c] Garnett (2014a); see also Garnett (2014b).
[d] Garnett (2014b).

[7] Machovina et al. (2015).
[8] Alexander et al. (2015).
[9] Machovina et al. (2015).
[10] WWF (2015).
[11] Ravilious (2013) based on Cassidy et al. (2013).
[12] Gerbens-Leenes et al. (2013).
[13] FAO (2013); Smil (2013); Eshel et al. (2014).
[14] Schlosser et al. (2014).
[15] FAO (2009a).
[16] Diets high in animal products are associated with an increased risk of NCDs such as heart diseases, type-2 diabetes and some forms of cancer; see Allen et al. (2008); Larsson and Wolk (2006). Diabetes treatment accounts for 10 per cent of the UK's National Health Service budget every year; see Diabetes UK (2015).

increase the risk of colorectal cancer by 18 per cent.[17] It has also been identified as a contributor to obesity[18] – now one of the three most costly social burdens created by humans.[19] This consumption pattern is not shared equally: we live in an era of 'complex, overlapping and connected malnutrition burdens',[20] where overconsumption of meat is elevating the incidence of NCDs for some, while insufficient access to the nutrients they provide can be a contributing factor to pervasive malnutrition for others. The industrialization of animal production to meet growing demand has also seen the widespread use of antibiotics to prevent disease, contributing to increased antimicrobial resistance and rising costs of treatment.[21]

## Box 3: Changing diets, changing minds

Efforts by state and non-state actors alike to push dietary change up the political agenda are likely to face resistance for a number of reasons, not least because a focus on reducing – rather than driving up – demand implies countering the trajectory of the protein transition and of consumption-led growth that some see as an indication of social and economic development. In addition, the received wisdom among governments is that supply-side change is both practically and politically easier to champion. The complexity of the issues at stake, coupled with the thin evidence base for designing effective policies to encourage reduced demand for meat, leaves considerable space for more conservative industry groups and governments to exploit uncertainty and defend the better-trodden path of supply-side mitigation.

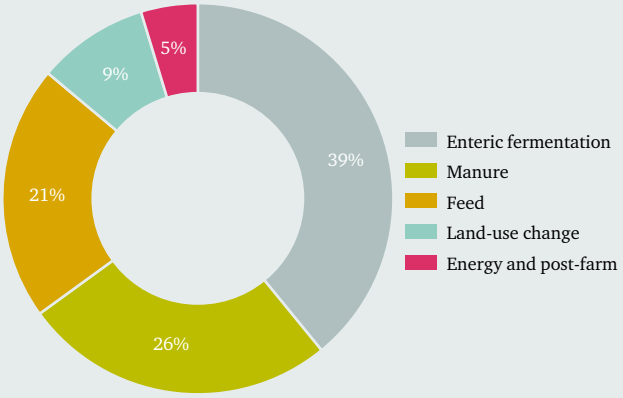
### National emissions accounting

Current frameworks within which GHG emissions are measured and monitored are production-based: governments are accountable for only those emissions that occur within national borders, i.e. those directly resulting from national livestock production. An alternative consumption-based approach would allocate GHG emissions resulting from the entire meat and dairy supply chain – including from land-use change for feed production and grazing, the production and use of fertilizers, and the transportation, processing and storage of feed and animal products (see Figure 2) – to the country in which the final products are consumed.

As a result of the production-based approach, major livestock-producing countries that rely heavily on imported fertilizers and feed, and major meat- and dairy-importing countries, are not being held to account for the carbon footprint of national consumption patterns. Consequently, there is little incentive for these governments to address the environmental impacts and emissions associated with unsustainable consumption or to incorporate demand-side mitigation measures into national climate strategies.

Complementary emissions inventory frameworks to ensure that consumption-based emissions are captured, and further independent research to measure consumption-based emissions at both national and global levels, would greatly strengthen the evidential basis and policy rationale for demand-side action to reduce the climate impact of the livestock sector.

Figure 2: Breakdown of livestock sector emissions by source




Source: Chatham House analysis based on FAO (2013).

### Supply-side efficiency improvements

The livestock sector is highly heterogeneous: production systems vary from farm to farm and region to region and, as a result, the range in total direct and indirect emissions associated with a given meat or dairy product may be very wide indeed.

Significant scope therefore remains for improving the efficiency of production across much of the global livestock sector, and consequently policy attention around the means and potential of supply-side mitigation measures has far outweighed that around demand-side options.[a] Discussions with industry and government stakeholders in China, Brazil, the United Kingdom

[17] A study published by the International Agency for Research on Cancer (IARC) in October 2015 reported the consumption of red meat as 'probably carcinogenic to humans' and processed meat as 'carcinogenic to humans'. The experts concluded the global impact of the consumption of processed meat to be of 'public health importance'; see IARC (2015), p. 1. See also Bouvard et al. (2015); Aune et al. (2009).
[18] Rouhani et al. (2014).
[19] Dobbs et al. (2014).
[20] IFPRI (2014).
[21] In the US, antimicrobial resistance is associated with excess health costs of $20 billion a year. See CDC (2011); CDC (2015).

and the United States as part of this research project revealed a strong tendency for industry and government actors alike to hail efficiency improvements in production as a more practical, effective and politically preferable means of reducing the climate impact of the livestock sector than strategies to encourage a reduction in meat and dairy consumption.

With private-sector interests across the feed, livestock, meat-packing, pharmaceutical and retail industries stacked strongly in favour of increased demand, and in the light of the important contribution of these sectors to GDP and rural employment in many of the largest emitting nations, a shift away from meat-rich diets is likely to meet with considerable political resistance.

### Development agenda

While the health benefits of predominantly plant-based diets are well-established,[b] physical and economic access to such a diet, as well as the ability to utilize such foods effectively, may be limited across certain populations both between and within countries. Where diverse and nutritious alternatives to meat and dairy products are not readily available, and where malnutrition and poverty are pervasive, livestock production and meat consumption continue to be understood as an essential means of improving nutrition, generating income and ensuring food security.[c]

It will therefore be important for policy-makers to recognize the varying needs of different demographic groups, and to tailor policy strategies and public messaging around dietary change accordingly. At a global level, policy approaches may benefit initially from an emphasis on moderating meat consumption, rather than on the prescription of a generalized message of reduction or substitution, which would be more appropriately targeted at high-consuming countries. Equally important globally will be the development of strategies to ensure the ubiquitous availability, affordability and desirability of nutritious plant-based foods.

[a] Cederberg et al. (2013); Hedenus et al. (2014).
[b] Katz and Meller (2014).
[c] Smith et al. (2013).

## The cycle of inertia

Dietary change at a global level – reducing the total amount of meat and dairy produce we eat, distributing this more equitably across the world's population and converging around healthy intake levels (see Box 2 and Annex B) – offers an important opportunity to keep global warming from reaching disastrous levels while also achieving significant and multiple co-benefits.

Despite this, fostering dietary change is a policy route that few governments have so far been willing to take.[22] Measures to encourage such a shift may involve difficult and politically sensitive trade-offs (see Box 3). For the most part, governments have opted to pursue mitigation in other sectors – such as energy – that are perceived, arguably in error, to be less challenging and less controversial. While a number of civil society organizations have recently sought to fly the flag for a shift in meat-eating habits,[23] these have largely been dwarfed by the scale of momentum behind decarbonization and divestment campaigns in other sectors.

Low government interest has resulted in low media interest in most countries, and publics are largely unaware of the contribution of our diets to global warming. Limited civil society pressure and a fear of industry backlash – together with an unwillingness to raise the spectre of rationing, or accusations of 'nanny state-ism' or market intrusion – have favoured policy inaction, resulting in a paucity of evidence around the efficacy of possible interventions.[24] This, in turn, has dissuaded subsequent governments from taking action, perpetuating the cycle of inertia around the problem of unsustainable food consumption patterns.

## International climate action

The international climate community has been relatively silent on the urgent need for a shift in dietary practices. While it is covered in the Fifth Assessment Report of Working Group III of the Intergovernmental Panel on Climate Change (IPCC),[25] efforts to establish a specific workstream on agriculture within the UN Framework Convention on Climate Change (UNFCCC) process have failed.

The lack of a common and substantive reporting framework for consumption-based emissions (see Box 3) has propagated a focus at international and national level on supply-side mitigation. Yet even in the context of supply-side action, livestock production is afforded minimal – if any – attention in national emissions reduction plans; and initiatives to mitigate its impact receive negligible support from climate

[22] Bailey et al. (2014).
[23] See Brighter Green in the US and China (http://brightergreen.org/), 'Meatless Monday' (http://www.meatlessmonday.com/) and 'Eating Better in the UK' (http://www.eating-better.org/).
[24] Garnett et al. (2015).
[25] IPCC (2014).

finance mechanisms.[26] Efforts are under way to establish climate-smart agriculture as an overarching conceptual framework for tackling agricultural emissions, but what is missing from this picture is a sorely needed discussion on climate-smart diets.

As we approach the signing of a new climate agreement in Paris in December 2015, we can no longer afford to continue on this path of inaction. Past emissions mean we are already locked in to global warming of 1.5°C above pre-industrial levels.[27] The Intended Nationally Determined Contributions (INDCs) on the table so far indicate that the Paris deal will not be enough to avert dangerous climate change, instead setting us on track for global warming of 2.7°C by the end of the century.[28]

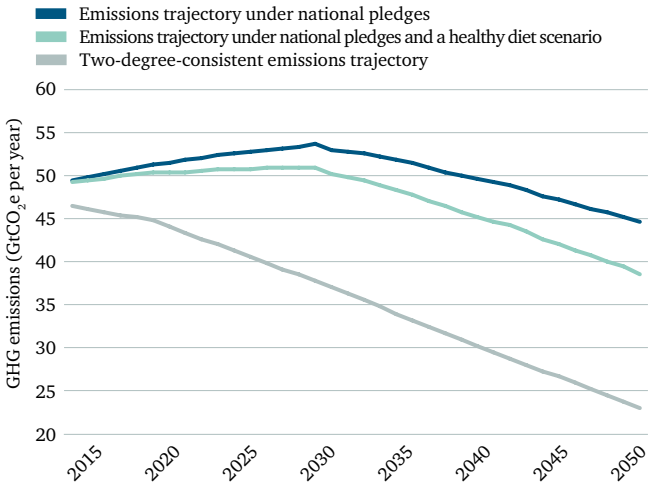
## The importance of dietary change

Left unchecked, current dietary patterns are incompatible with a two-degree pathway. If we are to avoid dangerous climate change, global yearly emissions must fall rapidly from today's levels of 49 $GtCO_2e$ to around 23 $GtCO_2e$ by 2050. If meat and dairy consumption continues to rise at current rates, the agricultural sector alone will soak up 20 of the 23 $GtCO_2e$ yearly limit in 2050, leaving just 3 $GtCO_2e$ for the rest of the global economy.[29] Even under the most ambitious of decarbonization scenarios, it will be near impossible for emissions from other sectors to drop to such levels by the middle of the century.

Dietary change could go a long way to plugging the post-Paris emissions gap: global adoption of a healthy diet would see a yearly emissions saving of 6 $GtCO_2e$ in 2050, almost all of which would result from reduced consumption of meat and dairy produce.[30] As a consequence, the predicted emissions gap between proposed mitigation measures and the two-degree scenario could be reduced by a quarter.[31] Moreover, emissions reductions of this scale have the potential to lower the overall costs of mitigation across the economy by up to 50 per cent by 2050.[32]

On the basis of national emissions reduction plans made so far, Figure 3 illustrates the emissions trajectory on which the world currently finds itself and indicates the scale of reductions that would result from the adoption of a lower-meat diet.

### Figure 3: Emissions reduction scenarios through to 2050




Sources: Bajželj et al. (2014)*; Climate Action Tracker (2015)**.
* See footnote 30 below.
** Emissions trajectory reflecting conditional pledges submitted by 1 October 2015. The two-degree-consistent pathway depicted here is the 'median' in terms of the predicted rate of decline in GHG emissions through to 2050.

Importantly from a public policy perspective, dietary change would yield significant benefits in terms of managing resource scarcity, improving global health and lowering the economic burden of NCDs, and ensuring food security for the future nine billion in line with fundamental goals of the broader post-2015 sustainability agenda.

Through reviewing the evidence on interventions to change diets and exploring public attitudes to meat and dairy consumption and climate change in four key consuming countries – Brazil, China, the United Kingdom and the United States – the research for this report tested the assumption that effecting dietary change is too difficult a task for governments and non-state actors to pursue. While recognizing the multitude and scale of the challenges that national governments would face in seeking to encourage a shift in consumption patterns, our research finds that this assumption is unjustified and that action can – and should – be taken.

[26] Bailey et al. (2014).
[27] World Bank (2014a).
[28] Climate Action Tracker (2015); UN Newsroom (2015).
[29] Chatham House analysis based on Bajželj et al. (2014) and Climate Action Tracker (2015).
[30] Assuming a shift to a diet that does not exceed 24g of red meat, 85g of poultry and 400g of dairy products per day, calculated from supplementary data in Bajželj et al. (2014); see the 'Healthy diets in 2050' scenario.
[31] As of 21 October 2015, none of the 120 INDCs submitted make direct reference to dietary change as a means of mitigating climate change. Only China's notes action related to food, with plans for low-carbon development in the food service sector. Agriculture is largely referred to in the context of climate adaptation rather than mitigation, and only 21 countries outline plans which refer directly to reducing emissions from the livestock sector. These are Afghanistan, Azerbaijan, Bolivia, Botswana, Brazil, Cameroon, Chad, Colombia, Costa Rica, Côte d'Ivoire, Ecuador, Ethiopia, Haiti, Malawi, Mongolia, Namibia, Togo, Tunisia, Uruguay, Vanuatu and Vietnam.
[32] Stehfest et al. (2009).

### Box 4: Methodology

This report is the product of a 14-month research project seeking to enhance understanding of public attitudes towards meat, dairy products and climate change, and to explore opportunities for policy interventions to encourage a global reduction in meat and, to a lesser extent, dairy consumption.

The project comprised three phases. The first was a 12-country online survey, commissioned by Chatham House and undertaken by Ipsos MORI, soliciting opinions on the relationship between diets and climate change. The 12 countries were Brazil, China, France, Germany, India, Italy, Japan, Poland, Russia, South Africa, the United Kingdom and the United States.

The survey, which is the first multi-country, multilingual study of its kind, questioned participants on a range of issues, including but not limited to their motivations for increasing or decreasing their meat and dairy consumption; their willingness to make behaviour changes to reduce their environmental footprint; and their trust in a range of information sources on climate change. Analysis was undertaken on a country-by-country basis to identify which demographic variables – income, age, gender – have a significant impact on the likelihood of regularly eating meat and dairy products, and on desired future meat- and dairy-eating habits.

The second phase involved in-depth focus groups in Brazil, China, the UK and the US, conducted by Glasgow University Media Group. The purpose of these focus groups was to better understand the influence of different cultural and information environments on public attitudes, to identify key sources of influence, to assess the conditions under which food decisions are made, and to evaluate the impact of new information on pre-existing attitudes. The four countries were selected on the basis of their importance as major meat and dairy producers and consumers,[a] and of their projected share of future demand growth. A total of nine focus groups were convened in each of the four countries, involving three different demographic groups (students; low-income; middle-income and professionals) in three different cities.

The third and final phase of primary research comprised a series of interviews and roundtable discussions in each of the four focus countries. During structured interviews with policy-makers, opinion-formers and leading industry representatives, each participant was asked the same set of questions as was put to the focus group participants. One roundtable discussion was held in each of the four countries, involving between 20 and 35 representatives from the national government, civil society and industry. Participants were invited to discuss the preliminary findings of our qualitative and quantitative research and to exchange ideas on the implications of these findings for state and non-state policy interventions.

[a] In 2011, they accounted together for just under half of global meat supply (bovine, pig, poultry, goat and mutton meat), over a quarter of global dairy supply (butter, ghee, cream and milk), just over half of meat production (cattle, poultry, goat, sheep and pig meat), and 24 per cent of milk production. Authors' analysis based on food supply data and primary livestock production data from FAOSTAT.

## Scope and structure of the report

It should be noted at the outset that while the combined production of meat and dairy products accounts for 7.1 $GtCO_2e$ a year, of which the latter contribute a significant proportion (27 per cent),[33] the research for this report has focused largely on demand reduction for meat. There are three reasons for this:

- The emissions intensity of dairy products (emissions per kilo) tends to be lower than that of meat products, meaning that reducing meat consumption will lead to higher marginal emissions reductions;
- On a per capita basis, global consumption of dairy products has remained stable for the past half-century, while that of meat is rising fast, making it a more urgent priority;
- Consumer attitudes to meat and dairy products are typically very different, in the main requiring different strategies if consumption is to be reduced. The limitations of this study necessitated a focus on the more urgent priority, even if this does not give the full picture. However, the volume of dairy emissions suggests that further research should be devoted to this issue and specific policies to reduce consumption of these products should be developed.

The report is divided into five main chapters. Chapter 2 considers the policy options available to governments seeking to reduce meat and dairy consumption at a national level, drawing on current academic thinking and past policy experience.

[33] Chatham House calculation based on data for cattle, buffalo and small-ruminant milk in FAO (2013).

Chapter 3 analyses the results of a 12-country survey to investigate public understanding of the role of meat and dairy consumption in driving climate change, and considers the relative importance of socioeconomic, cultural and demographic factors in determining dietary preferences.

Chapters 4 and 5 discuss the results of in-depth focus groups in the four selected meat- and dairy-consuming countries in order to better understand the role of social and cultural factors in shaping attitudes towards diets. Public understanding of, and responses to, the connections between diets and climate change are analysed to help inform strategies aimed at raising public awareness and fostering behaviour change.

Chapter 6 presents some guiding principles for policy strategies and offers recommendations for action at the national and international level to encourage a global reduction in meat and dairy consumption.

# 2. Interventions to Reduce Meat and Dairy Consumption


## Summary

- **A wide range of policy options is available to governments looking to tackle unsustainable dietary patterns, spanning a broad spectrum of increasing intervention.** Despite this, action to address unsustainable meat and dairy consumption has been virtually non-existent.
- **This limited precedent for intervention and an inconclusive evidence base have together created a cycle of inertia** whereby inaction leads to low levels of awareness, in turn perpetuating inaction. Breaking this cycle needs to be a priority.
- **Awareness-raising will be important in paving the way for more robust, interventionist measures and in building the necessary conditions for behaviour change among consumers.** Such strategies will benefit from industry buy-in, from the engagement of multiple – and potentially unusual – stakeholders, and from clear messaging that emphasizes the co-benefits to be realized.
- **While there is little doubt as to the effectiveness of 'nudges' employed by retailers to push consumers in certain directions, evidence of their effectiveness in pursuit of public policy objectives is less persuasive.** Any such strategies will need to be long-term and involve a myriad of nudges, and will require governments to work alongside retailers and other stakeholders, including civil society organizations and the media.
- **Policies that seek to influence consumer behaviour through choice editing or the manipulation of pricing will be more difficult to implement, and less well received when they are, but are likely to be the most effective in fostering behavioural shifts.** Such policies will require careful management in order to mitigate unintended consequences.


## Introduction

For governments looking to tackle unsustainable dietary patterns, there exists a wide range of policy approaches to foster reduced meat and dairy consumption among their population. These approaches span a broad spectrum of increasing intervention, from awareness-raising and education, through 'nudge' tactics and economic incentives, to taxation and restrictive legislation.[34] Supply-side initiatives to increase the availability of plant-based foods and decrease the associated costs may also incentivize a move away from livestock production and consumption.

Although there are very few recent precedents for government intervention to discourage meat and dairy consumption, many of these policy approaches have been widely adopted to influence diets and behaviour in other ways. Efforts to dissuade the public from consuming sugar, trans fats, tobacco, alcohol and other unhealthy products can offer a valuable learning opportunity, particularly around the use of health-focused messaging to change habits. More broadly, initiatives – whether at the national, regional or global level – that encourage healthier and more sustainable habits in other areas, such as personal transport or energy use to heat homes, provide some indication of how effective different policy tools might be in fostering attitudinal and behavioural shifts to mitigate climate impacts.

Different approaches lend themselves to different actors. Across the spectrum of intervention, governments may act in isolation or – as is more often the case – in collaboration with others including industry, civil society and, most importantly, the public. Equally, non-state actors may implement policies without government oversight or support. Table 2 provides an overview of this spectrum and the actor or actors likely to be involved, together with examples of what policies to discourage excessive meat and dairy consumption might look like.

## Inform and empower

At one end of the spectrum lie policies that seek to empower consumers through the provision of information. These policies assume that consumers make choices about their diets based, at least in part, on a process of rational decision-making. Armed with greater understanding of the positive and negative implications of a particular choice on individual wellbeing and the environment, they are – in theory – empowered to make better-informed decisions.

These policies have been widely used to encourage healthier and more environmentally sustainable eating habits. Some of these are considered below.

### Product labelling and certification

Labelling frameworks are a common tool used to inform consumers about the calorie, sugar, salt and fat content of a particular food product.[35] However, the evidence suggests that public understanding of complex front-of-package

[34] Garnett et al. (2015); Bailey and Harper (2015); see also Nuffield Council on Bioethics (2007); WCRFI (2015a).
[35] EUFIC (2007); US FDA (2013).

### Table 2: Spectrum of intervention to encourage dietary change

| | | Intervention type | | |
|---|---|---|---|---|
| | | **Inform and empower** | **Guide and influence** | **Incentivize, discourage or restrict** |
| **Actors** | **Non-state (business and civil society)** | • Product labelling and content advice<br>• Information campaigns | • Preferential positioning of desirable products in retail settings<br>• Reduction in plate and portion sizes in restaurants to aid lower consumption volumes<br>• Pledging of behavioural change in institutions or campaigns for change in public or private sector | • Voluntary commitments to use more or only sustainable, healthy products<br>• Public campaigns calling for changes to menus in public institutions |
| | **Government** | • Public information campaigns<br>• Advertising regulations<br>• Labelling regulations<br>• National or individual nutritional guidelines | • Change in default food purchase options for consumers<br>• Change in default food options in public institutions | • Ban or tax on unhealthy or unsustainable foods<br>• Subsidization of healthy and sustainable foods<br>• Inclusion of standards on sustainable, healthy foods within public procurement guidance |
| | **Collaborative** | • Agreements on standardized labels<br>• Multi-stakeholder nutritional guidelines schemes | • Agreements on range of menus | • Multi-stakeholder agreement on restrictions for the sale or advertising of undesirable products |

Source: Chatham House analysis, adapted from Bailey and Harper (2015).

labels can be limited[36] and that complementary measures to educate consumers about the meaning of product labelling frameworks – as have been implemented in Canada, for example[37] – may be necessary to maximize their impact.

Labels are also commonly used as part of certification schemes to raise consumer awareness of the environmental and social impacts associated with a given food choice.[38] Since such schemes tend to be voluntary, and industry- or NGO-led, they can give rise to a confusing variety of labels and standards. Nevertheless, these schemes can have significant and indirect positive benefits: requirements to show country of origin[39] introduce transparency and traceability into supply chains, and evidence suggests that the introduction of front-of-package labelling has driven some companies to reformulate their products in order to remove unhealthy ingredients.[40]

## Public information campaigns

Marketing and advertising campaigns are employed by the full range of stakeholders in the food industry both to encourage consumers to eat or buy certain products and to dissuade them from choosing other products. But any such campaigns that seek to encourage lower consumption of meat and dairy products for climate reasons will face two major challenges. The first is that much purchasing behaviour is automatic, driven by habit and by subconscious decisions.[41] The second is that, when conscious judgements are made, factors that have an immediate and direct impact on the consumer – such as the price and taste of food – tend to be more influential at the point of purchase than less tangible considerations such as environmental impact.[42] Even among consumers who intend to make sustainable choices, the phenomenon known as the 'value–action gap' commonly sees these intentions trumped by more practical concerns.[43]

Furthermore, government and civil society campaigns to encourage more sustainable, healthier choices must contend with countervailing industry messaging. The global food retail sector is worth $4 trillion a year,[44] with the top five fast food brands alone worth over $150 billion.[45] And their marketing powers are strong: of the 10 largest global advertisers in terms

[36] YouGov (2014).
[37] Retail Council of Canada (2015).
[38] See, for example, Fairtrade, Rainforest Alliance and LEAF (Linking Environment And Farming).
[39] See, for example, EU legislation at http://proudlymadeineurope.com/eu-legislation-on-country-of-origin/.
[40] Faculty of Public Health, UK (2008).
[41] Bailey and Harper (2015).
[42] Chatham House/Ipsos MORI (2014); for more detail see Chapter 3.
[43] For example, a Eurobarometer survey on European attitudes showed that about 80 per cent of citizens felt that a product's impact on the environment was important when taking a purchasing decision, but despite this no more than 15 per cent of consumers buy environmentally friendly products; see Retail Forum for Sustainability (2011).
[44] Scott (2015).
[45] Statista (2015).

of spending in 2013, six were food and beverage companies.[46] With funds of this scale being used to encourage consumers to 'eat more', publicly funded campaigns to promote an 'eat less' message face tough competition.

### Sustainable dietary guidelines

Dietary guidelines are an example of government-led information campaigns. Over 70 countries have developed such guidelines as a communication tool to provide simple and accessible information about the components of a healthy, balanced diet. A few (e.g. in Brazil, Norway, Sweden and the Netherlands) incorporate environmental considerations,[47] but research into their impact on eating habits is limited.[48] Where country-level studies have been undertaken, results indicate that while consumers tend to be aware that these guidelines exist, their understanding of what they actually mean is limited.[49] As a result, increased awareness does not necessarily translate into positive action.[50] Moreover, a lack of full understanding of information tools and guidelines may result in unintended consequences, or rebound effects. There is some evidence to suggest, for example, that consumers choosing a healthier option often overcompensate by eating more than would

### Box 5: Recommendations for National Sustainable Dietary Guidelines (NSDGs)

The development of national guidelines for sustainable, healthy diets, and the establishment of international norms to inform these guidelines, emerged from our research – notably from discussions with expert stakeholders in our four focus countries – as a particularly promising avenue for encouraging positive changes.

Specific guidelines can be elaborated to help individuals make healthier, more sustainable choices and can be referenced by institutions – public or private – as they seek to adopt menus and practices to achieve these goals. These guidelines can be used to offer dietary advice directly to consumers, and to inform government initiatives and legislation.[a]

A number of countries, including China, the UK and the US, are in the process of updating existing guidelines or formulating new ones, while Brazil has recently published revised guidance. The inclusion of sustainability standards in new and existing guidelines offers a fruitful approach for intervention in the near term. The establishment of international norms that advise on the definition of a sustainable, healthy diet and that reflect state-of-the-art nutritional and sustainability research would expedite the development of national guidelines.

In order to ensure coherent guidelines that afford equal importance to health, climate and sustainability objectives, NSDGs should be drafted and implemented by a coalition comprising key experts and stakeholders across government, for example involving the Ministry of Agriculture, the Ministry of Environment and/or Climate Change and the Ministry of Health.

Experience from past and ongoing processes to develop national dietary guidelines, and discussions with policy-makers, civil society and industry in our four focus countries, provide some insights regarding the successful design and implementation of NSDGs.

- The fundamental principle of NSDGs should be universal, long-term, equal and sufficient access to nutritious food. This acts as a starting point from which to consider the impact of food production, packaging and distribution on the environment and resource availability.
- NSDGs should aim to reduce the dependency of diets on foods with high environmental and/or social costs.
- NSDGs need to include clear messaging about the risks of overconsumption of certain foods, including specific recommendations on the maximum amount of red and other meat to be consumed.
- Public procurement guidelines for the preparation of meals in the public sector should conform to NSDGs.
- NSDGs should prioritize the provision of clear advice to the public, as well as food retailers and service sectors involving food preparation.
- NSDGs need to be flexible and relevant to different cultural and socioeconomic contexts within a country.
- NSDGs should be developed in consultation with civil society organizations, industry and the public in order to mitigate backlash and to ensure that guidelines are actionable, accessible and nationally appropriate. A national process of public consultation would enable input from a wide range of actors at the earliest stages of guideline development.
- NSDGs should be reviewed on a regular basis (e.g. every five years) to reflect updated evidence and the latest research.

[a] Clevers and Urlings (2015).

[46] Statista (2013).
[47] For more information, see the FAO portal at http://www.fao.org/nutrition/nutrition-education/food-dietary-guidelines/en/.
[48] Keller and Lang (2008).
[49] Hawkes (2013).
[50] Ibid.; Chatham House/Ipsos MORI (2014); Garnett et al. (2015).

otherwise have been the case, thereby offsetting many of the benefits gained.[51]

In order to encourage dietary shifts that meet public health, environmental and climate change objectives, cross-departmental cooperation will be required. Across most governments, the department or ministry for agriculture is primarily focused on domestic food production, while those responsible for national climate change strategies sit within a separate department or ministry, often closely tied to energy policy. Similarly siloed policy structures exist at global level among international governance and non-governmental organizations. These institutional arrangements create artificial barriers that hinder strategic thinking and that may preclude prioritization of the issue. Inter-ministerial, multi-stakeholder working groups that bring relevant parties together and support holistic, cross-sectoral planning would strengthen the design and implementation of international norms and national guidelines (see Box 5).

### Nutrition education

School-based nutrition education has provided another key conduit for government and NGO campaigns to promote healthy diets. Some examples are listed below.

- The 'Food Revolution Day' campaign, spearheaded by celebrity chef Jamie Oliver, aims to put food education on school curriculums worldwide. The campaign claims that progress has already been made in several countries, including in Brazil where the School Health Programme has made food and nutrition education a fundamental part of the national curriculum.[52]
- The WHO has worked with the Chinese government to implement a School Nutrition Project in Zhejiang province, which aims to improve nutrition and establish 'Health Promoting Schools', each with a comprehensive school health programme on nutrition. Following a successful pilot phase, the scheme has been expanded to over 50 schools, reaching approximately 93,000 students.[53]
- In Sweden, where free school meals are served to all children up to the age of 18, many catering services are actively working to offer more organic foods and reduce the amount of meat served, and 40 per cent of Swedish municipalities have introduced one meat-free day a week.[54]

While the results of research investigating the impact of education in schools are mixed, the evidence generally suggests that information provision is most effective in prompting behaviour change when combined with changes to the food options regularly on offer.[55]

### Policy implications

Policy-makers considering 'inform and empower' measures will be faced with a number of challenges. First, meat and dairy consumption patterns are driven by a myriad of cultural, institutional and aspirational factors and it is therefore unlikely that a single source or type of information will change behaviour.

Second, if 'inform and empower' strategies are to be assimilated into the automatic decision-making that drives consumer choices, they must offer a clear, simple message that is easily recalled. In the case of encouraging sustainable, healthy levels of meat and dairy consumption, this is not an easy task. The causal links between livestock production and GHGs are numerous and conceptually challenging, while the health message is equally complex.[56] Policy-makers will therefore need to work closely with marketing experts, and in some cases NGOs, to develop messages that are easily accessible, yet not over-simplified.

Third, strategies may be helped by broadening the message and focusing on the co-benefits to be gained by a shift away from meat and dairy. Messages that emphasize the positive public and individual health implications of a less meat-rich diet are likely to have considerably more sway than those that centre on environmental impacts alone. Guidelines for sustainable, healthy diets would provide an effective means of supporting dietary change at national and institutional level, but would need to be accompanied by awareness-raising campaigns and outreach programmes to ensure that the principles of healthy eating are fully understood and to avoid unintended rebound effects.

Fourth, policies must be well funded, and will require industry buy-in. The financial clout of the food industry is such that public and civil society efforts to counter messages of 'eat more' may be drowned out. Significant capital will be required to enable sustained, long-term public awareness campaigns

[51] This is known as the 'halo effect'; see, for example, Provencher et al. (2009).
[52] For more information about the campaign, see http://www.foodrevolutionday.com/campaign/#EGYa7bRGgcEp2SCM.97.
[53] For more information, see http://hhd.org/topics/nutrition-and-fitness/highlights/health-promotion-china-s-schools.
[54] Svenska Dagbladet (2015).
[55] Hawkes (2013).
[56] Micronutrients are an important component of diets, whether they come from animal or plant-based products; moreover, nutritional needs vary across demographic groups (they will be very different for pregnant women and older people, for example), making universally applicable intake levels for protein and micronutrients hard to prescribe.

that can compete with industry advertising. Industry buy-in will substantially enhance the reach and longevity of such campaigns, but will require careful management.

Fifth, awareness-raising strategies favour collaboration between governments and non-state actors. A cooperative approach involving independent and potentially unusual and surprising communicators, including educators and health professionals, would enable governments to harness a wide range of experience and expertise, and would offer the greatest chance of impacting on eating habits.

Finally, additional research is required to build the evidence base for policy-makers. Scant evidence of the effectiveness of information and awareness-raising campaigns has compounded the difficulties inherent in drawing causal links between awareness and action. Further research is needed to understand the efficacy of varying messaging approaches among different demographic groups and across different retail environments, in order to allow for more targeted, more impactful campaigns. Given the urgency of the issue at hand, governments will need to learn by doing, gathering experience through early action to test different strategies.

## Guide and influence

Further along the spectrum of intervention lie strategies that influence consumer choices through careful construction of the 'choice architecture' within which decisions are taken (see Box 6). In recognition of the predominance of subconscious bias and automatic decision-making in habitual circumstances – such as buying food in a supermarket – retailers have long manipulated the physical and information environment within which customers make their choices.

'Nudges', which may or may not go unnoticed by the consumer, are used to achieve a desired outcome without infringing on the consumer's own decision-making capacity (see Box 6). Although industry nudges that encourage consumers to purchase sweet treats while they queue at the checkout, for example, or duty-free alcohol while they wait for their plane, may be undesirable from a public health perspective, there is significant potential for governments and non-state actors to employ these same tactics to encourage healthier, more sustainable food choices. Some of these options are considered below.

### Box 6: Definition of choice architecture and nudge

**Choice architecture:** 'Choice architecture reflects the fact that there are many ways to present a choice to the decision-maker, and that what is chosen often depends upon how the choice is presented.'[a]

**Nudge:** 'A nudge … is any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives.'[b]

[a] Johnson et al. (2012).
[b] Thaler and Sunstein (2008).

### Positioning of food products in the retail environment

The positioning of products in prominent locations is highly effective in attracting shoppers. In recent years, and partly in response to considerable civil society and public pressure, a number of retailers have taken steps to leverage the power of product placement as a means to encourage healthier choices.[57] However, the likely success of public policy nudges to promote 'better' choices depends on an enabling environment that dampens the influence of countervailing industry nudges and that overcomes the fierce competition between retailers.[58] Depressed demand for meat and dairy products will fly in the face of powerful livestock industry interests, but will open up the market for meat alternatives which have seen significant growth in sales in recent years (Quorn, a mycoprotein-based meat substitute, has seen sales increase by 20 per cent between 2013 and 2015[59]). However, the penetration of the private sector in food-purchasing environments around the world is such that, in the absence of industry buy-in or regulation of private-sector marketing, government-led nudges would be unlikely to trump those of food retailers.

### Manipulation of menus and control of portion sizes

The way in which options are presented on restaurant menus has also been found to influence food choices. Research suggests that individuals may be more inclined to choose fewer unhealthy – or unsustainable – options if these are grouped together on a menu, and to select healthier – or more sustainable – options if these are distributed among a number of different categories.[60] Furthermore, testing is under way to assess public reaction to reducing the meat content of traditional meals as well as

[57] See, for example, The Guardian (2014).
[58] Tjärnemo and Södahl (2014).
[59] Food Manufacture (2015).
[60] Samson (2015).

offering innovative, more plant-based menus.[61] However, evidence of the implementation of such measures and their efficacy is lacking. More widely studied is the potential for restaurateurs – as for food retailers, food service providers, and other public and private food industry groups – to influence how much of a given product consumers eat through reducing portion sizes,[62] but further research is needed to assess how effective these cues may be in altering eating habits in the longer term.

### Adjustment to default meal options

Setting sustainable, healthy options as the default in retail settings or public institutions – for example, offering a vegetarian meal as the daily special in a restaurant or in school canteens – provides a means of harnessing the process of passive, automatic decision-making to guide consumers in a positive direction.[63] Evidence from other sectors suggests that changing the default option can have an impact on behaviour and choices,[64] but there is little precedent for employing these measures in the food sector.

### Improving access to alternatives

Food retailers have taken steps to increase the visibility and availability of healthy, more sustainable options. In 2015, for example, the multinational furniture retailer IKEA garnered considerable media attention by introducing a vegetarian alternative to its highly popular meatballs in a move to expand its policy of sustainable business.[65] Cooperative approaches that involve industry, government and other non-state actors may allow for the scaling-up of such approaches in the near term. A number of companies have also been developing synthetic animal products and unconventional proteins,[66] but significant time and investment would be needed both to produce these at scale and to shift consumer opinion.

### Positioning of food outlets in the public space

Incorporating the health and environmental impacts of diets into public planning offers a means to manage the choice architecture at a macro level. While it is difficult to establish clear and direct causal links between the prevalence of food retailers and outlets selling unhealthy food products and the incidence of diet-related health problems, some correlation seems likely.[67] Efforts in other sectors to integrate initiatives to guide individuals towards healthier or more environmentally friendly behaviour into public planning decisions – such as the introduction of bike-sharing stations in cities to encourage cycling – indicate the potential for positive results.[68]

### Policy implications

Although there is little doubt regarding the effectiveness of nudges employed by food and beverage retailers to push consumers in certain – often unhealthy – directions, evidence pertaining to the potential for nudge strategies to be employed in pursuit of public policy objectives is less persuasive.[69] Further research and evaluations are therefore critically needed.

Moreover, measures to expand and influence choice through changes to the choice architecture and the use of nudges to guide consumers will largely need to occur within the retail space, and so within the domain of the private sector. Short of introducing regulation on the positioning of meat and dairy products in supermarkets, governments will have little sway unless working alongside retailers, to whom these strategies are likely to be a particularly difficult sell without incentives.

Governments will need to support industry first movers and encourage responsible business through innovative policy-making and financial incentives. Civil society also has an important role to play here, putting pressure on retailers through comparative rankings or awareness campaigns to incentivize first movers and to turn the spotlight on those that fail to follow suit.

Policy-makers considering these types of interventions will need to ensure that strategies are wide-ranging and have enduring financial support. Early assessments also suggest that long-lasting shifts in consumer behaviour are unlikely to be triggered by stand-alone nudges; rather, myriad nudges will be required to achieve a cumulative impact.[70]

## Incentivize, discourage and restrict

At the opposite end of the policy spectrum from 'inform and empower' strategies are those that influence consumer

[61] For example, see the current work by Arlin Wasserman of Changing Tastes in collaboration with Menus of Change, at http://www.menusofchange.org/.
[62] Garnett et al. (2015).
[63] Samson (2015).
[64] Momsen and Stoerk (2014).
[65] IKEA (2015).
[66] For example, Impossible Foods, Muufri and Beyond Meat.
[67] Stanton (2015).
[68] See, for example, Fishman et al. (2014).
[69] Bailey and Harper (2015); Marteau and Mantzari (2015); British Medical Association (2012).
[70] Marteau et al. (2011).

behaviour through choice editing and through the manipulation of pricing. These policies are premised on the notion that reduced affordability or availability of a given product will lead to lower consumption.

Policies that edit food choices represent a risky option for governments, particularly those in liberal societies and free market economies where state intervention and price manipulation are considered aberrant and are likely to spark accusations of 'nanny state-ism'.[71] As such, there are few examples of past attempts to employ restrictive measures as a means to reduce consumption of a given food product and, where they have been implemented, their success has been mixed.[72] Nevertheless, economic modelling indicates that interventionist policies such as those below are likely to be the most effective in achieving behavioural shifts, including a reduction in meat consumption.[73]

### Raising prices through fiscal measures

Product-specific taxes have been used by a number of governments to remove incentives for the consumption of certain unhealthy products, notably sugar-sweetened beverages,[74] and these cases point to the potential for influencing meat and dairy consumption habits through taxes.

However, measures to restrict physical and economic access to food products may have a disproportionate effect on the poorest demographic groups. In the absence of complementary measures to facilitate access to substitutes and to educate people about the range of alternatives, higher prices for meat may encourage increased consumption of cheaper, poorer-quality products.[75] Public acceptance of such measures is likely to be low for this reason, although research has found that both the negative impacts of higher prices and public backlash may be mitigated through the ring-fencing of revenue raised from these taxes for use on social safety nets.[76]

Adjusting the relative prices of animal- and plant-based products, for example through the removal of subsidies to the livestock industry, may have the same effect as product-specific taxes while facilitating access to more sustainable, healthier food options.

### Public procurement guidelines and regulations

Public procurement rules for the food sector offer an obvious opportunity for governments to signal their commitment to fostering more sustainable diets. By requiring public institutions to buy only products that meet minimum standards in line with common certification schemes, public procurement guidelines can also provide an economic incentive for industry uptake of voluntary standards.[77] Alternatively, public authorities may engage directly with industry to establish partnerships that harness their bargaining power as major buyers to leverage higher sustainability standards among suppliers.[78] However, the enforcement of dietary guidelines varies considerably across countries.

### Restriction or ban on the sale or advertising of certain products

At the most extreme end of the intervention spectrum are measures to restrict the sale of undesirable products, either through a ban on the sale itself, or through the regulation of advertising and marketing. Where bans on sale have been implemented in the food sector, they have largely targeted products or ingredients that raise food safety concerns, or else have been applied in a limited number of contexts to regulate the sale of unhealthy products.[79] Restrictions on advertising are largely limited to advertisements that target children.[80]

### Policy implications

Interventionist approaches require careful management to mitigate unintended consequences and, in particular, adverse effects on the poorest. Interventions must therefore be part of a comprehensive suite of measures that limit negative impacts and be based on a thorough risk assessment of the possible consequences, both direct and indirect.

Governments are likely to face significant resistance from the livestock industry and food retail sector. In a number of countries the livestock sector is a significant source of employment and contributor to national GDP. Consequently, policy-makers should not underestimate the importance of transitional assistance that will enable

[71] Ipsos MORI (2012).
[72] Examples include restrictions on the production and import of genetically modified food products in the EU. For more information, see http://www.genewatch.org/sub-568798.
[73] Wirsenius et al. (2010).
[74] Bailey and Harper (2015). See also current calls in the UK for the introduction of a sugar tax – Public Health England (2015); www.jamieoliver.com/sugar-rush/.
[75] Garnett et al. (2015).
[76] This is known as a hypothecated tax; see Bailey and Harper (2015); Garnett et al. (2015).
[77] Brack (2015).
[78] In the Brazilian states of Pará, Acre, Rondônia, Amazonas and Mato Grosso, for example, state authorities have established agreements with federally inspected slaughterhouses to reduce deforestation associated with cattle production; see Gibbs et al. (2015).
[79] For example, a ban on vending machines selling sugar-sweetened beverages (SSBs) in schools.
[80] WHO (2014); WCRFI (2015b).

different farming practices to develop and alternative supply chains to be supported.

Using price to influence consumer choices is nevertheless likely to be a highly effective – and necessary – component of the policy toolkit, whether through rebalancing fiscal support mechanisms to lower the relative cost of sustainable and healthy food products or through incorporating the environmental and social externalities of meat and dairy produce into price at the point of sale.

The importance of the public sector in some countries as a major market for the livestock sector and the food industry more broadly creates an important opportunity for incentivizing voluntary industry standards and self-regulation by capitalizing on public procurement guidelines. Policy and financial support from multilateral or regional bodies may also encourage governments to take a leading role in promoting dietary change, signalling their commitment and in turn highlighting unsustainable consumption patterns.

## Breaking the cycle of inertia

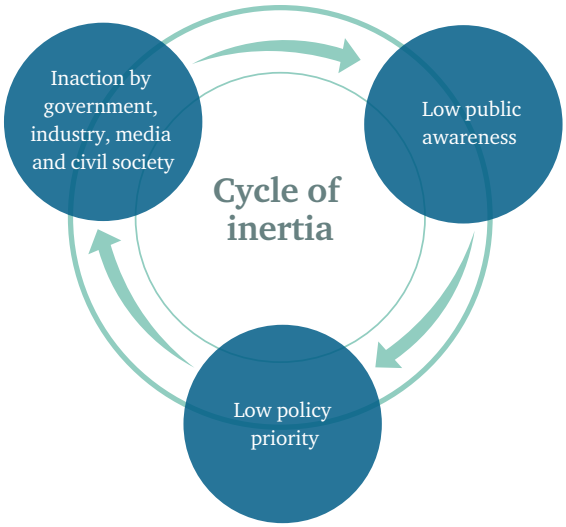
The opportunity for reducing both the environmental and health burden of excess meat and dairy consumption by fostering dietary change is significant. Despite this, there has been virtually no government action to curb the growth in meat and dairy consumption, and indeed in some countries – such as China –, increasing consumption has been a government strategy.[81]

The lack of intervention in this area has cultivated a paucity of evidence around the relative efficacy of certain measures over others, further inhibiting governments from taking the first step. These conditions have created the cycle of inertia noted above, whereby government inaction is maintaining low levels of public awareness, in turn relegating dietary change to the bottom of the political agenda (see Figure 4). Breaking this cycle must be a clear policy priority.

Awareness-raising will play a critical and preparatory role. More robust interventionist measures face less resistance when people are aware of the policy rationale and of the benefits to be reaped for the public good. In addition, public information campaigns and other strategies to enhance awareness help to create the conditions for consumers to make individual changes to their behaviour, as well as the political space for the full range of government interventions necessary to effect the scale of change required.

While public and industry buy-in to policies that restrict choice or regulate the market will be difficult to achieve, research indicates that there is a high degree of contradictory thinking, by which populations expect governments to govern where necessary.[82] Public outrage and tacit acceptance of intrusive measures should not be considered mutually exclusive.

**Figure 4: The cycle of inertia**




International research has shown that the degree and longevity of public resistance is highly context-dependent.[83] The reaction to and efficacy of the range of policy interventions discussed above will be influenced by a multitude of factors, not least common eating habits and current levels of awareness around the environmental and health rationale for dietary change.

An understanding of existing attitudes to diets will therefore be a critical point of departure for governments wishing to gauge likely levels of public interest in and support for interventions to encourage shifts in consumption patterns. At the same time, limited precedent for action in this area and a low evidence base should not foster policy paralysis. If the cycle of inertia is to be broken, governments must be willing to draw lessons from other sectors and to act early, accepting the need to assess and revise policies over time.

[81] Schneider and Sharma (2014).
[82] Ipsos MORI (2012).
[83] Ibid.

# 3. International Awareness of Livestock's Role in a Changing Climate


## Summary

- **Locally determined conditions are an important factor in influencing individual food practices.** Despite a strong correlation between national per capita GDP and meat and dairy consumption levels at a global level, sociocultural factors appear to be at least as important as income in shaping current and desired meat- and dairy-eating habits within and between countries. Key influencing factors will need to be identified and addressed on a country-by-country basis.
- **Factors affecting meat consumption differ considerably from those affecting dairy consumption.** The relative importance of income, age and gender in influencing current and desired consumption habits is distinct for meat and dairy products. Different strategies will therefore be needed to tackle overconsumption of each food group, with shifts in dairy consumption likely to be more difficult to achieve.
- **Survey results indicate a positive relationship between consumers' awareness of the carbon footprint of a given behaviour and their propensity to alter this behaviour.** While bearing in mind the value–action gap outlined above, these results nevertheless indicate an opportunity both to enable a small cohort of first movers to take action and to foster greater public openness to government intervention.
- **Confidence in government, industry and the media varies considerably between countries.** There are striking differences in terms of the perceived credibility of different information sources, most notably with regard to social media. In contrast, 'experts' and environmental groups were seen as helpful across almost all countries, indicating the important role for NGOs and the scientific community in raising the profile of this issue.


## Introduction

Achieving dietary change at a global level to reduce and rebalance consumption of meat and dairy products offers a rapid, effective and potentially low-cost way to contribute to meeting international climate goals.[84] Fostering such a global shift will not be easy and, as with other changes to habits and behaviour, will require widespread public buy-in.

In developing policy strategies that are effective in encouraging dietary change, understanding public attitudes to meat and dairy products, and identifying the primary factors that influence food choices, are critical first steps. As experience has shown, consumer practices are driven to a large extent by habit and by cues from the home and purchasing environments. Only by understanding how these habits are formed, and the power of subconscious levers, can policy-makers harness these influencing factors to encourage more sustainable choices.

The first phase of the research aimed to understand how consumers themselves apprehend their food choices and the factors that influence these. Chatham House and Glasgow University Media Group commissioned Ipsos MORI to undertake the first multi-country, multilingual survey specifically designed to solicit opinions on meat and dairy consumption and its relationship to climate change. The survey was conducted online in 12 countries (see Box 7 for details).

The survey was intended to evaluate the relative importance of a range of demographic and sociocultural factors in determining current and desired meat- and dairy-eating habits, and the extent to which climate change figures as an influencing factor in food choices. The 12 countries were selected to represent a range of socioeconomic, cultural and political contexts as a means to assess the extent of commonality and variation across eating habits, public awareness and understanding of climate change and its drivers. Further analysis was undertaken to identify whether three demographic variables – income, gender and age – have a significant impact on meat and dairy consumption patterns and on desired eating habits.

While the use of an online survey entails certain limitations in terms of achieving a representative demographic sample, particularly in developing and emerging economies where access to the internet is largely limited to urban populations and higher-income groups, the findings nevertheless provide a valuable indication of the complexities surrounding meat- and dairy-eating habits.

The discussion below outlines some key findings and suggests the possible implications of these findings for policy-makers looking to encourage dietary change. In particular, it explores the differences between consumption habits at national and subnational level, and the extent to which these necessitate a tailored policy approach.

[84] Hedenus et al. (2014); Bajželj et al. (2014).

### Box 7: The survey

An online opinion survey was undertaken by Ipsos MORI in 12 countries: Brazil, China, France, Germany, India, Italy, Japan, Poland, Russia, South Africa, the United Kingdom and the United States. A minimum of 1,000 individuals were surveyed in each of the 12 countries during September and October 2014.

The questions covered a range of issues,[a] including:

- Consumers' current meat- and dairy-eating habits;
- The motivations behind their desire to increase or decrease their meat and dairy consumption;
- Levels of understanding of climate change, and relative awareness of its different drivers;
- Consumers' willingness to alter their habits – both eating habits and other behaviours – in order to reduce their environmental footprint;
- Attitudes towards a range of sources to which consumers may turn when seeking information on climate change.

#### Demographic analysis

To further assess the impact of demographic variables on current and desired levels of meat and dairy consumption, a total of six global logistic regression models were run,[b] exploring the significance of income, gender and age in influencing attitudes and behaviour.[c]

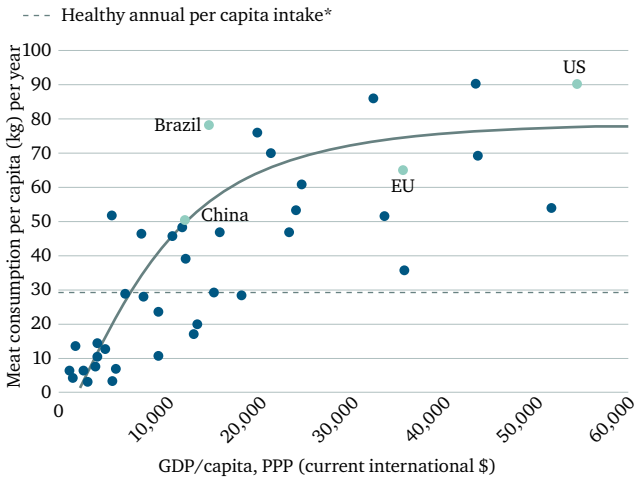
[a] The full list of questions is included in the Supplementary Materials, available online at https://www.chathamhouse.org/publication/changing-climate-changing-diets.
[b] Current level of meat consumption; current levels of dairy consumption; desire to eat more meat; desire to eat more dairy products; desire to decrease the level of meat consumption; desire to decrease the level of dairy consumption.
[c] For further details of the methodology, see Annex A.

## How much does income matter?

The influence of income levels on the consumption of meat and dairy products has been studied extensively, with a clear pattern emerging at global level. As societies urbanize and industrialize, incomes rise and populations as a whole enjoy improved physical and economic access to foods rich in protein and energy, and there is a shift away from cereal-based diets towards greater consumption of animal protein and processed foods.[85]

There is a strong correlation between rising national income and increasing intake of meat and dairy products, indicating a 'protein transition' that has significant implications for the scale of future meat- and dairy-driven emissions (see Figure 5). In 2011, for example, average per capita meat consumption in high-income countries was over five times higher than in low-income countries, and almost three times as high as in lower-middle-income countries.[86] Once per capita income reaches a certain level, there is evidence to suggest that meat consumption plateaus before declining, driven in large part by higher levels of education and awareness of the health and environmental costs of overconsumption.[87] Research has found that this same relationship between income and consumption levels is replicated at national level in some countries.[88] Both within and between countries, however, the income levels at which a decline occurs is so high that many individuals and many countries will not reach it for some time.[89] Policy interventions are therefore likely to be needed to bring forward the consumption plateau in the interest of climate stability.

### Figure 5: Indications of the 'protein transition': per capita meat consumption and GDP, by country, 2014




*Annual per capita intake of meat (beef, pork and chicken, but also including eggs) deemed a healthy level: calculated on the basis of per capita daily consumption levels (including losses at household, food service and retail level) in Stehfest et al. (2009), who estimated these levels based on the Harvard Medical School's Healthy Eating Pyramid (Willett (2001)).
Source: Authors' analysis based on GDP data from the World Bank (2014b) and meat consumption data (kg per capita of beef, veal, pig, poultry and sheep (retail weight)) from OECD/FAO Agricultural Outlook. The trend line marked is adapted from FAO (2009b).

[85] Sans and Combris (2015).
[86] Authors' analysis based on 2011 food supply data from FAOSTAT (g/capita/day). Pig, goat, mutton, poultry and bovine meat are included. Countries were grouped by their economic status for the 2015–16 fiscal year, as determined by the World Bank. For more information see http://data.worldbank.org/about/country-and-lending-groups.
[87] Vranken et al. (2014).
[88] Rivers Cole and McCoskey (2013).
[89] Ibid.

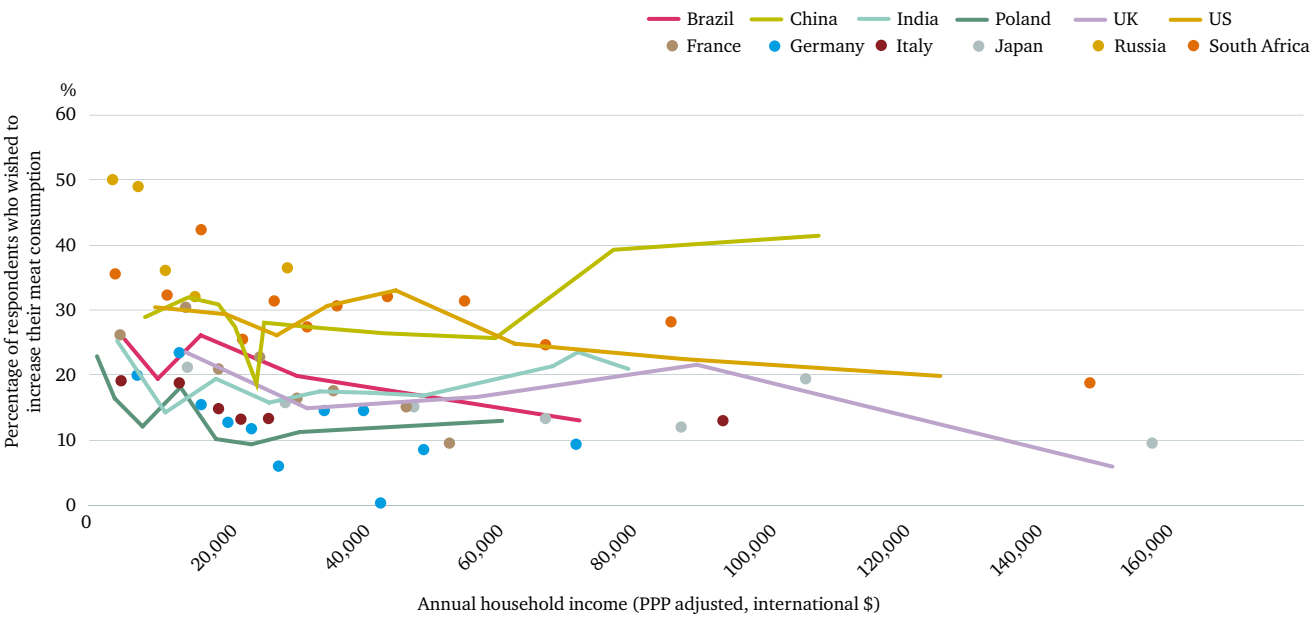
The idea that levels of meat and dairy consumption can be predicted on the basis of measurable indicators such as income is promising from a policy perspective: if eating habits could be modelled and replicated across country contexts and different demographic groups, the evidence base for future policy strategies would increase significantly. Lessons could be drawn from experiences in other nations or regions, and interventions could be targeted at disrupting known trends in order to curb anticipated growth in consumption.

While there appears to be a relationship between consumption and income levels both between and within countries, however, analysis of reported meat and dairy consumption across the 12 countries indicates that eating patterns cannot be explained fully by income alone.[90] Rather, the evidence suggests that drivers of dietary patterns are dynamic and complex at the national level, and that a global or even regional pattern is difficult to identify.[91]

Only a small number of countries – China, Germany, Italy and Japan – show a statistically significant correlation between income and reported meat-eating habits.[92] In terms of respondents' desire to increase or decrease their meat consumption, attitudes also vary considerably across the 12 countries, confirming the importance of nationally specific sociocultural dimensions – religious beliefs, traditional diets and the social politics of meat-eating, for example – in forming consumption patterns, as noted by others.[93] Trends in Brazil, China, India, Poland, the UK and the US – highlighted in Figure 6 – are illustrative of the degree of variation. The Y axis shows the percentages of participants wishing to increase their meat consumption, while the X axis shows PPP-adjusted income bands.

Similarly, with regard to desire to increase or decrease dairy consumption, national populations differed markedly in terms of the relationship between income and attitudes. While more affluent respondents in China and India were more likely than lower earners to express an interest in increasing their dairy intake, the opposite was true in Brazil and South Africa, countries with a strong cultural heritage of meat-eating. Here, higher earners were less likely to be interested in consuming more dairy products than lower-earning respondents.

**Figure 6: Global model for desire to increase meat consumption**




Source: Chatham House/Ipsos MORI (2014).

[90] Fourat and Lepiller (2015, forthcoming).
[91] During the survey respondents allocated their households to the appropriate income band in local currency from a predetermined range. The mid-point of the range was used as an estimate of the household income, converted into 2013 US$ according to the World Bank's purchasing power parity (PPP) conversion rate. All income bands shown in this report have been converted into PPP income to enable direct comparison between countries with different costs of living.
[92] The data were analysed to consider non-linear relationships. Each measure was looked at in each country for different income bands, but there was no evidence of U-shaped non-linear relationships. Where there was any relationship, the simplest explanation in all cases was a linear relationship (a regression, which could be described as a correlation). However, overall the analysis leads to the conclusion that whether an individual eats meat or not is driven more by other variables beyond the set of demographics collected.
[93] Sans and Combris (2015).

These differences between populations are indicative of the need to assess the income–consumption relationship on a country-by-country basis and to avoid broad generalizations on the basis of national per capita GDP. Of the emerging economies surveyed, the traditionally high meat-consuming populations of South Africa and Brazil seem less likely to aspire to eat more dairy produce as incomes rise than those in China and India, for example. Nevertheless, the correlation across six of the 12 countries surveyed between higher incomes and the greater likelihood of eating dairy produce indicates that global dairy consumption will continue to increase as incomes rise, a trend of significance to the climate agenda.

## Do other demographic factors influence consumption habits?

Age and gender have long been considered important determinants of an individual's food choices.[94] The received wisdom is that, on the whole, men tend to eat more meat than women, while older generations tend to eat less meat than younger ones.

Whereas patterns of correlation at the macro level between average national income and average national consumption levels are somewhat disrupted at country level, the influence of age and gender on reported meat consumption habits is fairly consistent across the 12 countries surveyed.

Table 3 illustrates those cases where there was a statistically significant correlation between demographic factors – gender, age and income – and the likelihood of eating meat and dairy products on a regular basis, showing the degree of variation both between countries and between meat and dairy consumption within individual countries.

In six (Germany, India, Italy, Poland, the UK and the US), women were less likely than men to describe themselves as regular meat-eaters,[95] and, across all but four countries (China, France, Italy and Poland), were less likely to express an interest in increasing their meat intake. Similarly, older respondents were less likely than their younger counterparts to state an interest in eating more meat. This trend was observed in all but one country, Germany, where age had no significant influence.

Interestingly, gender and age had little influence on dairy consumption, either current or desired. There were few statistically significant correlations between either demographic variable and a desire to eat more or fewer dairy products: women in the UK and Japan were more inclined than men to be seeking to decrease their intake, and the same applied to younger generations in Germany, China and India relative to older respondents.

**Table 3: Correlation between gender, age or income and current consumption of meat and dairy products, by country**

| Meat | Male | Female | Young | Old | Low-income | High-income |
|---|---|---|---|---|---|---|
| Brazil | | | | | | |
| China | | | | | ■ | |
| France | | | | | | |
| Germany | | ■ | ■ | | ■ | |
| India | | ■ | | | | |
| Italy | | ■ | | | ■ | |
| Japan | | | | | ■ | |
| Poland | | ■ | | | | |
| Russia | | | | | | |
| S. Africa | | | | | | |
| UK | | ■ | | | | |
| US | | ■ | | | | |

| Dairy | Male | Female | Young | Old | Low-income | High-income |
|---|---|---|---|---|---|---|
| Brazil | | | | | ■ | |
| China | | | | | ■ | |
| France | | | | | ■ | |
| Germany | | | | | | |
| India | | | | | ■ | |
| Italy | | | | | | |
| Japan | ■ | | | | ■ | |
| Poland | | | | | | |
| Russia | ■ | | | | | |
| S. Africa | | | ■ | | ■ | |
| UK | | | ■ | | | |
| US | | | | | | |

■ More likely to consume ■ Less likely to consume

Source: Chatham House/Ipsos MORI (2014).

[94] See, for example, Public Health England (2014a), for age, and Adams (1990), for gender.
[95] In the remaining six there was no correlation between respondents' gender and the likelihood that they would describe themselves as regular meat-eaters.

## Policy implications

These measurements of current and desired consumption of meat and dairy products are subjective. Participants were asked whether they would describe themselves as regular meat- or dairy-eaters, and whether they would like to eat more or less than they currently do, rather than to give estimates of how much meat and dairy produce they eat over a given period. The conclusions that can be inferred from these survey data therefore differ considerably from those that may be drawn from empirical studies into the correlation between actual income and consumption at national level and per capita income and consumption at international level. Nevertheless, from an analysis of the relationship between demographic factors and reported consumption habits at country level a number of important points emerge that have interesting implications for policy-makers.

### Sociocultural factors may, in some cases, trump high incomes

Two notable exceptions to the 'protein transition' phenomenon indicate the degree to which sociocultural factors may counter the force of rising income and disrupt the trend that is seen at global level. In India, meat consumption remains low among the predominantly Hindu population, despite rapid economic growth over recent decades. In Japan, the traditional relatively low-meat diet, rich in vegetables, fish and rice, has prevailed despite many years of healthy economic growth: average per capita meat consumption is the lowest among the high-income countries surveyed,[96] and the share of survey respondents who described themselves as regular meat-eaters was over two-thirds lower than the average across all 12 countries.[97]

An understanding of why these two countries have bucked the protein transition trend, and which factors wield the greatest influence over consumers' habits, can assist policy-makers around the world in anticipating the impact of rising incomes on dietary patterns. Where religious beliefs or cultural customs have a direct influence on the likelihood of an individual eating meat and dairy products, such an understanding will be critical to developing culturally sensitive policy messaging.

These countries may also offer an instructive point of reference for countries that share similar cultural or religious customs. In China, for example, the pervasiveness of the traditional Asian diet elements – fish, vegetables and legumes – over a heavy reliance on meat may indicate the potential to curb the current trend towards Western diets by promoting and protecting traditional cuisines. Lessons may be learned from experience in Japan, where there is evidence to suggest that younger generations are shifting towards more meat-rich diets but where the government has sought to maintain the traditional diet in the interests of public health and self-sufficiency in food production.[98]

### High earners may not always be the likely first movers, and other demographic groups may be more willing to shift consumption habits

The relationship between income and desired levels of meat and dairy consumption – where it exists – played out in markedly different ways across different countries. As noted, in the sample of 12 countries only four show a statistically significant correlation between higher incomes and increased likelihood of eating meat. High earners tend to describe higher levels of habitual meat-eating than lower earners. In the case of China, more affluent respondents are also more inclined to express a desire to eat more meat than they currently do.

In contrast, the wealthier participants across a number of other countries – France, Germany, Japan, South Africa, the UK and the US – were less likely to want to eat more meat than those on lower incomes. While this in part reflects existing higher levels of meat consumption in some of these countries, it may also be an indication of the global 'plateau' trend playing out at national level.

While it should be remembered that these responses give a subjective estimation of individual consumption patterns, the varying attitudes towards current and desired eating habits among higher earners across the countries surveyed indicate the need for further research to be undertaken at country level to better understand how rising incomes among lower and middle classes are likely to affect consumption patterns.

Women appear to be potential first movers across many of the surveyed countries. They are generally less likely than men to describe themselves as regular meat-eaters and to express an interest in increasing their meat intake. Given the important role that women play in preparing and providing food for the family in most countries around the world, policy strategies may benefit from exploring how their attitudes towards meat-eating may be harnessed to influence broader family and social circles. Action to 'de-masculinize' meat consumption is also likely to be important in shifting attitudes among men.[99]

[96] FAOSTAT, food supply data for 2011, g/capita/day.
[97] Japanese consumption of fish is significantly above the world average and higher than in the US and virtually all countries in the EU (see http://www.st.nmfs.noaa.gov/st1/fus/fus11/08_percapita2011.pdf). There are significant concerns over the sustainability of current and forecast consumption levels.
[98] Gadda and Gasparatos (2009).
[99] See, for example, Rothgerber (2013).

The seeming unpredictability of the relationship between income and consumption patterns at national level also underlines the need to respond to observed trends in each country and to act quickly to avert unsustainably and unnecessarily high levels of meat consumption. Policy-makers should focus attention on encouraging a plateau in meat consumption at the earliest opportunity in those countries that are moving towards higher average incomes, and on triggering a decline in advanced and emerging economies where consumption levels are already high.

### Factors influencing meat and dairy consumption differ. Thus targeted strategies are required for each, and tackling dairy consumption may be harder

The importance of demographic factors in influencing reported consumption habits was markedly lower for dairy consumption than for meat, with only two countries displaying a correlation between gender and the desire to change current levels, as opposed to nine for meat. Likewise, in only two countries did higher earners indicate a wish to consume fewer dairy products, as opposed to five for meat.

Policies that seek to reduce meat and dairy consumption levels will therefore require a nuanced approach, targeting each group of products separately. This will be particularly important in developing nationally appropriate messaging in countries, for example India, where religious beliefs have a significant influence on consumption of these products.

### The influence of demographic factors on meat and dairy consumption patterns varies considerably between countries

When assessing the relative importance of income, age and gender on current and desired meat and dairy consumption habits across the 12 countries surveyed, no clear pattern is discernible (see Table 4). The degree of variation between countries, and between responses relating to the two types of product, indicates the limited scope for predicting meat- and dairy-eating habits from an individual's demographic group.

## Awareness and understanding of climate change and its drivers: implications for dietary change

In addition to examining the influence of demographic factors on consumers' dietary habits, the multi-country opinion survey also sought to explore the degree to which a lack of awareness of the diet–climate relationship might hinder efforts to encourage dietary change.

**Table 4: Ranking of determinant factors for desire to reduce consumption of meat or dairy products**

| | Meat | | | Dairy | | |
|---|---|---|---|---|---|---|
| | 1st | 2nd | 3rd | 1st | 2nd | 3rd |
| Brazil | Gender | Age | Income | Gender | Income | Age |
| China | Age | Income | Gender | Age | Income | Gender |
| France | Gender | Income | Age | Income | Age | Gender |
| Germany | Age | Gender | Income | Age | Income | Gender |
| India | Gender | Age | Income | Income | Age | Gender |
| Italy | Income | Age | Gender | Age | Income | Gender |
| Japan | Income | Gender | Age | Gender | Age | Income |
| Poland | Age | Gender | Income | Age | Income | Gender |
| Russia | Age | Income | Gender | Gender | Income | Age |
| S. Africa | Gender | Age | Income | Income | Age | Gender |
| UK | Age | Income | Gender | Age | Income | Gender |
| US | Gender | Income | Age | Gender | Income | Age |

Source: Chatham House/Ipsos MORI (2014).

Understanding the importance of meat and dairy production as a driver of climate change is a precondition for voluntary action by consumers to change their diets in the interest of reducing their emissions footprint. The marginalization of livestock within mainstream climate policy discourse might reasonably be expected to contribute to low levels of media attention and public awareness, and the received wisdom is that public interest in the issue is too low for dietary change to occur.

In order to assess the size of the awareness gap around the diet–climate relationship and whether it really does pose an insurmountable obstacle to dietary change, respondents were asked about their awareness of climate change and its drivers in general, and the importance of the livestock sector in particular. The survey then tested their openness to changing their behaviour in order to mitigate the impact of their diets on the climate.

Responses across the 12 countries indicate that the awareness gap is indeed a particularly serious hindrance to individuals' openness to making behavioural changes.[100] Encouragingly, results from the range of countries studied indicate a high level of awareness of climate change as a global phenomenon, with over 80 per cent of respondents recognizing humans as responsible.[101] Less encouragingly,

[100] Just over one-third (35 per cent) of respondents unaware of transport's contribution to climate change stated they were unlikely to change their transport behaviour in order to reduce emissions. In the case of those unaware of meat and dairy production's contribution to climate change, 54 per cent were unwilling to change their meat consumption, and 62 per cent were unwilling to change their dairy consumption. This difference is highly unlikely to have occurred by chance.

[101] It should be noted that the question 'To what extent do you agree or disagree with the following statement: "Human activities contribute to climate change?"" was asked at the end of the survey, following a number of questions which included statements of climate change as fact. One example of such a statement was 'Experts now know that producing animals for meat and dairy products contributes to a number of health and environmental problems, including climate change'.

identification of the livestock sector as a contributor to greenhouse gas emissions was markedly lower than for other sectors. Over twice as many respondents pointed to direct transport emissions as a key driver of global warming as pointed to livestock,[102] despite the equal footing of the two sectors in terms of GHG emissions. While the extent of the awareness gap differed between countries,[103] a quarter of all respondents stated that meat and dairy production makes little or no contribution to climate change.[104]

Awareness of climate change had a limited bearing on meat- and dairy-eating habits compared with other, more immediate considerations. Across all 12 countries, factors that are of direct personal consequence to the individual tend to take precedence. Enjoyment of a particular food, considerations for personal health, and trust in the food source were cited by 90 per cent of all respondents, with price mentioned by 85 per cent as very or fairly important in determining their meat and dairy consumption patterns.

While assertions of the importance of climate change as an influencing factor in food choices were surprisingly common – 67 per cent of respondents overall noted it as a fairly or very important consideration in relation to the amount of meat and dairy products that they consume – this average masks markedly different attitudes across the 12 countries studied, and belies a more complex reality around understanding of climate change and the translation of this understanding into action.[105]

Over half of respondents in Brazil, France, India, Italy and South Africa, for example, indicated that climate change is an important consideration in determining how much meat an individual may eat,[106] although experience of the value–action gap discussed above indicates that this may not always lead to behaviour change. Respondents in Japan, Poland and the US attributed a below-average level of importance to climate change, while in Russia only 6 per cent of respondents believed it to be of importance.[107] In terms of dairy products, substantial differences were also seen between countries: while on average across the 12 countries, just over half of all respondents felt climate change to be an important factor in consumption choices, respondents in Russia indicated significantly different views from those in Brazil, for example, with 21 per cent of Russian respondents considering it to be important compared with 72 per cent of those in Brazil.[108]

A lack of awareness of the links between meat and dairy consumption and climate change, and the relative importance of factors of personal consequence, converge to create a public that is unlikely to make voluntary changes to individual eating habits if they are seen as unfavourable to current lifestyles.

While posing a considerable obstacle to dietary change, however, the awareness gap around the impact of meat and dairy consumption as a driver of climate change offers a significant opportunity for intervention to galvanize change. Despite the likely tendency for consumers to overstate the importance of climate change in determining their consumption habits, and recognizing the known phenomenon of the value–action gap, results from the survey indicate that increased awareness may cultivate a greater willingness to change behaviour at the individual level. Where individuals are already considering limiting their meat and dairy intake for other reasons, increased awareness of the climate rationale may prompt this group of potential first movers to take action.

Furthermore, respondents already open to the idea of reducing their meat and dairy intake were more likely to agree strongly that human activities are driving climate change: just under two-thirds of them believed that humans are responsible for the warming of the planet, compared with around half of those who were not prepared to change their eating habits. This indicates a positive correlation between higher awareness of climate change and a greater willingness to take individual action in response.

## Making the first move: who should be targeted first?

It is clear that while meat- and dairy-eating is the norm – 90 per cent of the survey respondents describe themselves as meat-eaters, and 91 per cent regularly eat dairy products[109] – there is a diverse range of attitudes towards current and desired eating habits, at both national and subnational level.

Given the limited evidence of the likely efficacy of differing awareness-raising interventions to encourage dietary change, and the urgent need for governments to make the first move, a stepwise strategy that starts by targeting those

[102] 64 per cent for transport compared with 29 per cent for livestock.
[103] Participants from Russia and the United States were most likely to say that the livestock sector contributed little or nothing to climate change, while those in Brazil, China, France, India and Japan were the least likely to attribute low importance to the sector.
[104] In contrast, only 8 per cent of respondents stated that transport makes little or no contribution to climate change.
[105] See discussion of the 'value–action' gap in climate and environmental policy in Blake (1999); and, more recently, Garnett et al. (2015).
[106] Share of respondents who indicated that climate change was 'net important', calculated as the difference between those who found it very or fairly important and those who saw it as not very or not at all important; 65 per cent in Brazil, 57 per cent in South Africa, 59 per cent in Italy, 55 per cent in India and 54 per cent in France.
[107] Share of respondents who indicated that climate change was 'net important'; 26 per cent in the US, 28 per cent in Poland and 39 per cent in Japan.
[108] Share of respondents who indicated that climate change was 'net important'.
[109] India is a notable exception: here, only 56 per cent of respondents eat meat, while 87 per cent eat dairy products.

most open to the idea may be the most fruitful approach in the near term. Those whose diet already comprises a combination of meat- and plant-based products may, for example, be more likely to respond positively and actively to increased awareness of the diet–climate relationship.[110] Equally, analysis of the survey results indicates that those individuals who are already engaged with climate change and who have an understanding of its drivers may represent an important group of first movers on the issue of sustainable consumption.

Yet even among those with a low awareness of the climate impact of the livestock sector, some groups are likely to be more receptive to interventions that promote reduced meat and dairy consumption. As noted earlier, certain demographic groups are less inclined than others to increase their levels of meat and dairy consumption – notably women (of all ages) and older people.[111] This suggests that messaging targeted at women and older generations may gain some traction in encouraging dietary change, although such an approach may further entrench existing associations of meat-eating with masculinity and so make it more difficult to spark behaviour shifts among the broader population. Equally, high earners in some countries – for example, in France, Germany, South Africa, the UK and the US – may be more receptive to the notion of reducing their meat consumption than those on a lower income.

## Choosing the messenger

If governments are to maximize these opportunities to spur action, they will need to give careful consideration to the media and other vehicles through which information on the diet–climate relationship is disseminated. As noted above, past policy experiences show that consumers are powerfully influenced by messaging and cues at both a conscious and a subconscious level, and policy interventions to raise awareness tend to be most effective when they employ a diverse blend of strategies and a broad range of actors.[112]

In order to understand which stakeholders are most trusted at a global level, and the degree to which awareness-raising strategies will need to be tailored to individual country circumstances, the survey asked respondents to identify the stakeholder groups to which they would most likely turn for trusted information on climate change and its links with meat and dairy production.[113]

Despite considerable differences across polities and regions, there was an overall tendency to turn to non-state actors rather than to governments. State authorities were afforded the highest importance in Brazil, China and India,[114] while participants in Germany, Japan and the US tended to rank the government fairly low relative to other sources.[115]

In contrast, 'experts' (left open for interpretation by survey respondents) were identified as the most helpful sources of information across 10 of the 12 countries polled, by a considerable margin. Similarly, in all but one country (Japan), environmental groups were deemed to be one of the most valuable groups for information, indicating the value accorded to stakeholders who are, for the most part, regarded as non-partisan.

Striking differences between countries emerged in relation to perceptions of traditional and social media, however. Broadly speaking, traditional media were deemed a useful source of credible information on environmental issues. But social media were accorded widely varying degrees of trust across the 12 countries. While around half of UK respondents, for example, found social media sources to be unhelpful in providing information on questions around climate change, around 80 per cent of respondents in India found them to be a helpful reference point, as did the other emerging economies included in the survey: Brazil, China and South Africa.[116]

The emerging economies – Brazil, China, India and South Africa – were also more inclined to trust industry sources than were the US and European countries (with the exception of Italy and Poland).

Relative estimations of the helpfulness of the different stakeholder groups differed greatly across the sample, but respondents across many countries accorded a similar degree of trust to multiple actors, suggesting the value of collaborative approaches to awareness-raising that involve a range of sources and media.

[110] de Bakker and Dagevos (2012).
[111] 20 per cent of women wanted to increase their meat intake, compared with 25 per cent of men; while 14 per cent of participants aged 45–65 wanted to do the same, compared with 31 per cent of those aged 18–44.
[112] Bailey and Harper (2015).
[113] These were: government; environmental groups; companies and labelling; social media; experts; traditional media.
[114] The share of participants finding governments to be 'net helpful' (calculated by subtracting those who found them unhelpful from those who found them helpful): India (77 per cent), China (72 per cent), Brazil (63 per cent).
[115] The share of participants finding governments to be 'net helpful': Japan (18 per cent), Germany (21 per cent), US (26 per cent).
[116] 78 per cent of respondents in Brazil said they would find social media helpful, as did 78 per cent of respondents in China, and 70 per cent of respondents in South Africa.

### Policy implications

Past experience tells us that increased consumer awareness of the environmental benefits of one choice over another does not always translate into sustainable choices. The value–action gap outlined in Chapter 2 indicates that informing consumers of the diet–climate relationship will not be sufficient to trigger dietary change. Nevertheless, the awareness gap that exists around this relationship acts as a significant deterrent to government intervention on the issue: fearing backlash from the public, and in the absence of any public pressure to tackle the problem at hand, governments have largely chosen a path of inaction, perpetuating the cycle of inertia.

Awareness-raising will be an important means of breaking this cycle. The findings of this first multi-country survey on public awareness and attitudes around the link between meat and dairy production and climate change suggest that there is considerable potential to increase consumers' openness to change through informing them of the carbon footprint associated with current consumption patterns. The results offer a unique insight into some key challenges and opportunities associated with promoting dietary change at international and national level, and raise a number of issues that merit consideration in the design of effective awareness-raising strategies.

#### What are the sociocultural dimensions that influence consumer choices, and how important are these factors relative to demographic factors?

The survey results indicate that, in spite of macro-level trends suggesting otherwise, it may not be possible to predict an individual's likely dietary habits on the basis of demographic factors alone.

Policies that seek to reduce meat and dairy consumption will need to be tailored, targeting each country and consumer group separately, and regarding meat and dairy products as distinct from each other.

The varying importance of a range of factors on consumer choices across the 12 countries warrants further research to understand which carry the greatest weight in each country and hence how best to communicate the issues. Improved understanding of the concerns that push and pull consumers towards meat and dairy consumption, and of the conscious and subconscious decision-making processes more broadly, will be essential to the design of effective strategies to raise awareness and to influence choices.

#### What is the best way to close the awareness gap?

Information campaigns may have the most impact if they broaden the message and focus on the health benefits to be reaped from reduced meat and dairy consumption, but the most effective messaging will need to be determined at a country level, and may include other environmental, deforestation or animal welfare issues. Demographic groups showing a greater inclination to shift dietary patterns for health reasons may represent an important group of first movers.

Governments will also need to consider carefully who is best placed to engage the public on issues around diet and climate change. Widely varying attitudes across the 12 countries underline the need for nationally specific approaches that recognize the relative credibility of the state, media, industry, NGO and other non-state sources in broadcasting the need for action.

In many cases, non-state actors may be a more trusted source of information, but given the divergent degrees of confidence placed in different stakeholders by the 12 country samples, creating coalitions that include a wide variety of participants is likely to be beneficial in heightening the credibility of awareness campaigns.

# 4. Analysing Public Understanding in Brazil, China, the UK and the US


## Summary

- **The majority of people accept climate change as a human-induced phenomenon;** however, levels of understanding are determined by direct experience and tangible impacts on the individual or the local community. There is a perception of a need to act to counter the threat posed by climate change, but this is dampened by a general reluctance to accept individual responsibility.
- **The importance afforded to health considerations in dietary habits as indicated by survey respondents is borne out by the focus group discussions**. Efforts to foster a reduction in meat and dairy consumption will therefore need to be accompanied by campaigns to improve understanding of alternative protein and micronutrient sources, and to focus on current overconsumption levels for meat products.
- **Mainstream media are the most credible source of information for most people,** who implicitly expect to be alerted through these media to issues of importance and concern. Greater coverage of the issue of climate change and its drivers therefore holds considerable potential for prompting public interest in the issue and raising awareness to a level at which behaviour change becomes more likely.
- **High levels of credibility are accorded to scientists and collective global organizations** such as the UN; currently their voices are not routinely heard in the mainstream national or global media. In order to enable these key information-providers to play a formative role in raising awareness and shifting public attitudes, their voices should be accorded greater prominence across multimedia sources.


## Introduction

In order to foster a global shift in dietary patterns in pursuit of reductions in greenhouse gas emissions, it is necessary to understand the conditions under which individuals make their food choices as well as their awareness and understanding of climate change and its drivers. Results from the 12-country Chatham House survey carried out by Ipsos MORI in 2014 provided an indication of the level of public awareness of different sources of GHG emissions. They also signal some of the factors that consumers may prioritize when making food choices (e.g. price, health, enjoyment, environmental concerns). The survey thereby provided some scope for assessing how climate change, its drivers and its impacts are understood, and for probing the many influences that inform consumer choices.

The second phase of the research process was designed by the Glasgow University Media Group and comprised a series of focus groups in Brazil, China, the UK and the US, for which participants were recruited by Ipsos MORI (see Box 8 for more information on the research approach and methodology). The purpose of these focus groups was to explore in depth the headline findings that had emerged from the online survey and that were discussed in the previous chapter.

There were two key components to the discussions. First, they sought to explore the information environment around climate change and diets, to review the trust placed in different sources of information, and to understand the cultural and social factors that shape attitudes to meat-eating.[117] Secondly, they attempted to trial the impact of new information on individuals' willingness to make behaviour changes in response to climate concerns, and thereby glean an initial indication of likely resistance to or acceptance of a range of interventions (an analysis of the discussion following the introduction of this new information follows in Chapter 5).

Some of the key findings from the focus group discussions are considered below. They should be seen as the first step in a process that will be critical to the design of effective interventions to raise public awareness and to lay the conceptual foundations for dietary change strategies.

## The point of departure: how is climate change understood by the public, and who influences this understanding?

### Overview

- In the UK and the US, climate change is recognized as important but is a highly polarized and polarizing issue. There is disengagement with the question of climate change and its drivers, related in part to an assumption that governments cannot be trusted to act in the public good and an expectation that action at societal level will be negligible.
- In Brazil and China, there is strong public feeling on issues that are directly associated with climate change – deforestation and pollution respectively – and a focus on these concerns and their links with

[117] The focus groups did not have separate discussions on dairy consumption.

### Box 8: Research approach and methodology*

A total of 36 focus groups were held across Brazil, China the UK and the US, with the aim of examining local and cultural information environments, understanding sources of influence, exploring the conditions under which decisions and behaviour are formed, and assessing the processes by which views and beliefs are modified in response to new information and group interaction. The research was qualitative, the sample sizes were small and the purpose was not to collect data generalizable to an entire population but to explore in depth current strands of belief and opinion across selected groups.

Nine focus groups were held across three different locations in each country, involving three different demographic groups – low-income, middle-income/professionals and students. All respondents were drawn from geographically diverse but urban areas.[a] Participant recruitment was conducted by Ipsos MORI in such a way as to ensure that all groups reflected key sociodemographic criteria including gender, age and income levels.

The focus groups were moderated by the GUMG and Ipsos MORI and conducted in the local language. In each, discussion centred around three key areas:

- *Awareness and understanding of the diet–climate relationship.* Questions probed the nature and sources of belief and opinions in relation to meat production and climate change, and the impact they have on consumption behaviour.
- *Responses to new information.* Each respondent was presented with an information sheet of statements and diagrams describing and illustrating the contribution of meat production to climate change. The purpose was to test the initial responses of individuals and to observe the way in which they processed, absorbed and critiqued what they had read, with the aim of evaluating the potential for attitudinal shifts in response to new information.
- *Impact of the new information.* Respondents were asked to consider the level of priority and legitimacy they would give to individual and collective action to tackle this issue (this was compared with their positions before receiving the information), how they would react to a variety of hypothetical interventions, and whether they perceived there to be any barriers to change.

* For a full presentation of the methodology, see Annex A.
[a] See Supplementary Materials, available online at https://www.chathamhouse.org/publication/changing-climate-changing-diets.

climate action and dietary change is likely to gain considerable traction in raising public awareness and in promoting government action.

- The need for coordinated action at a global level was emphasized by groups in all four countries. There was some suggestion that decisive action in the West may galvanize belief in China that change is possible and worthwhile, and vice versa.
- A consistent feature across all four countries is the credibility afforded to scientists and collective global organizations such as the UN. Currently, these voices are not routinely heard on climate issues in the mainstream national or global media, but increased coverage of their viewpoints may yield considerable positive returns.

Focus group discussions presented an opportunity to delve further into these attitudes and awareness levels and to explore what shapes an individual's understanding of the issues at hand (see Box 8). The four countries were chosen on the basis of their importance as meat and dairy producers and consumers, as representing a range of political and cultural landscapes, and as potential game-changers in terms of international attitudes and approaches to dietary change. They therefore offer an instructive starting point for exploring public attitudes at national and subnational level.

Previous research has illustrated the degree to which climate change remains relatively low on the political, media and public agendas in each of these four countries: governments have not been consistent in addressing it, media attention has been sporadic and, as a result, it is not a priority issue for the public. The relatively high levels of awareness reported by respondents to our online survey seem to contradict this: the vast majority (83 per cent) agreed that human activities contribute to climate change[118] and a high share (33 per cent) attested that it was very important to them in deciding how much meat to eat.

The focus groups allowed for the further probing of this result and an assessment of the extent to which 'climate

[118] Once again, it should be noted that the question 'To what extent do you agree or disagree with the following statement: "Human activities contribute to climate change?"' was asked at the end of the survey, following a number of questions which included statements of climate change as fact.

change' is accurately understood by the general public and purported consideration of the climate in individual lifestyle choices is borne out in practice.

Each focus group began by asking its members what came into their heads when they heard the phrase 'climate change', with the purpose of eliciting immediate associations, perceptions and priorities. The first associations of the groups largely mirrored findings from the earlier online survey: industrialization – and the emissions from factories and vehicles, in particular – was referenced consistently across all samples, and observations of changing weather and seasonal patterns were associated with climate change in all groups. The phenomenon was also understood to be indirectly related to broader societal and economic advance. However, more focused discussions of causes and impacts revealed differing national and cultural priorities.

### Lived experience has a significant influence on understanding of the drivers and impacts of climate change

While representing only four of the 12 countries surveyed, the focus groups showed the extent to which the specific local environment – both geographical and cultural – can influence an individual's awareness and interpretation of what is generally considered a global issue. Differences in first associations across the country groups indicated the importance of lived experience and locally determined conditions in influencing understanding of what climate change means.

In the UK and US, first associations tended to be key terms such as global warming and greenhouse gases, and – in spite of areas of confusion such as a continuing association with the ozone layer – there was a relatively high awareness of the key scientific arguments for climate change.

In China, and to a lesser extent in Brazil, respondents talked of the direct and often quite detrimental impacts of climate change on health and wellbeing. In the Chinese sample, while understandings of causes and effects were the least developed of the four countries, responses were strongly reflective of conditions experienced by the population on a day-to-day basis. There was some familiarity with key terms such as greenhouse gases and global warming, but the strongest tendency was to relate climate change directly to pollution, which was taken to include air pollution, toxic chemicals and poisoned rivers. For most in the Chinese groups the two terms were synonymous, but some of those who recognized that there was a difference defined pollution as both an impact and a cause.

> I think atmospheric pollution is one of the important reasons [for climate change] and actually they are interacting, they are like a two-way interaction, not a one-way.
>
> *Shanghai, middle-income, male*

This prioritization of pollution in the Chinese respondents' interpretations reflected the high level of concern over the direct, tangible impacts of poor air quality on individual and public health, on food safety and on quality of life.

> There will be more diseases and it's getting warmer and warmer so just now we have smog. Everybody wears a mask and we can never breathe easily, and if the sky was blue and the weather very good, we [could] breathe more easily.
>
> *Beijing, low-income, female*

As might be anticipated, air pollution figured much less consistently across the Brazil, UK and US samples, where the problem of city smog is generally far less severe. Only in Brazil was it also raised as a concern in terms of the direct impacts of poor air quality.

Indeed, climate change – while understood in different ways – was an issue of equally high concern and interest in Brazil and China. Levels of understanding varied with regard to what 'climate change' actually means, with those in education most likely to offer more detailed explanations of the science. But a strong and recurrent theme across Brazilian groups was that of *'man versus nature'*, with some describing climate change as the result of human interference in or exploitation of the natural habitat. First associations elicited comments such as *'aggression of man to nature'* and *'lack of care for nature'*, probably reflecting the high cultural value placed on the country's natural resources and, in particular, the Amazon rainforest. As such deforestation was a priority in concepts of climate change, seen as crucially responsible for increasing greenhouse gas emissions and directly related to other issues of concern such as population growth.

> Because people who live in slums, they will start living any place, then they start having children. They have one, they have 100, they have 1,000. There is no sanitation, no public sewerage, nothing. The waste that is generated is put in a river. They start to deforest in order to find somewhere to live.
>
> *Porto Alegre, middle-income, male*

In Brazil a common reference point was the recent water crisis,[119] most notably in the heavily affected area of São Paulo. However, while some saw the crisis as a direct impact of climate change, others blamed a failure in government planning. A similar point was made in the San Francisco groups about recent water shortages.

[119] Hawes (2015).

### Policy implications

The importance attributed to climate change is determined to a great extent by its direct and tangible impacts on the individual or the local community. While confusion around the meaning of climate change poses a challenge to policy messaging that emphasizes the climate benefits of reduced meat and dairy consumption, existing public concern for local environmental issues presents a key policy opportunity. Harnessing existing societal concerns and cultural interests and focusing on their links with diet and climate may gain considerably more traction than generalized campaigns that promote a global case for climate action. Understanding local concerns will be a critical first step in tailoring awareness-raising strategies to maximize their impact and influence.

## The majority accept the role of humans in driving climate change and the need to act, but politics can confuse the issue

Respondents across all countries and socioeconomic groups tended to agree that human activity contributes to climate change. However, scepticism over this is difficult to measure. It is best understood as a spectrum of different beliefs, from those who claim climate change is not happening, to those who believe it is happening but is the result of natural processes, to those who believe human behaviour is playing only a limited role.[120] This range of beliefs was expressed by most groups in the UK and the US. Among these sceptical respondents there was a general tendency to question the robustness of the data and the limitations on scientific knowledge.

In Brazil and China sceptical beliefs were less common, and the science was less disputed.[121] There was also no general sense that the debate was divisive and that one might be expected to take a position on the issue – unlike in the UK and US groups, where several participants pointed to the role of their broader political beliefs in determining the extent of their openness or hostility to climate change arguments. In the UK, perceptions and attitudes were also, to a degree, embedded in ideological belief systems:

> *London, middle-income, male:* I mean there's lobbying on both sides, isn't there? There's quite a big green lobby that would quite like to see certain industries, oh, I don't know, taken down or taxed heavily in favour of other industries because they think that's the answer to everything, but I happen to disagree with that.
>
> *Moderator*: So they're equal in a way, in terms of the agenda behind both sides …?
>
> *Male*: Yeah, I feel it's a bit anti-progress, the sort of green lobby, that's my beef with it [climate change] I think.

Among the UK and the US groups, there was a stronger sense of the politically and socially divisive nature of the issue, with first responses including comments such as '*hysterical half-truths*' and '*uh-oh trouble*'. Some strongly believed that these divisions, and their foundations in the various agendas of corporate, political and (in the US) religious agencies, had stalled meaningful action on the issue.

The general perception in the UK and the US was that the information environment was '*conflicted*' on climate change – for some, it was '*deliberately misleading*' – and this had led to confusion and caused doubt about the science.

> I think the greatest success is the fact that they even made it a debate. As they said, they introduced doubt where it should just be there is no doubt. Politicians, as you said, you know, are not even – are refusing to, have been very weak. The politics have been very weak to come to the table and just say there is no debate … I think they will err on the side of who is getting the money.
>
> *San Francisco, middle-income, male*

While climate change was seen in the UK and US to be deserving of attention, the issue was accorded a lower priority across these samples than in Brazil and China. This disengagement reflected the general lack of trust in politicians,[122] as expressed above, and was compounded by a sense that the broader public was not motivated to act or support action and society was fundamentally selfish:

> I think the problem is just the people. They're the cause of the problem and the reason it just continues. Honestly I don't think people actually care enough about making a change.
>
> *London, student, male*

While there was a broad consensus that action should be taken on climate change, the groups were divided as to the role that individuals should take, and how much agency they possessed. There was a degree of distinction between the industrialized and emerging economies over the sense of responsibility shown for driving and tackling climate change. While in the UK and US samples people broadly distanced themselves from the actions of those (largely in public roles) who were causing climate change, in Brazil and in China there was a greater sense of personal responsibility:

[120] For a detailed discussion on the range of ways of defining scepticism in the UK context, see Capstick and Pidgeon (2014).
[121] The findings of the Chatham House/Ipsos MORI (2014) multi-country survey showed that fewer respondents disagreed with the statement that 'human activities contribute to climate change' in China (2 per cent) and Brazil (3 per cent) compared with the UK (9 per cent) and US (14 per cent).
[122] Lack of trust in politicians was a key finding of Happer et al. (2012), and is also supported by other studies including Ipsos MORI (2013); and in the US, the Pew Research Center (2014) showed that only 24 per cent of the population trust the government in Washington 'just about always' or 'most of the time'.

> You have to start from yourself, have to pay attention to your own eco-awareness to save the water, to be more eco-friendly, to go green, and don't drive cars, try your best using public transportation, take metro lines, reduce the pollution, and that is more about starting from yourself.
>
> *Shanghai, professional, male*

Perhaps paradoxically, respondents in the US generally believed in the power of individual action, but they were less keen to accept their own active role in driving climate change, and by consequence their role in solving the problem.

### Policy implications

The debate over whether climate change is driven by humans seems to reside largely within the political arena. This, coupled with a general sense that governments are unlikely to take meaningful action on climate change, points to an opportunity and necessity to leverage greater public interest and engagement through more resolute and coherent political messaging. Inaction by the government risks signalling that climate change is a low priority and could in turn discourage individual action. Conversely, a decisive move by governments to commit to action against climate change may strengthen the perception of collective momentum, encouraging action at the individual level and strengthening faith in its efficacy.

## The media environment is understood to be shaped by financial interests and political bias, but nevertheless has a significant influence on levels of public awareness

When asked about assessments of trust and credibility in relation to information on climate change, respondents across all samples discussed the complex process by which they accessed a range of information across different media and news outlets.[123] Trusted information was generally perceived as difficult to access in the multimedia environment, and some respondents noted that they tended to compare and contrast a range of coverage in order to gain a sense of consistency and consensus.

Across all countries, but to varying degrees, there was evidence of a general distrust of journalism and awareness of the ideological bias of different outlets. Through this process of comparatively examining the range of media sources, the differing agendas of each news outlet could be eliminated and accuracy of basic factual details and arguments allowed to emerge.

> You need to research to make up your own mind. I usually listen to radio, watch television, read the newspapers and some magazines. So, if I want to go more in depth, I go to the internet and then I research on various websites. Then I make my own conclusions. Because nothing is true.
>
> *Rio de Janeiro, middle-income, female*

> I try to do as much research as possible, scientific research and then on the back of that skim through various forms of media to see what they're saying, ranging from *The Guardian* to *The Express*, just to see.
>
> *Glasgow, middle-income, male*

> I search information a lot and I will determine according to the news media.
>
> *Chengdu, student, female*

Despite an interest in actively navigating the media environment to access multiple perspectives, this process of searching for further information and scanning the range of media is triggered by mainstream reporting through official outlets such as the BBC, CCTV, CNN and Jornal Nacional. Respondents tended to follow consumption of mainstream reports with social media discussion and accessing specialist website and blogs. In other words, mainstream news outlets set the agenda and focus interest on specific areas.[124] As one respondent described, they pique or '*awaken*' people's interest:

> So first you are awakened by the media, radio and TV, and then I would go to the internet, more secure sources and read on one or three sites that are reliable.
>
> *Porto Alegre, middle-income, male*

The internet, and in particular Google search and social media such as Facebook and Twitter, are central to this processing of information but respondents were divided over the degree to which information accessed via search engines or social media could be trusted.

The Brazil sample was distinctive in this respect, in that some respondents saw social media discussions as trustworthy, and part of a wide process often involving friends and family, which had the potential to challenge the mainstream media. However, in the other three countries, social media and the majority of alternative media, including blogs and specialist online journals, were generally not trusted, mainly because the credentials of those presenting the information could not be verified.

[123] See further discussions in Happer and Philo (2015, in press).
[124] British research has shown that mainstream media are the 'lifeblood' of social media. See Newman (2011), p. 6.

> I have lots of people on my Facebook and not all of them I would trust for information … I mean, I think social media's a great way for passing on information but whether that information is credible, that's a whole different matter.
>
> *Glasgow, middle-income, female*

In China, sources of information tended to be divided between official and non-official media; the former included state media such as CCTV and to a lesser extent other respected news outlets, while non-official media encompassed a range of digital and social media. Overall, trust in information from social media tended to be higher than in the UK and US;[125] however, for some, authority and credibility were primarily invested in official media. Among these respondents this reflected the high levels of trust in the state and CCTV's perceived rigour in news-gathering.

Climate change is subject to peaks and troughs in mainstream media attention.[126] The issue is generally not a priority in the news outlets across any of the sample regions, though in times of extreme weather – such as drought, as experienced currently across Brazil and in San Francisco – it receives spikes in attention. Therefore while all groups discussed effective ways of accessing credible information on climate change, only a minority, mainly drawn from the student groups, had actually done this. As such, interpretations and understanding were drawn from the range of sources encountered but not actively sought on the subject: mainstream news broadcasts, TV documentaries (for example, *Discovery* channel), the BBC and books. Documentaries and news items were seen as most credible when they referred to specific studies.

> I don't go looking for information because I'm not that interested but if I heard the BBC report that such and such respected academic institute had put out a report saying x, y and z, I would give that some credence.
>
> *London, middle-income, male*

### Policy implications

Mainstream media remain a hugely important source of information, with these traditional sources afforded a high degree of trust. There is an implied expectation that they will alert the public to issues of concern and importance. Greater coverage of the issue of climate change and its drivers therefore holds considerable potential for prompting public interest in the issue and raising awareness to a level at which behaviour change becomes more likely. For media outlets to do so, state and non-state actors alike will need to assist in the formation of simple, accessible messages to convey the nature and importance of this complex problem. As individuals adopt an increasingly active approach to accessing information in the media, public campaigns to raise awareness or prompt behaviour change will need to span the full range of media sources in order to gain currency.

## The scientific community is not perceived to be free from political and financial influence, but is the most trusted source of information on climate change

The most trusted sources across all groups were scientists and scientific sources, particularly among those who were currently in education or had received a higher level of education. Groups in China expressed doubts about routine academic sources but high-quality state-funded institutions of science were more likely to be trusted. In the Brazilian groups in particular, much of respondents' knowledge and understanding of climate change had been gained during their education, and the high level of respect for science and scientists had been established at a young age.

Scientists and other experts were perceived as more knowledgeable than journalists, and as providing information directly rooted in the evidence rather than offering conjecture. In the US, where trust in any information source was limited, the credibility of scientists was seen as relative.

> Depending on who's funding their [scientists'] research, [they] might have a lot to say about their opinion because I mean you can – you can look up studies on butter and you'll find, you know, the American Heart Association funded research on butter and the scientists found out that it caused 80 per cent of heart attacks but, yes, somebody else will fund research on butter and they found that it doesn't do anything.
>
> *Dallas, student, male*

Some suspected that the political and business agendas were influencing scientific research and that universities were increasingly reliant on funding from agenda-led groups. But the consensus of opinion among scientists and collective bodies was seen as providing the most convincing evidence, and many of those sympathetic to the issue regretted that the conversation had become dominated by the sceptics.

[125] The Chatham House/Ipsos MORI (2014) survey also found that respondents in Brazil and China were more likely to invest higher degrees of trust in social media than in the UK and the US.
[126] The 'Daily Climate' charts trends in coverage of climate change, which experienced a sharp rise in reporting in 2014, but suffered extreme lows in the years from 2009. For more information see Fischer (2015). See also Boykoff et al. (2015).

### Policy implications

The scientific community is held in high regard, in large part owing to its place outside the political sphere. Concerns over the increasing influence of financial flows and political interests must therefore not be ignored: if scientists are to maintain their credibility and position of influence, assertion and protection of non-partisan, independent expertise and insight will be critical. In the face of funding constraints and political co-option, these actors may require the financial support of national and international non-state actors, and possibly the regulatory support of governmental and intergovernmental bodies.

## Diet, meat and climate change: an unfamiliar line-up?

Results from the online Ipsos MORI survey carried out in 2014 indicated that willingness to make changes to lifestyles and behaviour is positively influenced by an awareness of the importance of taking action to solve an issue. But awareness of this importance does not necessarily prompt action and, as seen above, there is some reluctance to accept personal responsibility for what is deemed to be a collective problem. The focus groups aimed to explore this dynamic within the specific context of climate change, meat-eating and dietary change.

### Overview

- The issue of climate change and livestock is currently not on the public radar in any of the countries. It is not something that most people have read or heard about and some struggled to connect it to their own experiences or visualize the impacts.
- Introducing the issue into the media and public debate will face different challenges. In the UK and US there is widespread distrust of the information environment; people find it very difficult to invest trust in the range of speakers on any political issue, and this tendency is heightened with regard to climate change as there is a broad perception of the range of agendas which feed into reporting.
- Messages on the link between meat and dairy production and climate change are therefore likely to be met with scepticism in an environment in which many members of the public have already taken partisan 'positions' and are resistant to new arguments on that basis.
- In Brazil and China, in terms of opening up the debate, there is greater trust in the information that is available; in the former the state provides legitimacy, while in Brazil there is an openness to a range of speakers from big corporations, education professionals and experts on social media.

### Awareness and understanding of the impact of meat production and consumption on climate change are low

As might have been anticipated in the light of the multi-country survey results, there was low awareness across the four focus group countries of the impact of food production on climate change. There was almost none in China, and where it existed elsewhere it was concentrated in the middle-income groups. These tended to be respondents who had existing knowledge of, and interest in, climate change. In the Brazil groups, some had become aware of the issue through coverage of deforestation.

> "I hear a lot about deforestation, the emission of gases, of methanol, basically that is it. But [I hear] more about deforestation.
>
> *Rio de Janeiro, student, male*

When asked specifically, however, some had made a vague connection between meat and dairy or food production and climate change.

> "I have heard … when you put things in the measure of carbon footprints, how [the diet of] someone who eats red meat … is much more of a carbon footprint than someone who only eats fish and poultry, versus someone who eats an all plant-based diet.
>
> *Washington, student, male*

Some thought the key issue might be the impact of higher temperatures on livestock and some confusion was apparent. For others in the UK and the US groups the connection had been made through hearing jokes and comments about 'cow burps' and 'cow farts'. Despite indications in the survey that climate change is a factor in individuals' consideration of their food choices, the nature of these comments suggest that this is unlikely to be borne out in practice: respondents tended to dismiss the issue completely or to define it as a minor one.

Others, once prompted, made connections with a range of issues such as population growth. Discussions also indicated a general negativity across the samples about modern meat production methods with regard to food safety and animal welfare. This concern was particularly high in the US, and reflected a broader cynicism about big corporations and industry.

Among those for whom the issue was a novelty, levels of acceptance of the argument varied across the samples. In the Brazil groups, there was a general willingness to accept the connection, while in China (where, as noted, awareness was generally lower) respondents were more resistant.

> No, I didn't hear such claims. I'm not familiar with this. Most importantly, I like to eat meat.
>
> *Chengdu, middle-income, male 1*

> I don't trust this statement or this claim. I think the process of industrialization caused climate change. In ancient times people still ate meat. I don't trust it.
>
> *Chengdu, middle-income, male 2*

### Policy implications

The awareness gap around the links between meat and dairy production and climate change is such that policy messaging centred on reducing the climate footprint of our diets will have limited impact. In the short term, policies that emphasize the potential co-benefits of reduced meat and dairy consumption to the individual and to the public as a whole, particularly in terms of health, may therefore hold more promise.

## Conclusions

Undertaking focus groups in these four countries allowed for a more in-depth exploration of the findings to emerge from the online survey. In particular, the groups sought to further explore existing awareness around the climate impact of meat and dairy consumption, and to understand who and what informs current understanding of these issues. While the qualitative nature of the research and the relatively small sample sizes do not allow for general conclusions to be drawn on societal attitudes and responses across the four assessed countries, a number of challenges arise from the discussions that are of salience to the consideration of future policy interventions:

- **Confusion around the meaning of 'climate change', its causes and its impacts creates a weak foundation on which to base awareness-raising around the contribution of the livestock sector and the importance of our food choices.**

  If policy messaging aimed at fostering dietary change is to focus on the climate benefits, attention will need to be paid to depoliticizing discussions around climate change and demystifying its drivers. The influence of experience and direct, tangible impacts on individual understanding of climate change indicates that messages tailored to particular societies or populations – how climate change will affect them, and how they are contributing to GHG emissions – may better capture public attention and interest than broader messaging around climate change at a global level.

- **There is a significant awareness gap around the role of meat and dairy consumption in driving climate change, owing in part to a lack of government and media signalling.** Despite a degree of scepticism around the trustworthiness and independence of media and particularly political sources, there is an implicit expectation that the mainstream media and the government – through school education and communication tools – will alert the public to issues of critical importance.

- **Awareness-raising campaigns should target local environmental concerns and emphasize the importance of diet and climate change relative to these.** The focus group discussions suggest that the importance of experience in influencing consumer priorities extends beyond material concerns at the point of purchase and relates also to more local environmental concerns. Deforestation and drought in Brazil and the US, and pollution in China, are problems related directly or indirectly to climate change and growing demand for meat and dairy products. Addressing existing public concerns around these issues offers a potentially fruitful approach to enhancing public understanding of the importance of dietary change.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# 5. Public Responsiveness to New Information and Policy Options in Brazil, China, the UK and the US


## Summary

- **New information explaining the link between meat and dairy consumption and climate change is likely to meet with some resistance as it challenges preconceptions and existing behaviour.** Effective communication through visual tools may help to lessen the conceptual leap for many, and the development of simple messages that are easily disseminated will be crucial.
- **New information alone is unlikely to prompt shifts in behaviour, but will be an important first step in propagating change.** The choice architecture in each of the four countries promotes meat-eating, and there exist significant societal barriers to pursuing a plant-based diet, including the perception that meat is key to a healthy diet and any substitutes are inferior.
- **Nudges are not enough.** While softer policy approaches would naturally be favoured by most, there is an implicit recognition that dietary change is likely to be achieved only by more interventionist policies that impact upon prices.


## Introduction

In the second part of the focus group analysis, as described in Box 8 in Chapter 4, new information on the links between diet and climate change was presented to the participants to test their initial response to information and to observe how this was processed. The discussions detailed below analyse the way in which individuals access existing information, and explore the role of government signalling and media coverage in triggering public interest.

## Response to new information

Once the nature of and background to people's existing beliefs and behavioural intentions had been established, the information sheet was introduced (for a copy of this, see the Supplementary Materials, available online). This included the key statement that emissions from meat and dairy production globally were roughly equal to emissions associated with the tailpipe emissions from all the world's vehicles.

### Overview

- The diet–climate relationship is a difficult concept to grasp for many. Familiarity with the climate impact of transport coupled with the invisible nature of livestock emissions presents a significant challenge to the assimilation and acceptance of information showing the equal importance of both as drivers of climate change.
- The source of information around the diet–climate relationship will have a significant impact on its credibility. The public is likely to respond more positively to such information when it comes from independent, apolitical sources.
- Most respondents admitted that, even if it were proven to be true, they would not change their behaviour on the basis of this information alone. Many nevertheless felt that being informed about the diet–climate relationship would prompt them to reflect critically on the issue and on their eating habits.
- Some respondents conceded that while climate change concerns would not be the only or even primary factor in driving their decisions, they might play a role in realizing existing, often unfulfilled, intentions to reduce levels of meat consumption.

### Challenges to preconceptions and to existing behaviour meet with resistance

In the context of low levels of pre-existing awareness and degree of confusion across all samples, the information was generally received with surprise, and was for some difficult to process immediately. Even for those who had some level of awareness and understanding, the degree of impact on global emissions was unexpected.

The levels of shock were highest in the groups in China, possibly reflecting the lower levels of understanding of climate change in general and this issue in particular, and also the very clearly understood connection between transport and pollution.

> This is the first time I've seen this figure. I feel surprised that it's so exaggerated, shocking, I doubt it, it's too much.
>
> *Beijing, middle-income, male*

The information was novel, however, across all samples, and the comparison of the relative emission levels of transport and livestock production was the most immediately striking element, partly because it required respondents to rethink prior assumptions about key drivers of climate change. It also challenged the message that had been reinforced across their information environments, including the media they consumed and the education they received.

> I think whenever you're told about greenhouse gases or anything, it's always transport … it's not that widespread that it comes from food and animals, it's normally about planes.
>
> *Manchester, student, female*

> We always studied it. But this thing with the animals was never something taught [in] schools, in conversations.
>
> *Rio de Janeiro, middle-income, female*

> First of all I didn't know that, I was surprised. Secondly, no-one has heard of it.
>
> *Beijing, low-income, female*

A further factor in relation to the transport comparison, which emerged strongly in Brazil and China, was that respondents struggled to visualize the impacts: one Brazilian respondent noted that '*you can see the fumes coming out of cars but not animals*'. In the China focus groups, this related to the strong association between pollution and climate change which respondents directly observe and experience. The link between animals for food and climate change did not provide such direct and tangible evidence.

Some in the UK and US groups felt that the information made them feel guilty about their own behaviour, and again there was resistance owing to both the perceived difficulty of tackling the diet–climate link and the sense of responsibility being shifted from governments onto individuals.

### Policy implications

Campaigns to raise awareness of the relationship between food choices and GHG emissions are likely to meet with confusion and resistance. Effective communication through visual tools may help to lessen the conceptual leap for many, and the development of simple, accessible messages that are easily disseminated will be crucial.

## The degree of scrutiny in assessing new information reflects broader dynamics of trust in the information environment

The way in which the new information was negotiated reflected the broader levels of trust in the information environment in which the different groups were immersed. Notably in China, where the immediate reaction was strongest, the general tendency to accept information from official sources led to a fairly rapid tempering of initial resistance.

In the US groups, where there was a very low level of trust in information sources and public bodies, scepticism about the data presented was more sustained, and some noted they would be looking for reinforcement and legitimacy from other information sources before addressing the questions raised. There was also some connection between an existing belief in climate change and acceptance of the arguments, with those participants who displayed prior awareness or knowledge of climate impacts more inclined to consider the new information credible.

But in all groups, the information was generally accepted – and the crucial factor in this respect was the provenance of the information and the relative trust accorded to the collective bodies, the UN and the less familiar IPCC. The UN carried most weight in Brazil, and some noted it was a key reference source in relation to issues around deforestation, which are taught in schools from a young age.

In the UK groups, the UN and the IPCC were invested with trust on the grounds that they were large, accountable collective bodies, which would mean that inconsistencies in information were likely to be eliminated. This sense was widespread in the US also, but the funding of scientists and political agendas remained issues of concern. Some Chinese respondents had similar concerns about the UN, although the focus was more on its being an international body that would be unlikely to prioritize national interests.

Largely, however, the reasoning behind participants' trust in or scepticism about these sources centred on their perceived degree of independence. Concerns over the pervasiveness of political and financial agendas, and the extent to which these permeate even supranational scientific bodies, only serve to highlight the basic assumption that non-partisan, apolitical actors can be trusted as information providers, as was also reflected in the positive perceptions of 'experts' among survey respondents.

The caveat to the acceptance of the information across the samples was that, to be effective, the message would need to be reinforced across mainstream media (crucially state media for Chinese respondents), and endorsed by the trusted collective bodies referenced on the information sheet. This reflects both the pervasive assumption that mainstream media will bring to light – and to a certain extent endorse – those issues that are of critical importance, and the general tendency in Brazil, the UK and the US to trust those sources that are seen to lie outside the political space.

### Policy implications

The provenance of information has a significant influence on its acceptance by the public. New and uncomfortable information has a higher chance of being believed and accepted if it comes from a source that is not perceived to be driven by ulterior motives, that lies outside the political space but that has relevance to the national context. The UN and IPCC were generally regarded as credible sources, indicating the potential role that intergovernmental or non-governmental actors can play in raising awareness, particularly those with a scientific basis. As indicated in the online survey, governments are largely perceived to be important providers of helpful information, and these focus group findings suggest that state actors stand to benefit from engaging and aligning with scientific and independent communicators.

### Greater awareness alone is unlikely to prompt shifts in behaviour

Before the new information was introduced to the focus groups, there was no widespread pre-existing commitment to alter meat consumption in response to concerns about climate change. This was partly because the information was not well established or pervasive enough to have the potential to shift behaviour. Across the samples (mostly in the UK and US groups) there were some who had already reduced or considered reducing their meat consumption, but environmental concerns tended to be a contributory factor rather than the primary driver. The new information on diet and climate change was, however, highlighted as a likely trigger for change among some who were already concerned about the health effects of eating meat, particularly red meat.

This was also reflected in responses to the question about the need for governments to take action on this issue. There was a general sense that they should, but when probed respondents did not feel strongly that action on this should be prioritized over other measures taken to tackle climate change, and there was a distinct lack of engagement with this issue across all samples.

The new information did not, in most cases, cause respondents to commit to reducing their meat consumption, though it did encourage further reflection upon the issue for some in all groups. The topic was familiar in the UK and US, in the context of reinforced cultural messages about the negative health impacts of excessive meat consumption, and the promotion of plant-based diets. Indeed some already aspired to follow such diets, though this was seen as difficult.

There was some awareness of media messages about the environmental impact of eating meat but these connections were not as well established. In the UK sample, some had changed their behaviour in response to these arguments, while others had unrealized intentions of doing so.

In the US, there was less of a stated commitment to behavioural change in response to health messages, with one respondent noting that '*I'd pretty much eat anything as long as I don't die right after*'. Some did note that the threat or experience of illness would be an important factor, especially if the message were communicated by the medical profession.

#### Policy implications

Awareness-raising alone will not be a sufficient means of fostering behaviour change. Rather, it will need to form part of a comprehensive suite of policy approaches, including strategies that encourage and facilitate alternative food and lifestyle choices, tapping into dominant conceptions of a healthy diet as a means to create culturally relevant advice and alternative options that are not in sharp contrast to existing practices. When concerns around the health impacts of meat-eating are at a high – in the wake of a food safety scare, for example – policy-makers and campaigners should seize the opportunity to raise awareness of the longer-term health implications of overconsumption of meat.

## How the social landscape shapes dietary choices

Having established the nature of current attitudes, beliefs and behaviour and then introduced the new information, the third aim of undertaking focus group analysis was to explore the extent to which the cultural and social significance of diets – and particularly of meat-eating – influences individual food decisions, and how this significance differs at country and regional level. Without this understanding, policies that promote a reduced-meat diet risk triggering fears of cultural erosion, social marginalization and other unintended consequences.

### Overview

- In all countries meat has an important cultural value. In Brazil and China meat consumption is symbolic of social and economic progress, whereas in the UK and US there are positive associations with nutrition but also strong negative sentiments about individual and societal health impacts, mass meat production and food safety.
- Structural factors such as cost and convenience, in combination with a range of social norms that promote meat-eating, are important in all countries.
- Awareness-raising strategies to encourage changes in dietary practice may benefit from a stepwise approach that focuses first on issues of direct interest to the consumer, i.e. on the health benefits of lower meat and dairy intake or on potential cost savings to be made through adopting a diet richer in plant-based alternatives.
- While consumer practices have proved fairly resilient in the face of certain health messaging campaigns,[127] there is some indication that the cumulative effect of health, climate and economic messaging around the

[127] See MacDiarmid (2013) for more on the discrepancy between knowledge about healthy diets and dietary choices.

co-benefits of reduced meat and dairy consumption may be to instigate behaviour change among those with a nascent interest in shifting current practices or adopting healthier, more sustainable lifestyles.

### The perceived importance of meat to a healthy diet

A dominant theme across all samples was the importance of taste preference – as one woman in Beijing noted, *'if it's delicious nobody cares'* – and for the large part respondents perceived meat-eating to be an experience without parallel. A related but less prevalent perception across the samples was that currently there are no effective substitutes in terms of texture and nutrition. In all countries, meat was seen by some as an integral part of a healthy diet. This was particularly so in China (where meat consumption was rightly perceived to be lower than in the West) and Brazil, where alternatives to meat were understood to be inferior in terms of nutritional value.

> I don't agree: if we don't eat meat, why are there more people who have a longer life? In the past people would die at 50 or 60 years old, [but] now a lot of people have a life over 70 or 80 years old. If you only eat vegetables the nutrition is not enough.
>
> *Beijing, low-income, male*

> Soy is a substitute to meat, but I don't really believe that soy has the same proteins as meat does.
>
> *Rio de Janeiro, student, male*

Fish was nevertheless seen by respondents in Brazil – and to a lesser extent in China, the UK and the US – as a potential substitute for meat, associated with fewer negative impacts in terms of health and wellbeing.

#### Policy implications

The importance accorded to health considerations in food practices, as indicated by survey respondents, is borne out by the focus group discussions. Efforts to foster a reduction in meat and dairy consumption should therefore be accompanied by campaigns to improve understanding of alternative protein and micronutrient sources, and should focus on the degree to which many people are currently overconsuming meat and dairy products. Acquiring a basic knowledge of what constitutes a healthy diet, and the skills for preparing food at home, may be equally important in enabling a shift in dietary practices. Without such complementary measures, the belief that meat and dairy products are essential components of a healthy diet is likely to present an insurmountable barrier to policies that fall short of a ban.

### Choice architecture promotes meat-eating in each of the four countries, and there exist significant societal barriers to pursuing a plant-based diet

Very strong societal barriers to limiting meat consumption were highlighted across all samples. Structural barriers, such as cost and convenience, were widely recognized, and were particularly emphasized by the US respondents. It was noted that healthier food was more difficult to access, particularly in poorer neighbourhoods, and much more expensive, and that more plant-based diets were largely restricted to those on higher incomes.

> Our system here in the United States, our food infrastructure is not geared to favour it. It is almost like vegetarianism and veganism is something you can afford.
>
> *Washington, low-income, male*

> It's simple, it's cheaper to be unhealthy.
>
> *Washington, student, male*

Similar sentiments were expressed in the UK, where a reliance upon pre-packed sandwiches for lunch and the higher price of vegetarian options were sometimes seen to be a barrier to healthier eating, but what was particular to the US was a broader cynicism about the agenda of successive governments to promote unhealthy diets in the interests of the meat industry and their generation of profits. Again this reflected the general and widespread feeling that business sets the agenda in the US.

> I think the government has failed [on] the standard American diet. The diet it has been pushing for the past 20, 30 years has clearly made Americans unhealthy.
>
> *Washington, low-income, male*

We find here a series of contradictory pressures. Health concerns can act as negative forces on meat-eating while other social conventions create an expectation that people will consume meat.

#### Policy implications

In addition to raising awareness around the nutritional value of alternatives to meat and dairy products, governments may also need to consider fundamental changes to the choice architecture within which food decisions are made. Policy-makers will need to address current constraints to physical and economic access to nutritious alternatives, and to work with industry to develop strategies to expand choice and encourage consumption of plant-based alternatives through lower prices and improved availability, and mitigate unintended consequences for the eating patterns of less affluent populations.

### The culture of meat-eating is complex and highly influential

The difficulties of resisting social norms, including meat-based meals cooked by close friends and family members, the marginalization of vegetarians and vegetarian options, and the promotion of burgers and other fast foods, were discussed across the Brazil, UK and US samples.

In Brazil, a key factor in resistance to the idea of reduced meat intake was the centrality of the barbecue to Brazilian culture, particularly in the south of the country. The weekend barbecue is a long-established tradition that brings people together and, for some, it is the high point of the week. There was a concern that to limit meat consumption might require respondents to sacrifice social activities and to be marginalized in their peer group by such behaviour.

> I think about my friends, they always do barbecues. It would be hard. Everyone invites you to barbecues, you have to have meat. How will you barbecue without meat?
>
> *São Paulo, middle-income, female*

This sense of marginalization, or marking oneself as different, was strong in the US groups too. One US respondent noted that limiting meat-eating would require a '*whole identity shift*' and others discussed the way in which changing behaviour around meat-eating had led to their stigmatization. An aspect of this was the sense of national identity: '*we are America, most of us grew up on meat or [were] raised on meat.*' As another respondent put it, '*We eat meat because we just plain eat meat. It's what we do.*'

In Brazil and China, meat-eating was strongly associated with economic and social prosperity in recent years.[128] The understanding of meat consumption as progressive in these cultures was dominant: there was a perception that it represented a better and more successful life. Therefore reducing or cutting it would be seen as a regressive step.

### Policy implications

The cultural significance of diets – and meat-eating in particular – is both highly important in influencing food choices and highly context-specific. Policies that aim to foster dietary change will need to take the cultural specificities of target populations into account and to tailor policy interventions accordingly. In the near term, there may be value in emphasizing moderation rather than substitution. In the longer term, efforts to trigger dietary shifts may first need to focus on instigating an inversion of the aspirational status of plant-based and meat-based diets.

Whatever the strategy or intervention, state and non-state actors will need to recognize the importance of protecting and promoting cultural heritage and maintaining food-centred traditions.

## Who should take action, and how?

The complexity of the social and cultural politics that surround meat-eating and diets is such that policies to promote dietary change will be highly sensitive. The final objective of the focus groups was to test the received wisdom that this sensitivity – and the industry and public backlash that it was likely to provoke – precludes government intervention. Participants were presented with a number of possible policy options, spanning the spectrum from awareness-raising to taxation.

While broader conclusions as to likely public responses must be drawn with caution from a short discussion among a limited number of participants, the way in which the various options were critiqued by participants nevertheless provides insights that call into question whether the received wisdom is justified.

### Overview

- In Brazil and China, there is a more general openness to modify behaviour. Where this is combined with higher levels of trust in government and science-based information, this may prove to be a significant opportunity to leverage individual action through a sense of societal momentum for change.
- While climate change is not a priority for publics across these countries, there is widespread recognition that it is an issue requiring attention, and an expectation that governments will take the lead. As a result, there is little appetite to resist meaningful action taken by governments that would be seen to be in the public interest.
- In the longer term, public legitimacy on this basis is likely to be accompanied by increasing acceptance and adaptation, as with other major changes such as smoking bans.
- The reinforcement of media and public messages that are given legitimacy by scientific findings, and that are tailored to resonate with nationally differentiated

[128] See also The Economist (2014).

existing concerns such as pollution, deforestation, negative health impacts and distrust of industry, is likely to play a central role in changing attitudes and behaviour.

### Governments are expected to act in the interests of the public good, and increased awareness is likely to bolster public support for intervention

Exposure to information outlining the links between meat and dairy production and climate change prompted a greater number of respondents to support proposals for government action, with the highest level of approval for collective action in the Brazil sample. When specifically asked to rate the importance of collective action on a numerical scale, respondents across all countries accorded higher priority to such action than they had done before receiving the information sheet.

The Chinese group was the only one in which the number of respondents initially attributing the highest level of priority to collective action was reduced after the new information was introduced, but this finding must be seen in the context of the sample group's particularly low initial understanding of the issue. In some cases, the starting point was effectively zero where some had not fully understood the premise of the original question, which was predicated on some degree of understanding of the causes and effects of climate change.

Overall across the samples, after the new information was presented there was a widespread acceptance – and for some an expectation – that governments should take some form of action. In the Brazilian and Chinese groups the state was seen to be central in raising awareness and tackling the issue. Collaboration with trusted collective bodies such as the UN and, in Brazil, multinationals (which were invested with a greater degree of trust than in other samples) was seen as an effective counterpoint to lack of trust in politicians.

> I think it's not something to be worried [about] by the general public […] but for the government it's something for them to worry about and the government must do something mandatory by legislation.
>
> *Chengdu, student, male*

> For me, the government has to do something … it has to come from several sources.
>
> *São Paulo, middle-income, male*

> It would be even more credible with the government and the UN!
>
> *Porto Alegre, low-income, male*

There was a general sense among respondents across the UK and the US too that governments have a responsibility to raise awareness and to act in the interests of the public good, though there were caveats, particularly with regard to the level of trust in politicians. Respondents in the US groups explained in strong terms that American people do not like governments telling them what to do.

> I think it's the government's duty to inform us, to keep us informed and to work, work on our behalf.
>
> *London, low-income, female*

> I think government regulation has a bigger impact than an individual.
>
> *Washington, low-income, male*

> Americans are going to be bad enough, conservatives especially, because we like our rights, we like being able to make our own choices.
>
> *Dallas, low-income, female*

### Policy implications

While conclusions on the potential for attitudinal shifts based on focus group analyses should be drawn with caution, it seems likely that increased awareness of the importance of the need to address consumption patterns to tackle climate change would bolster public support for government interventions. Despite some degree of resistance with regard to government intervention into individuals' lifestyle choices, there is an implicit expectation that governments should take the lead in addressing issues of importance to the public,[129] and individual action is perceived to be fairly ineffective in comparison with state-level action.

Both the focus group discussions and the responses of survey participants suggest that public support would be further increased by the perception of cooperative action among a range of actors, including surprising communicators and unusual coalitions of stakeholders. Cooperation across policy arenas will be particularly important both for fostering new partnerships and for broadening and strengthening the existing evidential basis around the efficacy of different policy interventions.

### Awareness-raising is perceived to be a necessary first step in a wider strategy

Across the samples, distinctions were made between measures that would be acceptable and popular, and those that would be less popular but more effective in shifting behaviour. Labelling was largely welcomed as

[129] This finding is supported by recent research around public attitudes to food system challenges, which found that the UK public expects governments to take appropriate action to encourage sustainable food consumption patterns, including adequate regulation of the food system, informative food labelling and more general awareness-raising campaigns; see Which? and the Government Office for Science (2015).

a measure; as one UK respondent noted, '*it can't hurt*'. However, respondents felt that it would ultimately be ineffective as few read labels. In both the Brazil and China samples the question of the packaging of meat was raised as an issue; meat was often bought at markets without packaging, and many consumed meat cooked by others. In the US groups, general scepticism was expressed about labelling. Increasingly for some it was seen as an extension of branding – as one respondent noted, '*I don't even know what organic means any more*.'

Public information campaigns were largely popular and considered to be important across all samples – though they were widely perceived to be only a starting point for any drive to shift individual and collective action. Some considered multimedia campaigns, and particularly those endorsed by mainstream media, to be a priority, while others believed that campaigns should penetrate schools to be most effective.

> I see a process that is a lot slower. It should be disseminated in education, in schools to children and [then] as a base for everything that comes after.
>
> *Porto Alegre, middle-income, male*

### Modifications to the choice architecture would be welcomed

The measure considered the most popular and the most effective was the promotion of alternative foodstuffs in markets and more generally.

> If Tesco had three-quarters of its aisles devoted to non-meat products, that's what we'd all be buying – and [the same applies to] adverts on the telly.
>
> *Manchester, middle-income, female*

In the US, it was felt that the government had a strong role to play in encouraging healthier diets, for example by promoting particular foodstuffs and reducing portion sizes. A reversal of earlier measures which were believed to have been introduced to encourage unhealthy diets and overconsumption was also seen as necessary.

Some, particularly in the UK and US, felt that such 'nudge' tactics were at the limits of acceptable government action, but others thought that for public information campaigns to be effective it was imperative for them to be accompanied by stronger and more interventionist measures.

### Price hikes score highly on efficacy but raise concerns around equality

The most controversial example of intervention was the question of raising taxes to increase the price of meat. It was widely believed this would be unpopular and some felt it was inherently unfair. It was described by some as a '*tax on the poor*', and in Brazil some feared it might lead to meat becoming available only to those wealthy enough to pay for it. There was a perception that lower-income groups would be excluded from social activities such as barbecues, and that such groups might go back to being restricted in their food choices:

> It [meat] will become a luxury item.
>
> *Rio de Janeiro, student, female*

> Today, some people don't have the means to have meat every day, so they save it for the weekend! It's complicated. We would go back to old times.
>
> *Porto Alegre, student, male*

However, there was a general perception that taxation would be effective as the public responds to prices. Removal of subsidies to the meat industry, which was understood to have the same outcome as price increases on individual products, was similarly believed to be effective, although reactions to this measure were more positive. There was surprise that the industry received subsidies, directly or indirectly, in the context of free market economies. Despite the likely efficacy of measures such as subsidy withdrawal, however, the question of unintended consequences of price increases was also raised in some of the groups – primarily greater consumption of cheaper, mass-produced meat.

> I think it would market-shift towards fast food and cheaper food alternatives. I don't necessarily think it would incentivize people to eat less meat products. I think it would incentivize them to eat cheaper or more cheaply produced meat products.
>
> *Washington, middle-income, female*

### Policy implications

While softer policy approaches would naturally be favoured by most, there was an implicit recognition that dietary change was likely only to be achieved by more interventionist policies that use price to influence consumer choices. Concerns over unintended impacts point to the importance of complementary measures to improve access to alternatives, and a recurrent emphasis on the need to make alternatives more affordable indicates that a restructuring and redistribution of existing fiscal support measures may be a popular and important step in facilitating access to more sustainable food options.

### Initial resistance to interventions would be likely to subside

On the issue of public legitimacy and response to decisive interventionist action on this issue by governments, respondents across all samples initially expressed varying

degrees of anger, dismay and resistance. In the US, the recurring theme was resistance to governments instructing the public how to behave, and the encroachment on civil liberties.

A crucial factor in the wider public acceptance of such action would be the nature of these changes; how gradually they were imposed, whether they were based on credible information rooted in scientific evidence, and whether they were founded on strong arguments about the public good, for which governments would ultimately take responsibility.

In the China sample, state-led action was accorded greater legitimacy, but it was widely perceived that such action would be determined in part by the need to maintain social harmony. Tackling meat-eating was considered unfair in the global context, given China's more recent economic development and lower consumption levels. One respondent said that '*governments wouldn't be that stupid*'.

Across the sample groups, however, it was felt the initial resistance to such measures would recede and the public would accept them in the same way as changes such as earlier restrictions on smoking, which were framed as being in the wider public good.

> You know, people just get used to … the rules, and get used to … they might not like it for quite some time but … like speed cameras and … it's just, I think people kind of get used to it and just accept things. There's a lot of people who just don't care enough about stuff to kick up a fuss.
>
> *Manchester, student, female*

> There would be a resistance in the beginning but I would accept it.
>
> *São Paulo, student, female 1*

> I would comply with it because it is good for you, it is necessary for the future. If they are clear that it is for your future.
>
> *São Paulo, student, female 2*

### Policy implications

While focus group participants largely substantiated the received wisdom that government intervention would initially meet with public resistance, there was a general agreement that this resistance would be short-lived, particularly if people had prior understanding of the benefits of such interventions. Thus the expectation that the scale of backlash would inhibit government action warrants revision, and future policy strategies need to be informed by more active engagement with public opinion.

## Conclusions

The second part of the focus group analysis sought to:

- trial the impact of new information and review the trust placed in different information sources;
- evaluate the degree of willingness to make individual behaviour changes in response to climate concerns;
- test the received wisdom that the notion of government intervention to encourage dietary change would meet with strong resistance from the public; and
- glean an initial indication of the relative resistance to, or acceptance of, a range of interventions.

The focus groups confirmed both significant differences and commonalitites across the four countries, in relation to receptivity to new information and responses to government interventions, which should inform the design of policy strategies across the four countries and the international community at large.

- **The cultural and social significance of meat-eating is strong and heavily influences individual eating habits.** Deep-seated beliefs in the importance of meat to social gatherings, to social status and to individual health will be difficult to change, and must be accounted for in the development of policies along the spectrum of intervention. While there are embryonic shifts in attitude across small pockets of the populations in each of the focus group countries, meat-eating remains the norm. Recognizing the scale of the conceptual challenge and societal change that a dietary shift would imply for many, the most successful policies in the near term are likely to be those that promote moderation of consumption rather than fundamentally altering dietary habits.
- **Owing to these cultural and social ties, and to the protected private sphere of food choices, government interventions of any kind aimed at fostering dietary change are likely to meet with initial resistance.** While this will render policies politically sensitive and difficult to implement, resistance is unlikely to be so strong or so protracted as to preclude intervention altogether. With consistent and convincing messaging around the benefits to the individual and public good, interventions are likely to be accepted in the medium term.

- **Most people, unsurprisingly, prefer soft policy approaches that inform and empower the individual, not least because they anticipate that more extreme interventions will bring imbalanced and unintended consequences.** But there is a general recognition that altering prices will influence habits, and that any significant shift in eating habits is unlikely to result without such interventions.
- **Combined approaches that raise awareness of the importance of dietary change and facilitate access to alternatives, while also removing incentives for the consumption of meat and dairy products, are likely to be the most successful and most accepted options.** Future policies must take full account of the current state of knowledge and the influence of the existing choice architecture. Unless sufficient attention is paid to modifying this architecture and laying the conceptual foundations for a shift in eating culture, there will be a considerably increased risk of negative impacts upon the diversity and nutritional value of diets among less affluent populations.

# 6. Guiding Principles for Policy Change

## Introduction

Designing and implementing policies to encourage dietary change that are accepted by the public and by industry will be no mean feat, but must be done. Differing dietary preferences, cultural norms, agricultural economies, retail environments, awareness levels and degrees of trust in information-providers are such that no single policy strategy will be replicable across countries or communities.

While faced with a daunting task, governments will nevertheless need to respond to public concern and in many cases to spearhead action: as our research indicates, people expect governments to inform, to educate and to act in the public interest. If unsustainable consumption patterns are to be interrupted and modified, governments will need to take the first step, supported by civil society organizations, academia, progressive industry and the media, and drawing on existing policy experience, research insights and lessons from other sectors.

From a review of current policy approaches, analysis of results from our multi-country opinion survey and in-depth focus groups, and discussions among key stakeholders, there emerge a number of key principles that should inform policy strategies along the full spectrum of intervention. These principles are a guiding framework to help governments develop policy approaches that maximize public legitimacy and industry buy-in, and that mitigate the risk of unintended and negative consequences.

## Build the case for government intervention

A compelling evidence base that resonates with existing policy objectives such as managing healthcare costs, reducing emissions or implementing international frameworks will help mobilize policy-makers.

### Emphasize the economic grounds for change

At global and national levels, overconsumption of animal protein represents a significant drain on national resources. It is one of the known contributors to growing rates of obesity around the world, while overconsumption of red meat, in particular, is associated with increased risk of heart disease and certain cancers. Furthermore, health professionals and the public have expressed growing concern over the use of antibiotics in livestock management and its impact on the effectiveness and costs of human health treatment.

During a time of shrinking government budgets and constrained, short-termist planning, forward-thinking policy-makers may find the economic case for ambitious – and unprecedented – climate mitigation difficult to make. Focusing on the benefits to be reaped in terms of improved public health,[130] and subsequent cost savings in national health budgets, will provide important bargaining power to garner political support.

**A comprehensive assessment of the economic impact of unmitigated growth in meat consumption, and the associated rise in the incidence of NCDs, antibiotic resistance and climate change impacts, would go a long way towards strengthening political support for innovative policy approaches.** There is also a need for further analysis to address the economic case from a natural resource perspective, such as the cost of water depletion, land clearance and biodiversity loss.

**Supranational bodies with oversight of both the health and climate agendas – such as the World Health Organization (WHO) – should commit to establishing a taskforce with the specific remit of undertaking this assessment and publishing the findings in the near term.** New methodologies developed through this process to evaluate current expenditure relative to health and environmental savings in the medium term would provide a foundation on which governments may conduct their own assessments to make the case for dietary change.

### Align with the broader sustainability agenda

The received wisdom is that measures to encourage dietary change will encounter a multitude of obstacles, many of which will be insurmountable. Addressed in isolation, these challenges may seem unique, but framed as a means to promote sustainable resource use, to contribute substantively to the decarbonization of economies and to tackle the global economic burden of rising obesity, dietary change emerges as one component of a broad suite of policy strategies already being implemented. The important role, in particular, of reduced meat and dairy consumption in helping meet international climate targets needs to be recognized. This would ensure that dietary change is placed on national climate policy agendas and considered as a potential mitigation option at the international, national and local level.

[130] Scarborough et al. (2012).

**Dietary change and a rebalancing of global consumption patterns provide an opportunity to make significant strides towards achieving the central aim of the post-2015 development agenda, to foster sustainable and equitable resource use across all sectors.** A global reduction and redistribution of meat consumption would represent a key achievement in line with a number of the 17 Sustainable Development Goals (SDGs), including goal 2 (to end hunger, achieve food security and improve nutrition, and promote sustainable agriculture), goal 3 (to ensure healthy lives and promote wellbeing for all at all ages), goal 12 (to ensure sustainable consumption and production patterns), and goal 15 (to protect, restore and promote sustainable use of territorial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss). And, as low-cost interventions which in turn reduce the costs of climate mitigation efforts across other sectors, strategies that encourage shifts in dietary habits represent an enticing option for policy-makers around the world in moving towards the 13th goal (to take urgent action to combat climate change and its impacts).

Unabated growth in meat consumption and the resource intensity of livestock production threaten to undermine these goals. **Policy strategies that tackle unsustainable, unhealthy and inequitable consumption and production practices in a holistic and integrated manner – rather than addressing each in isolation – will be critical to implementing the post-2015 development agenda.**[131] **Dietary change offers a crucial way to achieve this.**

### Establish international norms and standards on sustainable diets

**Concerted efforts should be made at international level to assess the relative resource intensity of different diets and food groups, and to arrive at a common definition of what a 'sustainable diet' looks like – both across different cultures and in view of future resource constraints and growing global demand for calorie- and protein-rich foods.** This will enable the international community to tackle the issue of inequitable resource consumption around the world more effectively and to better align supply with nutritional demand.

Taking measures within the framework of international agreements and national policy frameworks should also help alleviate concerns that country-level and individual actions have little merit by signalling a global commitment to delivering meaningful change. Focus group participants across all four countries alluded to the apparent lack of political will to tackle climate change, arguing that individual behaviour changes would have minimal impact and make little sense. Clear, high-level policy commitments to improve diets and to reduce their climate impact would signal a key change, creating momentum behind the movement for dietary shifts, and empowering individuals and companies to make their contribution. **National sustainable dietary guidelines that consider environmental sustainability would provide a firm foundation for scientific research, industry action and government leadership to build on, encouraging them to coalesce around a message that resonates with the public.**

Creating an international framework for the development of such guidelines would enable national plans to be benchmarked against globally agreed norms and standards. **An international taskforce under the auspices of a supranational or intergovernmental body, such as the WHO or the IPCC, could develop a common framework to reflect state-of-the-art research on the health and environmental impacts of dietary choices.** Using this framework, the taskforce would assist in the benchmarking of existing national sustainable dietary guidelines (see Box 5) and would develop methodologies and recommendations to encourage and facilitate their acceptance at regional, national and city level. Countries should seek to learn lessons from one another in terms of the recommendations put forward and the process of development.

### Build the evidence base for policy-makers

The limited policy attention paid to date to dietary change as a key element in climate mitigation, coupled with limited experience of policies to discourage unsustainable consumption patterns, as well as concerns over 'nanny state-ism', are likely to converge to make many governments wary about taking the first step and signalling a commitment to reduce meat and/or dairy consumption. Furthermore, when channelled through sceptical or even hostile reporting by the media and contested by counter-arguments, the strength of the scientific rationale for dietary change may be diluted, lessening public acceptance and easing pressure on the government and industry to take action.

Accurate, trusted and consistent evidence of both the climate mitigation potential inherent in dietary change and of the benefits from shifts in meat and dairy consumption – environmental, economic and health-related – would bolster the foundation for government action while attracting increased public support for policy intervention. Given the marked differences between consumer attitudes towards meat and dairy products, in terms of elasticity

[131] Frison (2015).

of demand and key factors influencing consumption behaviour, it is clear that further research is needed to assess the particular obstacles to and opportunities for shifting dairy-eating habits.

**Reporting frameworks for national emissions that capture those embedded in the consumption of food and other resources will be necessary to understand the climate impact of national meat and dairy intake.** National emissions inventories have been one of the principal means by which governments assess their progress in meeting climate change objectives. But according to the current reporting requirements of the UNFCCC, which are followed by most national governments, only those emissions produced within national borders need to be accounted for, meaning there is little incentive to address the climate impact of meat and dairy consumption patterns (see Box 2). Shadow reporting of consumption-based emissions by state and non-state actors would inform governments of the climate footprint of national meat and dairy consumption while raising awareness of the limitations of current inventory frameworks.

A recent IPCC communiqué highlighted the 'significant, but uncertain potential' for dietary change to realize emissions reductions and to lower the costs of mitigation in other sectors.[132] **Revisiting and strengthening the policy recommendations around dietary change as a means of climate mitigation in a future IPCC report would reinforce the evidential basis for action.** An expert working group should be established under the auspices of the UNFCCC to address opportunities for rapid agricultural and land-use emissions reductions resulting from demand-side activities.[133]

**Pilot programmes enable evidence of policy impacts to be gathered while taking early action. These could be developed across a range of cultural and socioeconomic settings and at varying scales to develop methodologies and to generate experience and lessons learned.** China has a long history of piloting system changes: a number of cities and provinces have tested low-carbon development,[134] though these have tended to focus on reducing fossil fuel usage or trialling emissions trading schemes. China is therefore well placed to be a first mover in this area. It could, for example, establish green food zones at city or province level – and to share expertise and experience with other governments.

### Work across government

**Discussions with government and civil society stakeholders in Brazil, China, the UK and the US revealed the degree to which institutional divides and policy silos hinder a holistic assessment of and response to the problem of unsustainable consumption.** Policy frameworks at national and international level to promote public health, to manage land use sustainably, to improve the efficiency of food production and to reduce greenhouse gas emissions have largely been developed in isolation: responsibility for each policy area tends to fall within the remit of a distinct government ministry or public interest group, and as yet there has been little evidence of cross-interest cooperation to achieve the co-benefits mentioned above.

**In order for governments to develop policy strategies that harness the opportunity for realizing multiple benefits, it will be important to break down these policy silos.** Effective policy development will require expert input from a range of ministries. **Inter-ministerial working groups can provide a forum for encouraging the cross-pollination of ideas and experiences, to inform policies which can then be implemented through the relevant ministerial programmes.** Such cross-sectoral and structured dialogues will be particularly necessary in countries such as the UK where responsibility for climate change mitigation falls within a broader policy package and tends to be afforded low priority.

**Non-state actors, and particularly NGOs, have a vital role to play in the formation of broad coalitions, both by participating themselves and by encouraging other actors to engage.**[135] Coalitions of civil society groups from the environmental, health and food security spheres – for example, the 'Eating Better' alliance in the UK,[136] 'My Plate My Planet' in the US,[137] and the Livewell Project in the EU[138] – can encourage interdisciplinary thinking and advocate for cross-sectoral policy development at government level.

[132] Smith et al. (2014).
[133] Between 2015 and 2020 the Secretariat to the UNFCCC is to organize a series of technical expert meetings to make it easier for Parties to identify policy options, practices and technologies with high mitigation potential and to assist with planning for their implementation; for more information, see UNFCCC (2015).
[134] NDRC (2013).
[135] WWF and Alpro are working to build a plant-based eating coalition; http://www.wwf.org.uk/about_wwf/working_with_business/companies_we_partner/alpro_partnership.cfm.
[136] For more information, see http://www.eating-better.org/.
[137] For more information, see http://www.myplatemyplanet.org/.
[138] For more information, see http://livewellforlife.eu/.

## Initiate national debates about meat and dairy consumption

Increasing public awareness about the problems of overconsumption of animal products can help disrupt the cycle of inertia, thereby creating more enabling domestic circumstances and the political space for policy intervention. Governments have a role to play here, as do the media, the scientific community, civil society and progressive business.

### Tailor strategies to national contexts

The degree of variation in dietary preferences, eating habits, retail environments and sociocultural norms around the world, and the influence of these factors on an individual's own attitudes towards meat and dairy consumption, necessitate locally determined and culturally sensitive policy approaches. While certain principles can guide the design of policies at a general level, it will be important for governments, as for all actors, to engage with the public at the appropriate scale.

**Opportunities for intervention will vary across communities, regions and countries, meaning that policy strategies must be developed in line with local conditions and cultures if they are to be effective.** Women have a central role to play in most countries, for example, in providing and preparing food for the family[139] and for broader communities including schools. Where such groups of key influencers or potential first movers exist, policy messaging and interventions should be tailored to these groups in order to facilitate the dissemination of ideas and experience across the community as a whole.

**City-level action is increasingly being seen as a central component of broader measures to encourage sustainable living and consumption.** There are examples of communities that have successfully implemented policies to discourage overconsumption of meat and dairy and to promote alternatives. The adoption of the 'Meatless Monday' philosophy in Los Angeles in 2013[140] could serve as a model for other cities. Working groups that bring together interested authorities elsewhere with those who have already taken ambitious steps to reduce meat and dairy consumption in their community could accelerate the deployment of similar measures in other locations.

However, existing networks, such as C40,[141] have been relatively slow to embrace the opportunities posed by dietary change in their GHG reduction strategies.

**Given that, globally, 54 per cent of people live in urban areas,[142] accelerating the establishment of new networks and expanding the remit of existing eco-city networks to include food choices could bring significant health benefits and emissions reductions.**

### Broaden the message

There are several important reasons why policy messaging focused solely on the climate benefits of dietary change is unlikely to gain traction. Few precedents exist for addressing dietary demand issues within the framework of international climate discussions, including shifting diet choices and reducing overconsumption and loss through waste. Governments have a low appetite for proposing potentially unpopular demand-side behaviour changes. And there is limited public awareness of any climate impact resulting from food choices.

As the survey results, focus group discussions and previous research in this area have shown, **consumer choices, where based on conscious thought, are much more likely to be influenced by considerations that have direct impacts on individuals or their friends and families.** Currently, health ranks higher than the environment in most consumers' choice. While low concern for global environmental impacts may be discouraging to governments looking to promote dietary change, the significant health benefits from reduced meat consumption still present a considerable opportunity for leveraging autonomous action at an individual level.

**Across many countries where obesity, type-2 diabetes and other NCDs are on the rise, tapping into the health benefits of reduced meat consumption may gain considerable traction in the short term.** Strategies and campaigns that avoid condemnation of current meat consumption habits but that focus instead on the co-benefits of dietary change, including potential cost savings, will allow decision-makers to promote a positive vision of improved wellbeing, both for the individual and for the environment now and in the future, and are more likely to be successful in shifting social norms.

Where there is nascent interest in limiting the negative impacts of human activities on the environment, there may be value for governments and NGOs in emphasizing the links between livestock production and better-known issues, such as deforestation. As more tangible consequences of climate change and resource degradation become apparent in future years

[139] United Nations Department of Economic and Social Affairs (2010).
[140] Meatless Monday (2013).
[141] C40 is a global network of megacities committed to tackling climate change. For more information see www.c40.org.
[142] UN News Centre (2014).

and as younger generations, in particular, engage with the issue, environmental concerns at a global level may well have greater salience too. **Incorporating a push for dietary change simultaneously into existing government- and civil society-led public health and environmental campaigns would provide an opportunity to raise awareness at an individual level while pursuing broader policy agendas at relatively minimal cost.**

### Ensure the message is accessible

To maximize public understanding, awareness-raising strategies will need to centre on simple, accessible messages that convey the importance of dietary change without relying on knowledge of livestock production methods and indirect emissions. For many participants of the focus groups across all four countries, new information detailing the scale of emissions associated with meat and dairy consumption required an enormous conceptual leap, in large part because the causal relationship is not easy to visualize.

**Keeping in mind the risk that oversimplification may itself lead to mistrust, particularly of scientists, governments will need to invest significant financial and human resources into developing hard-hitting and effective visual campaigns, potentially with civil society partners who can match the power of industry marketing.** Governments should work with, or at least learn lessons from, industry, civil society actors and the media, who use accessible and emotive messaging to great effect.

Adaptation of existing front-of-package labelling schemes may allow governments to convey recommended consumption levels, such as those proposed by the WHO, that are easily comprehensible and accessible and that nudge consumers at the point of purchase.

Measures may also be needed to dampen the influence of industry advertising campaigns promoting a simple message of 'eat more meat'. While an outright ban on advertising has been implemented for other products, such as cigarettes, it is unlikely to be a feasible option for meat and dairy products. **Simple messaging around the health implications of eating a more varied diet and/or reducing meat and dairy consumption will be important in achieving public buy-in to dietary change and to help counteract campaigns encouraging increased meat consumption.**

### Mobilize mainstream media

Despite the rise in social media use and a good deal of scepticism around the independence and credibility of more traditional media outlets, mainstream media were held up in the focus groups and opinion survey as an important educator on issues of public interest. **TV, radio, and national news broadcasters remain an important vehicle for the presentation of government policies and measures, technological developments, new views and thinking, and changing societal opinion and behaviour.**

**The absence of an issue from the mainstream media is often taken by the public as an indication of its low level of importance.** Limited media coverage of the links between diet and climate change triggered a strong sense of scepticism among many participants in the focus groups; they argued that were this a serious problem, then surely they would already have been alerted to it. Consequently, traditional media are critical for alerting the population at large to the diet–climate relationship.

**In recognition of the sway of media coverage over public awareness and interest, government actors in cooperation with NGOs and other stakeholders will need to engage strategically with journalists, supporting ongoing collaborative dialogues devoted to knowledge development and accurate reporting around climate change and its drivers.** Given the complexity of the links with livestock production, and the associated difficulties in communicating the issue to the public, there is a need to draw on the expertise of national journalists to understand which issues resonate with the public, to address any pre-existing concerns and priorities, and to explore which messaging clarifies but does not over-simplify the issue. Specific benefits could be gained by supporting journalists and other communicators with accurate and accessible briefings.

**Government or academic institutions could also prioritize linking journalists with non-partisan experts, such as scientists, public health professionals and others who may not be well-equipped to speak to the public directly, but who could inform journalists accurately and thoroughly and serve as sources for their reporting.** Furthermore, the work of strategic communication organizations that support informed debate, such as Climate Nexus in the US[143] or the Climate and Energy Intelligence Unit in the UK,[144] could be useful in assisting with the accurate reporting of these complex issues, as could international media networks such as the network

[143] For more information, see http://climatenexus.org/.
[144] For more information, see http://eciu.net/.

of Science Media Centres,[145] which has centres in Australia, Japan, New Zealand and the UK.

In all countries, coverage of the issue should be ramped up through state-run broadcasters and independent reporting on issues of global concern should not be impeded. In addition, opportunities to engage directly with the public through social media need to be energetically exploited.

### Engage independent and surprising communicators

The importance placed by survey and focus group participants on evidence and information that is sourced outside the political space points to the value of non-partisan, non-state actors in engaging the public on the issue of diet and climate change. A high degree of trust was placed in the scientific community, NGOs and – in some countries – supranational organizations such as the UN.

Public confidence in actors outside the policy space who are engaging with the issues of climate change and sustainable consumption – such as UK-based celebrity chef Jamie Oliver, for example, and the basketball player Yao Ming in China[146] – signals the need for policy-makers to cast a wide net in developing collaborative coalitions. **Celebrities – be they chefs, actors, writers or musicians – often have influence on socioeconomic groups that are otherwise difficult to reach.** There are many successful experiences of celebrities working with NGOs, industry and the government to promote a variety of lifestyle messages including those around health, diet and the environment.

Other actors from the private sector (for example innovators and investors supporting the development of unconventional proteins such as lab-grown meat), from the health and nutrition field (including family doctors and community health professionals) and from local public interest groups (such as community movements to encourage consumption of locally sourced food products) can all bring unparalleled insight and expertise to local and national governments seeking to foster attitudinal and cultural shifts around diet.

**Coalitions and cooperative approaches that draw on a range of different stakeholders from a variety of sectors and a diverse spread of expertise are likely to be key in gaining greater public trust and acceptance.** Avoidance of co-option and an explicit emphasis on the independence of these information-providers from financial and political interests will be critical to maintaining their value. In some countries, this may be a question of public awareness-raising on the part of NGOs to emphasize their distance from government and industry; in others, it may be a more pragmatic – and difficult – question of avoiding financial dependence on interested parties and seeking alternative sources of capital where public funds are limited.

**Philanthropic capital could provide a valuable foundation for civil society action, social innovation, media coverage and scientific research, but has so far largely been focused on other areas of climate mitigation and public health.**

Governments, too, will have a role to play in protecting the space of the non-partisan voice, and will themselves depend on the success of scientists, environmentalists and health professionals in advocating dietary change, raising levels of public awareness and developing public acceptance of the rationale behind potentially unpopular interventions. Financial support for capacity-building and participatory decision-making processes would help to facilitate civil society engagement, though transparency and independent assessments will be critical to maintaining confidence in the independence of government-commissioned research. **Greater collaboration with international scientific bodies – such as the UN, the IPCC and the Global Research Network for Non-Communicable Diseases – would further enhance the actual and perceived independence of the evidence base and rationale for dietary change.**

## Pursue comprehensive approaches

The evidence indicates that shifting diets will require comprehensive strategies drawing on all components of the intervention toolkit. Such strategies will amount to more than the sum of their parts by sending a powerful signal to consumers that reducing meat consumption is beneficial to both health and the environment, and that governments take the issue seriously. Successful policies will be specific to national contexts, and may benefit from framing government-led dietary guidance around a positive message of cultural preservation and the promotion of gastronomic diversity.

[145] For more information, see http://www.sciencemediacentre.org/international-smcs/.
[146] Yao Ming has been involved in a successful drive to reduce the consumption of shark-fin soup. For more information, see http://www.wildaid.org/sharks.

### Expand choice

**Focus group participants, particularly those in China and the US, pointed to structural barriers that serve to limit physical or economic access to alternatives and that encourage a diet high in animal protein.**

**Research, experience and consumers' own admission show that understanding the importance of behaviour change is rarely enough of a driver to effect this change, so policies to raise public awareness of the benefits of dietary change will not be sufficient on their own to spark shifts in behaviour.** The success of industry nudges to promote the consumption of sugary treats and alcohol, for instance, as well as meat and dairy products, indicates the potential for shifting food choices in the opposite direction through simple changes to the choice architecture in retail settings.

Greater availability of vegetarian, vegan and lower-meat options among pre-prepared meals, and preferential positioning of alternatives in shops and schools – for example, the placement of vegetarian and vegan sandwiches or fresh fruit and vegetables at the front of a supermarket or at eye level on canteen shelves – may go a long way to alerting customers to options other than their usual meat- and dairy-based choices. Government subsidies for plant-based foods, targeted at low-income groups, may provide a further means of ensuring access to a healthy and sustainable diet.

**Consideration should be given to diversifying options at a macro level, and building a choice architecture that promotes a balanced and healthy diet.** Applying the principles of moderation and variation to planning of public and private eating spaces – from food halls through restaurant menus to office canteens – offers an opportunity to nudge consumers towards healthier diets and to educate through experience of alternatives to meat and dairy products. **Local governments should take the opportunity to influence the prevalence of retail outlets offering vegetarian and vegan options through planning regulations, just as they make recommendations over the siting of other key institutions such as hospitals and schools.**

### Capitalize on public procurement

Governments have an important role to play in incentivizing action that stimulates the market for meat and dairy alternatives. In particular, they can capitalize on the significant purchasing power wielded through public procurement. **As providers of meals in state schools and universities, hospitals, prisons and other institutions, governments are in a strong position to influence diets, support the market for meat and dairy alternatives, and diversify consumer choices through amendments to public procurement standards and guidelines.**

Alignment with national sustainable dietary guidelines and the provision of healthy, tasty alternatives to meat and dairy products as the default option in schools and other public institutions can effect a shift in awareness and attitudes in two ways: first by demonstrating to individuals how they may follow a diet that is lighter in animal protein; and secondly through a process of normative feedback, whereby individuals bring this increased awareness and understanding to their wider social circles. By encouraging consumer demand, such action would also induce local or even national and multinational food service providers to make broader changes to their supply chains and product ranges.

Where feeding programmes in public institutions are funded not by national governments but by development banks, these institutions should require that recipient programmes are run in line with WHO recommendations and, if and when it is formalized, international guidance on sustainable dietary practices.

The role of civil society organizations and the scientific community in pushing for government action and in informing the design and implementation of public procurement guidelines will also be key. **The establishment of food boards that bring together local and city authorities, independent experts, industry actors and academics to develop procurement guidance and food policies can facilitate this process while ensuring that food programmes are in line with national sustainable dietary guidelines and that they reflect the latest knowledge on nutrition and environmental impact.**

### Use price

Price is a primary consideration in food decisions made by the individual, particularly among demographic groups whose physical and financial access to a range of food environments is limited. **A lack of easy access to affordable alternatives is a major barrier to dietary change, particularly in areas dominated by low-cost supermarkets selling cheap, highly processed products. Rebalancing the relative costs of meat and dairy produce and plant-based alternatives can enable governments to improve access to a diverse, healthy and sustainable diet.**

Price adjustments may be realized at the farm gate or at the point of purchase. The transmission of higher prices directly to the consumer was identified by focus group participants as the most effective means of shifting food-purchasing behaviour. **While political appetite for introducing a carbon tax on meat is likely to be low, research**

**undertaken in the UK exploring the implications of introducing carbon taxes on food products showed that incorporating the societal cost of GHGs into the price of foods could reduce emissions, improve health and generate substantial tax revenue.**[147]

Lessons learned from the ongoing campaign for a sugar tax in the UK to tackle childhood obesity,[148] and from experience of national taxes on sugar-sweetened beverages and other food products in countries such as Mexico and Hungary,[149] would be instructive for the design of future campaigns and policy strategies focused on meat. Where successful, the introduction of relatively small taxes to influence purchasing practices for reasons of public health or sustainability, such as the 15 per cent and 5-pence taxes on plastic bags in Ireland[150] and the UK respectively,[151] presents an opportune moment to broaden the public debate to meat.

Fiscal incentives are another way of encouraging industry action to improve the range, affordability and desirability of plant-based foods and alternative proteins by adjusting farm-gate prices. The rebalancing of fiscal support measures for animal- and plant-based foods, for example through the reduction or removal of subsidies to the livestock industry, would be likely to result in significant changes to the relative price of meat, dairy products and alternatives. Such a move would have a similar effect to product taxes, while also making plant-based foods a more economically attractive option to consumers. **Just as the G20, G7 and others have called for the removal of fossil fuel subsidies,[152] so other stakeholders should pursue the removal, reduction or redirection of subsidies that support carbon-intensive agricultural products and production methods.**

### Learn by doing

**The need to generate evidence merits the investigation of opportunities to work through existing policy programmes and frameworks at national and local level.** By identifying ways in which existing national and international policy frameworks – relating to both climate change and public health – may be adapted to include dietary change, policy-makers open the door to pooling expertise, funds and political support in order to galvanize action.

As discussed above, national sustainable dietary guidelines, school feeding schemes and community health programmes may all present opportunities to incorporate reduced meat and dairy consumption objectives through minimal adjustments, thereby limiting the financial and human resource investment required and allowing for rapid progress to be made.

**The risks of implementing unprecedented or untested policies can be mitigated through the inclusion of strong, independent monitoring and evaluation to measure their efficacy and to identify and address any unintended consequences.** Policies aimed at influencing consumer practices in other sectors can inform the design of similar review mechanisms for future strategies targeted at meat. Both the plastic bag levy in Ireland[153] and the financial support system in place for solar photovoltaic panels in Germany[154] are illustrative examples of responsive review processes that have been effective in achieving positive shifts in consumer behaviour.

**Further analysis and piloting – by governments as well as the retail sector – are needed to test a range of approaches and to generate evidence as to their efficacy.** In particular, further testing on consumer and supply chain responses to carbon labelling is needed to build on past work by organizations such as the Carbon Trust in the UK.[155] The introduction of innovative initiatives and pilot schemes at local level or for a limited time period, and the inclusion of comprehensive review mechanisms within these, allows for lessons to be learned and evidence to be gathered without stalling action that is urgently needed, while contributing to broader efforts to raise public awareness of the necessity and feasibility of dietary change.

### Support innovation

**Structural changes to the choice architecture – including diversifying menus, increasing the share of vegetarian and vegan options in processed foods, and nudging shoppers towards healthier options in the store – will need to be driven and implemented by the retail industry and service sector.**

As the food system becomes ever more globalized, food supply chains are increasingly dominated by a shrinking number of multinational private actors, including

[147] Briggs et al. (2013). It should be noted that in a revenue-neutral scenario, emissions reductions were achieved but to the detriment of public health owing to increased consumption of sugar. This demonstrates that sustainability and health goals are not always aligned.
[148] The Guardian (2015); UK Government and Parliament (2015).
[149] Bíró (2015); Instituto Nacional de Salud Pública (2015).
[150] DECLG (2007).
[151] HMRC (2014); Welsh Government (2014); DEFRA (2015).
[152] G7 (2015).
[153] Lyons (2013); DECLG (2007).
[154] Fulton and Capalino (2012).
[155] Carbon Trust (2012).

producers, processors, retailers and food service providers, who dictate the market and hold enormous sway over eating habits. **If the leading tier of responsible business can be persuaded to increase the range, quality and affordability of alternatives to meat and dairy products, they could instigate an industry-wide shift in the right direction.** Large-scale multinationals, in particular, are in a strong position to trial and sustain a shift to more diverse menus with greater choice of plant-based products.

**However, without government measures to incentivize first movers through innovative policy-making and regulation and to support industry action through public–private partnerships, wholesale market changes are unlikely. Pressure from civil society for industry actors to alter their business model, and NGO endorsement of innovative action and best practice, are likely to be further key ingredients in instigating industry action.**

Already, a number of national and international companies and networks are engaging with governments and business associations such as the Climate Group[156] and the World Business Council for Sustainable Development[157] to help them decarbonize, though largely in other sectors. An opportunity exists to enlarge their remit to include dietary change and associated shifts in the supply chain and retail environment.

**Investment in R&D around unconventional proteins, raising the profile of plant-based alternatives and making vegetarian options the default across public-sector institutions can all drive up demand and incentivize production.** Longer-term civil society campaigns to encourage the development and availability of non-meat options[158] will have a critical role, making dietary change easier by increasing consumer demand as well as keeping the pressure on industry boardrooms to innovate.

**Finally, governments should adjust their policies and incentives to provide signals to agricultural producers to shift production from animal-based to plant-based foods.** This would help to ensure that demand-side changes at the supermarket or other point of sale are supported by supply-side changes.

### Promote and protect diversity

**Strong concern was expressed across public and expert discussions in all four focus countries as to the possibility of altering deep-set cultural attitudes to diet, and the threats posed to national, community and individual identities by such fundamental shifts.** The centrality of meat-eating to community and family barbecues and other celebrations in Brazil and the US, for example, not only presents a significant barrier to dietary change, but also represents an important tradition to be preserved.

**In order to protect these sociocultural customs and to minimize resistance from the public, policies to encourage reduced meat and dairy consumption should promote a message of moderation and variety – rather than substitution or elimination – and should offer actionable ways in which to achieve this**. Phrasing moderation in terms of a small steak a couple of times a week, for instance, can convey the message in simple, comprehensible terms while demonstrating that dietary change is achievable without necessitating a fundamental shift in lifestyle.

In Brazil, national dietary guidelines already promote diversity and moderation, and emphasize the social nature of eating and preparing food. In Asian countries, where traditional cuisine uses meat and dairy products sparingly, emphasizing the preservation of national and local heritage, valuing diversity and resisting the homogenization of global diets can serve as a unique lever for promoting moderation in diets and discouraging increased consumption of processed foods. **Local and national cultures and traditions should therefore inform the development of food policies and guidelines, and should be regarded as an opportunity for fostering positive change rather than an obstacle to dietary shifts.**

The ability to prepare food and the availability of the necessary facilities both have a significant impact on people's diet choices. The rise of convenience food – processed, pre-prepared, pre-packaged food – has been accompanied by a decline in culinary skills[159] and time allocated to cooking,[160] and a lesser understanding of how the food on our plates is produced. **While in some countries there are growing social movements to build awareness of where our food comes from, a widespread dissociation of products from their sources presents challenges to efforts aimed at encouraging dietary change.**

Governments will need to invest resources in building knowledge and skills around how to cook with alternative ingredients. **School education and community outreach programmes that have been initiated to**

[156] For more information, see http://www.theclimategroup.org/.
[157] For more information, see http://www.wbcsd.org/home.aspx.
[158] For more information, see https://www.change.org/p/mcdonald-s-it-s-time-for-a-healthy-meatless-option.
[159] Short (2003).
[160] Smith et al. (2013).

**raise awareness of healthy eating and living may provide a strong foundation upon which to build.**[161] Where dietary guidelines exist at the national level, they should form the basis for education programmes on national curriculums. Initiatives in place in Brazil and South Africa use established networks of trained health workers to provide dietary advice to low-income groups and rural communities.[162] Other governments should explore the potential to emulate these initiatives and build knowledge and skills through existing social services and outreach programmes.

## Conclusion

The urgency of the challenge that governments are facing – to close the post-Paris emissions gap and avert dangerous climate change – is such that action must be taken now. Evidence and experience must be generated through early interventions and innovative policy-making. The guiding principles outlined above can inform the design of strategies that mitigate the risk of backlash and unintended consequences, and that reflect the national particularities of eating practices, cultural heritage, socioeconomic conditions, and the information and marketing environments. By applying these principles, governments – supported and encouraged by civil society, and in cooperation with industry actors – must take the lead in breaking the cycle of inertia and seizing the undoubted opportunities that exist for tackling this critical driver of climate change.

[161] Hawkes (2013).
[162] Johnson et al. (2013); Department of Health of the Republic of South Africa (2013).

# 7. The Need for Action

At the global level, meat consumption already exceeds sustainable levels. Overconsumption of animal protein, and particularly red and processed meat, comes with a substantial and growing social and economic cost. Moreover, there is clear evidence of the environmental damage caused by an expanding livestock sector at local and global level. From both these perspectives, the case for reducing global meat consumption is increasingly difficult to dispute.

Unsustainable dietary patterns undoubtedly present a thorny issue for governments. Incumbent industry interests are strong and the contribution of the sector to national economies can be significant, while public awareness of the role of diets in driving climate change is low. To complicate matters further, where diverse and nutritious alternatives are not readily available, increased consumption of meat and dairy produce can be an important means of improving individual and public health.

One of the main purposes of this report, however, is to challenge the hitherto largely untested assumption that government action to change diets is too problematic a prospect to explore. Drawing on original research, including an online multi-country opinion survey and focus groups in four key consuming countries, it offers a unique evaluation of public attitudes and understanding around climate change and meat and dairy consumption. While recognizing the need for further research, it outlines strategies to break the cycle of inertia that has impeded action to combat unsustainable consumption, and proposes guiding principles by which governments, industry and civil society could create an enabling environment for positive change.

State leaders and politicians are in an unequalled and vitally important position to instigate a shift in public and industry mindsets. Publics expect governments to act in the common good and to signal the importance of change where it is needed. Without this sense of government commitment, individuals are unlikely to take action. By raising public awareness of the economic, health-related and environmental benefits of following a more plant-based diet, incentivizing industry innovation and supporting first movers, and galvanizing cross-sectoral, multi-stakeholder campaigns for change, governments can – and should – take the lead in initiating moves towards more sustainable consumption.

Policy priorities will differ by country, by region and, in many cases, by demographic group, and further research will be needed to identify appropriate targets and to develop culturally sensitive, persuasive and viable strategies. Industry action will be key: consumers must have easy access to a diverse, healthy, affordable and appetizing diet if the positive impacts of reduced meat consumption are to be realized. A scaling-up of civil society pressure on governments and industry alike will be central to creating the political space for government intervention and changes in the private sector.

Most importantly, government action must be taken now. Lessons from other sectors and experience at local and city level provide a strong foundation on which to build effective national strategies that may be adapted and adjusted over time. From sustainable dietary guidelines, through public procurement standards for schools and hospitals, to planning regulation, financial support mechanisms and investment to support the availability and affordability of enticing alternatives, government interventions are urgently needed if long-term, large-scale dietary change is to be achieved.

As countries across the world gear up to agree a deal to avert dangerous climate change, the mitigation potential and economic savings to be made from a shift towards healthier diets with lower meat content should not be underestimated. With current pledges falling far short of the two-degree target, and emissions from agriculture set to soak up virtually all of the remaining annual carbon budget by 2050, governments can no longer afford to ignore the urgent need for dietary change.

# Annex A: Research Approach and Methodology for 12-Country Survey and Focus Groups in Brazil, China, the UK and the US

## 12-country survey

The survey was conducted in 12 countries in total – Brazil, China, France, Germany, India, Italy, Japan, Poland, Russia, South Africa, the United Kingdom and the United States. The surveys in Brazil, France, Germany, Italy, Poland, Russia, the UK and the US were conducted via Ipsos Interactive Services online panels. Those in China, India, Japan and South Africa were conducted via external suppliers.

The survey questions were asked in English in India, South Africa, the UK and the US, with slight linguistic adaptations for each country. The survey questions were translated from English into the main languages used in the non-English-speaking countries, and all translations were verified by an independent translation agency. For an English-language version of the survey, see the Supplementary Materials, available online at https://www.chathamhouse.org/publication/changing-climate-changing-diets.

Just over 1,000 adults were surveyed in each country between 26 September and 10 October 2014.

Quotas (or targets) were set by age and gender in all countries to ensure the participants were representative of the offline population. The age range of the sample surveyed in each nation varied depending on levels of internet penetration. A regional quota was also set in some countries (Brazil, France, Germany, Italy, Poland, Russia, the UK and the US).

The use of online panellists means that in some cases the respondents are likely to be representative of more affluent, connected populations. The data have, however, been weighted to the known national populations: by age and gender in all countries; and additionally by region in Brazil, France, Germany, Italy, Poland, Russia, the UK and the US.

At the aggregate level each country was given equal weight regardless of relative population sizes. Russia's 1,000 responses are therefore equivalent to Poland's 1,000 despite its considerably larger population.

## Focus groups in Brazil, China, the UK and the US

In 2011–12, researchers from Glasgow University Media Group (GUMG) and the Energy, Environment and Resources department at Chatham House were engaged in a UK-wide qualitative study that sought to explore the conditions under which public belief, attitudes and behaviour in relation to climate change were established and developed over time. As part of the study, new methodologies were developed that allowed the researchers to examine potential triggers for changes in beliefs and behaviour.[163]

The current report reflects the findings from an extension of this methodological approach to the issue of meat consumption and climate change. A total of 36 focus groups were held across Brazil, China the UK and the US, with the aim of examining local and cultural information environments, understanding sources of influence, exploring the conditions under which decisions and behaviour are formed, and assessing the processes by which views and beliefs are modified in response to new information and group interaction. The research was qualitative, the sample sizes were small and the purpose was not to collect data generalizable to an entire population but to explore in depth current strands of belief and opinion across selected groups. The open-ended and unpredictable nature of focus group discussion meant that discussions could cover a wide range of range of related issues; however, coding and analysis of group data highlighted recurring themes as well as similarities or differences in attitudes and responses across demographic groups.

Nine focus groups were held across three different locations in each country, involving three different demographic groups – low-income, middle-income/professionals and students. All respondents were drawn from geographically diverse but urban areas.[164] Participant recruitment was conducted by Ipsos MORI in such a way as to ensure that all groups reflected key sociodemographic criteria including gender, age and income levels. Potential participants were also screened so as to ensure a representative spread of levels of concern around climate change and a representative share of vegetarians (these criteria aligned with those applied to recruitment for the Chatham House multi-country survey conducted by Ipsos MORI in autumn 2014). The same sampling procedure was used in all four countries.

[163] Happer et al. (2012). The report is available at http://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Energy%2C%20Environment%20and%20Development/1212ukerc_climatechange.pdf.
[164] See Supplementary Materials, available online at https://www.chathamhouse.org/publication/changing-climate-changing-diets.

The focus groups were moderated by GUMG and Ipsos MORI and conducted in the local language. In each, discussion centred around three key areas:

*Awareness and understanding of the diet–climate relationship*. Questions probed the nature and sources of belief and opinions in relation to meat production and climate change, and the impact they have on consumption behaviour.

*Responses to new information*. Each respondent was presented with an information sheet of statements and diagrams describing and illustrating the contribution of meat production to climate change, reproduced opposite. The purpose was to test the initial responses of individuals and to observe the way in which they processed, absorbed and critiqued what they had read, with the aim of evaluating the potential for attitudinal shifts in response to new information.

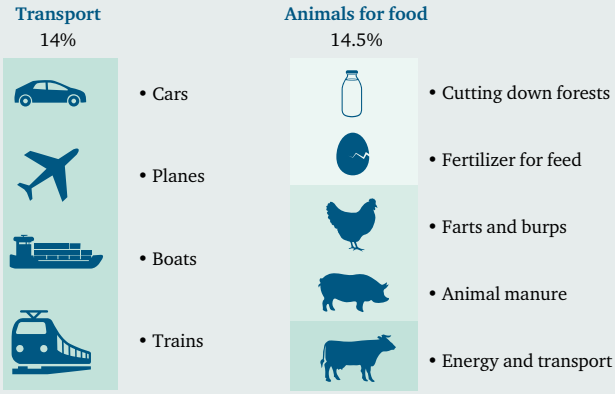
*Impact of the new information*. Respondents were asked to consider the level of priority and legitimacy they would give to individual and collective action to tackle this issue (this was compared with their positions before receiving the information), how they would react to a variety of hypothetical interventions, and whether they perceived there to be any barriers to change.

As with previous GUMG research, the focus group method included a set of written questions for the participants. The written responses were used primarily as a general guide to views and language used and also as an effective comparison point for initial individual responses and later modifications as a result of group interaction. Numerical responses selected from a scale of one to 10 on, for example, the level of priority given to collective action were used as a starting point for exploring the processes by which individuals arrive at decisions and form their responses in an area about which they know very little.

## Information sheet presented to respondents during the focus groups (in English)

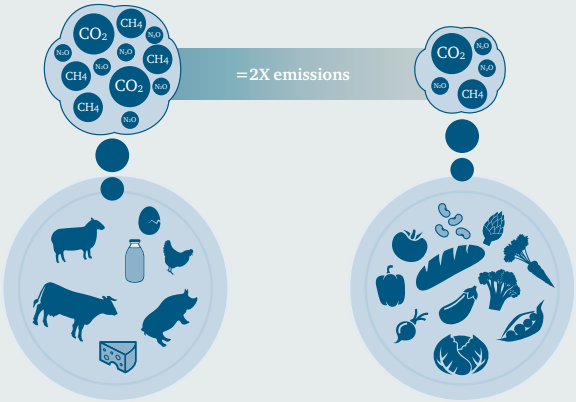
Climate change is caused by human activities, producing gases such as carbon dioxide, methane and nitrous oxide that heat up the planet. Producing animals for their meat and their products such as milk and eggs is responsible for almost 15% of those gases globally. (United Nations Food and Agriculture Organization, 2013)

This is roughly equal to all the climate changing emissions from the fuels burned, by all cars, trucks, trains, boats, and planes, combined. (United Nations Food and Agriculture Organization, 2013; Intergovernmental Panel on Climate Change, 2014)




Scientists now know that to keep global warming below dangerous levels, we must stop burning fossil fuels, and we must also limit the amount of animal products we collectively eat. (Hedenus et al., 2014; Bajželj et al., 2014; Pelletier and Tyedmers, 2010)

For people who don't eat animal products, the amount of greenhouse gases produced to make their food can be half of that for the average person who does eat animal products. (Scarborough et al., 2014; Heller and Keoleian, 2014)



# Annex B: Recommended Levels of Meat and Dairy Intake

| | Recommendations |
|---|---|
| Chinese Dietary Guidelines | • The key messages relating to meat and dairy consumption in the Guidelines are as follows:<br>  • Meat, poultry, fish and shrimps should be eaten regularly in small quantities;<br>  • Milk, beans, or dairy or soybean products should be consumed every day.<br>• The 'Food Guide Pagoda' – a visual representation of how much of each of different food groups should be eaten each day – accompanies the Guidelines. The pagoda consists of five levels. Meat and poultry (50–100g), fish and shrimp (50g) and eggs (25–50g) make up the third and middle tier of the pagoda; milk and milk products (300g) and bean and bean products (30–50g) make up the second tier from the top. |
| Dietary Guidelines for the Brazilian population | • Brazil's Dietary Guidelines give general dietary advice rather than prescribing specific intake quantities, and acknowledge that healthy diets derive from socially and environmentally sustainable food systems. The 'Ten Steps to Healthy Diets' include making natural or minimally processed foods the basis of one's diet, limiting the consumption of processed foods, and avoiding the consumption of ultra-processed foods.<br>• In relation to meat and dairy products, the guidelines recommend preparing meat with the least possible oil and salt, and warn of the health risks of excessive consumption of red meat and processed meats and the unhealthy fats in red meat and poultry. Fish and eggs are suggested as good substitutes for red meats. They recommend low-fat or fat-free milk and plain yoghurt for adults, and state that cheeses (like all processed foods) should be consumed in small amounts. |
| Dietary Guidelines for Americans | • The current edition of the Dietary Guidelines for Americans was published in 2010. In parallel, the food icon – *My Plate* – helps consumers build a healthy plate at meal times. The key messages in the Guidelines relating to meat and dairy consumption are as follows:<br>  • 'Increase intake of fat-free or low-fat milk and milk products, or fortified soy beverages';<br>  • 'Choose a variety of protein foods, which include seafood, lean meat and poultry, eggs, beans and peas, soy products and unsalted nuts and seeds';<br>  • 'Increase the amount and variety of seafood consumed by choosing seafood in place of some meat and poultry';<br>  • 'Choose foods that provide more potassium, fibre, calcium and vitamin D. These include vegetables, fruits, whole grains, milk and milk products';<br>  • 'Replace protein foods that are higher in solid fats with choices that are lower in solid fats and calories and/or are sources of oils'.<br>• The USDA Food Patterns were developed to assist individuals in carrying out the recommendations of the Dietary Guidelines by suggesting daily amounts of food to consume from the different food groups. For a calorie level of 2,000 they suggest 156g (5.5 oz) of protein foods per day per capita made up of 51g (1.8oz) meat (beef, pork, lamb), 43g (1.5 oz) poultry (chicken, turkey), 34g (1.2 oz) fish/seafood, 11g (0.4 oz) eggs and 17g (0.6 oz) nuts and seeds. For dairy, they suggest 710ml (3 cups) per day. |
| Harvard School of Public Health | • The 'Healthy Eating Plate' suggests limiting milk and dairy products to one to two servings per day and recommends that protein sources make up one-quarter of consumers' plates. Its advice is to:<br>  • Choose fish, poultry, beans and nuts;<br>  • Limit red meat (choose lean cuts and avoid charring meat) and cheese;<br>  • Avoid bacon, cold cuts and other processed meats.<br>• Stehfest et al. (2009) estimated the following daily per capita intake levels, based on the Harvard Medical School's Healthy Eating Pyramid.<br>  • 10g beef, 10g pork, 46.5g poultry and eggs, and 23.5g fish. |
| World Cancer Research Fund | • According to the World Cancer Research Fund, in order to guard against colorectal cancer, the population-average consumption of red meat should be no more than 300g (11 oz) per week – this corresponds to an average of 42.9g per day, and processed meats should be avoided as much as possible.<br>• Those who do regularly consume red meat should aim to eat less than 500g cooked red meat (18 oz) a week – this corresponds to an average of 71.4g per day – and should avoid processed meat as much as possible.[165] |

[165] Red meat refers to beef, pork, lamb and goat meat from domesticated animals including that contained in processed foods. Processed meat refers to meat preserved by smoking, curing or salting, or addition of chemical preservatives, including that contained in processed foods.

| | Recommendations |
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| World Health Organization | • According to the WHO, 0.83g of protein per kg of body weight per day would meet the requirements of 97.5 per cent of the healthy adult population. This equates to 58.1g of protein per day for a 70 kg adult.<br>• The IARC, the cancer agency of the WHO, classifies red meat as 'probably carcinogenic to humans' and processed meat as 'carcinogenic to humans'. It concludes that each 50g portion of processed meat eaten daily increases the risk of colorectal cancer by 18 per cent. |
| UK Government | • The UK Department of Health recommends that people consuming more than 90g of red and processed meat per day should reduce levels to 70g per day (in order to prevent an increased risk of colorectal cancer).<br>• It also recommends choosing leaner cuts of meat, removing skin from poultry, reducing added fat when cooking meat, and choosing lower-fat dairy products.<br>• Public Health England is responsible for the 'Eatwell Plate' – and an illustration of the quantities and proportions of each food group that should be consumed as part of a healthy balanced diet. A Guide accompanies the plate. The key meat- and dairy-related messages are as follows:<br>  • Eat 'some milk and dairy foods' every day but choose lower fat versions whenever possible. They are an important source of protein and vitamins, and calcium;<br>  • Eat 'some meat, fish, eggs, beans and other non-dairy sources of protein' every day. These are an important source of protein, vitamins and minerals. |
| Institute of Medicine and Centers for Disease Control and Prevention | • The Institute of Medicine and Centers for Disease Control and Prevention recommend a daily allowance of 0.8 grams of protein for every kg of body weight per day. This equates to 56g of protein per day for a 70kg adult. |

Sources: Chinese Nutrition Society (2007); FAO (2015); Gordon and Gilbert (2011); IARC (2015); Institute of Medicine (2002/2005); Keyou (2011); Ministry of Health of Brazil (2014); NHS (2015a and b); Public Health England (2014b); Stehfest et al. (2009); USDA and US HSS (2010); WCRF and AICR (2007); WHO et al. (2007); Willett (2001).

# References


Adams, C. (1990), *The Sexual Politics of Meat: A Feminist-vegetarian Critical Theory* (New York: Continuum).

Alexander, P., Rounsevall, M., Dislich, C., Dobson, J., Engstrom, K. and Moran, D. (2015), 'Drivers for global agricultural land use change: the nexus of diet, population, yield and bioenergy', *Global Environmental Change,* 35, pp. 138–47.

Allen, N.E., Key, T.J., Appleby, P.N., Travis, R.C., Roddam, A.W., Tjønneland, A., Johnsen, N.F., Overvad, K., Linseisen, J., Rohrmann, S., Boeing, H., Pischon, T., Bueno-de-Mesquita, H.B., Kiemeney, L., Tagliabue, G., Palli, D., Vineis, P., Tumino, R., Trichopoulou, A., Kassapa, C., Trichopoulos, D., Ardanaz, E., Larrañaga, N., Tormo, M.-J., González, C.A., Quirós, J.R., Sánchez, M.-J., Bingham, S., Khaw, K-T., Manjer, J., Berglund, G., Stattin, P., Hallmans, G., Slimani, N., Ferrari, P., Rinaldi, S. and Riboli, E. (2008), 'Animal foods, protein, calcium and prostate cancer risk: the European Prospective Investigation into Cancer and Nutrition', *British Journal of Cancer*, 98, pp. 1574–81.

Andreyeva, T., Long., M. and Brownell, K. (2010), 'The impact of food prices on consumption: a systematic review of research on the price elasticity of demand for food', *American Journal of Public Health* 100(2), pp. 216–22.

Aune, D., Ursin, G. and Veierod, M.B. (2009), 'Meat consumption and the risk of type 2 diabetes: a systematic review and meta-analysis of cohort studies', *Diabetologia*, 52, pp. 2277–87.

Bailey, R., Froggatt, A., and Wellesley, L. (2014), *Livestock – Climate Change's Forgotten Sector: Global Public Opinion on Meat and Dairy Consumption* (London: Chatham House), available at https://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20141203LivestockClimateChangeBaileyFroggattWellesley.pdf.

Bailey, R. and Harper, D. R. (2015), *Reviewing Interventions for Healthy and Sustainable Diets* (London: Chatham House).

Bajželj, B., Richards, K.S., Allwood, J.M., Smith, P., Dennis, J.S., Curmi, E. and Gilligan, C.A. (2014), 'Importance of Food-Demand Management for Climate Mitigation', *Nature Climate Change,* 4(10), pp. 1–6.

Bíró, A. (2015), 'Did the junk food tax make the Hungarians eat healthier?', *Food Policy*, 54, pp. 107–115.

Blake, J. (1999), 'Overcoming the value-action gap in environmental policy: tensions between national policy and local experience', *Local Environment: The International Journal of Justice and Sustainability,* 4(3), pp. 257–78.

Bouvard, V., Loomis, D., Guyton, K.Z., Grosse, Y., El Ghissassi, F., Benbrahim-Tallaa, L., Guha, N., Mattock, H. and Straif, K. (2015), 'Carcinogenicity of consumption of red and processed meat', *The Lancet Oncology*, published online 26 October.

Boykoff, M., Daly, M., Gifford, L., Luedecke, G., McAllister, L., Nacu-Schmidt, A. and Andrews, K. (2015), 'World Newspaper Coverage of Climate Change or Global Warming, 2004–2015', Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, online, accessed 10 September 2015 at http://sciencepolicy.colorado.edu/media_coverage.

Brack, D. (2015), *Reducing Deforestation in Agricultural Commodity Supply Chains: Using Public Procurement Policy* (London: Chatham House), available at https://www.chathamhouse.org/sites/files/chathamhouse/field/field_document/20150902AgriculturalCommoditiesDeforestationBrack.pdf.

Briggs, A., Kehlbacher, A., Tiffin, R., Garnett, T., Rayner, M. and Scarborough, P. (2013), 'Assessing the impact on chronic disease of incorporating the societal costs of greenhouse gases into the price of food: an econometric and comparative risk assessment modelling study', *BMJ Open* 3(10).

British Medical Association (2012), 'Behaviour change and the role of the state – BMA position statement', online, accessed 14 September 2015 at http://bma.org.uk/working-for-change/improving-and-protecting-health/behaviour-change.

Capstick, S. and Pidgeon, N. (2014), 'What is climate change scepticism? Examination of the concept using a mixed methods study of the UK public', *Global Environmental Change*, 24, pp. 389–401.

Carbon Trust (2012), 'Food, the carbon story', online, 15 March, accessed 2 July 2015, at https://www.carbontrust.com/news/2012/03/food-the-carbon-story/.

Cassidy, E.S., West, P.C., Gerber, J.S. and Foley, J.A. (2013), 'Redefining agricultural yields: from tonnes to people nourished per hectare', *Environmental Research Letters*, 8(3), pp. 34015–22.

Castanheira, E.G. and Freire, F. (2013), 'Greenhouse gas assessment of soybean production: implications of land use change and different cultivation systems', *Journal of Cleaner Production*, 54, pp. 49–60.

CDC (Centers for Disease Control and Prevention) (2011), 'Antimicrobial Resistance Posing Growing Health Threat: CDC and Partners Celebrate World Health Day 2011 to Draw Attention to the Issue', CDC Newsroom, online, 7 April, accessed 30 August 2015 at http://www.cdc.gov/media/releases/2011/p0407_antimicrobialresistance.html.

CDC (2015), 'Antibiotic use in food-producing animals: tracking and reducing the public health impact', online, accessed 21 September 2015 at http://www.cdc.gov/narms/animals.html.

Cederberg, C., Hedenus, F., Wirsenius, S. and Sonesson, U. (2013), 'Trends in greenhouse gas emissions from consumption and production of animal food products – implications for long-term climate targets', *Animal: An International Journal of Animal Bioscience*, 7(2), pp. 330–40.

Chatham House/Ipsos MORI (2014), 'Public awareness of the relationship between meat and dairy production and climate change', a twelve-country survey commissioned by Chatham House and Glasgow University Media Group and undertaken by Ipsos MORI.

Chinese Nutrition Society (2007), The Chinese Dietary Guidelines, online, accessed 20 October 2015 at http://dg.en.cnsoc.org/index.html.

Clevers, E., and Urlings, M. (2015), 'From Dietary Guidelines to Dietary Guidance' *European Journal of Nutrition & Food Safety* 5(4), pp. 2347–5641.

Climate Action Tracker (2015), 'Effect of current pledges and policies on global temperature', online, accessed 2 November 2015 at http://climateactiontracker.org/global.html.

de Bakker, E. and Dagevos, H. (2012), 'Reducing meat consumption in today's consumer society: questioning the citizen-consumer gap', *Journal of Agricultural and Environmental Ethics*, 25(6), pp. 877–94.

DECLG (Department of the Environment, Community and Local Government of Ireland) (2007), 'Plastic Bags', online, accessed 2 October 2015 at www.environ.ie/en/Environment/Waste/PlasticBags/.

DEFRA (Department for Environment, Food and Rural Affairs) (2015), 'Plastic bag charge introduced in England', online, 5 October, accessed 10 October 2015 at www.gov.uk/government/news/plastic-bag-charge-introduced-in-england.

Department of Health of the Republic of South Africa (2013), 'Roadmap for Nutrition in South Africa: 2013–2017' (Pretoria: Department of Health, Republic of South Africa).

de Vries, M. and de Boer, I.J.M. (2010), 'Comparing environmental impacts for livestock products: a review of life cycle assessments', *Livestock Science* 128(1), pp. 1–11.

Diabetes UK (2015), 'Poor state of diabetes care "costing lives and money"', online, 14 January, accessed 20 October 2015 at https://www.diabetes.org.uk/About_us/News/Poor-state-of-diabetes-care-costing-lives-and-money-/.

Dobbs, R., Sawer, C., Thompson, F., Manyika, J., Woetzel, J., Child, P., McKenna, S. and Spatharou, A. (2014), 'Overcoming Obesity: An initial economic analysis', Discussion Paper, McKinsey Global Institute, November, accessed 3 June 2015, at http://www.mckinsey.com/~/media/McKinsey/dotcom/Insights/Economic%20Studies/How%20the%20world%20could%20better%20fight%20obesity/MGI_Overcoming_obesity_Full_report.ashx.

Eshel, G., Shepon, A., Makov, T. and Milo, R. (2014), 'Land, irrigation water, greenhouse gas, and reactive nitrogen burdens of meat, eggs, and dairy production in the United States', *Proceedings of the National Academy of Sciences* 111(33), pp. 11996–12001.

EUFIC (European Food Information Council) (2007), 'Making sense of Guideline Daily Amounts', online, accessed 10 August 2015 at http://www.eufic.org/article/en/nutrition/food-labelling-claims/artid/Making_sense_of_Guideline_Daily_Amounts/.

European Commission (2013), *The Impact of EU Consumption on Deforestation: Comprehensive analysis of the impact of EU consumption on deforestation.* Technical Report 2013-063. European Commission Publications Office.

Faculty of Public Health, UK (2007), *A Cap on Health, The impact of the EU Common Agricultural Policy on Public Health* (London: Faculty of Public Health).

Faculty of Public Health UK (2008) 'Traffic-light food labelling – A position statement', online, accessed 22 October 2015 at http://www.fph.org.uk/uploads/ps_food_labelling.pdf.

FAO (Food and Agriculture Organization of the United Nations) (2009a), *How to Feed the World in 2050,* online, accessed 20 October 2015 at http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf.

FAO (2009b), The State of Food and Agriculture (Rome: FAO).

FAO (2012), *World Agriculture Towards 2030/2050: the 2012 Revision*, ESA Working Paper 12-03 (Rome: FAO).

FAO (2013), *Tackling Climate Change through Livestock: A Global Assessment of Emissions and Mitigation Opportunities* (Rome: FAO).

FAO (2015), *Food-based dietary guidelines*, online, accessed 13 November 2015 at http://www.fao.org/nutrition/nutrition-education/food-dietary-guidelines/en/.

FAOSTAT (FAO Statistics Division) (various years), accessed 20 September 2015 at http://faostat3.fao.org/home/E.

Fischer, D. (2015), 'Back in the headlines: climate coverage returns to its 2009 peak', The Daily Climate, online, 2 January, accessed 12 June 2015 at http://www.dailyclimate.org/tdc-newsroom/2015/01/climate-change-coverage-2014.

Fishman, E., Washington, S., and Haworth, N. (2014), 'Bike share's impact on car use: evidence from the United States, Great Britain, and Australia', *Transportation Research Part D: Transport and Environment*, 31, pp. 13–20.

Food Manufacture (2015), 'Meat of the Future', online, 19 February, accessed 5 August 2015 at http://www.foodmanufacture.co.uk/Supplements/Food-Ingredients-Health-Nutrition/Demand-for-meat-alternatives-on-the-rise.

Fourat, E. and Lepiller, O. (2015, forthcoming), 'Forms of Food Transition: Socio-cultural Factors Limiting the Diets', *Animalisation* in France and India', *Sociologia Ruralis*, doi: 10.1111/soru.12114/abstract.

Freston, K. (2015), 'It's Time for a Healthy, Meatless Option (Please!)', online, accessed 20 October 2015 at https://www.change.org/p/mcdonald-s-it-s-time-for-a-healthy-meatless-option.

Frison, E. (2015), 'SDGs: we missed a boat, but it is not too late to focus on sustainable food systems', http://www.fcrn.org.uk/fcrn-blogs/efrison/pass-parcel-blog-series-2-emile-frison-sdgs-we-missed-boat-it-not-too-late-focus.

Fulton, M. and Capalino, R. (2012), *The German Feed-in Tariff: Recent Policy Changes* (Frankfurt am Main: Deutsche Bank AG).

G7 (2015), 'Leaders Declaration G7 Summit 7–8 June 2015', online, 8 June, accessed 7 September 2015 at https://www.g7germany.de/Content/EN/_Anlagen/G7/2015-06-08-g7-abschluss-eng_en.html.

Gadda, T. and Gasparatos, A. (2009), 'Land use and cover change in Japan and Tokyo's appetite for meat', *Sustainability Science*, 4(2), pp. 165–77.

Garnett, T. (2014a), 'What is a sustainable healthy diet? A discussion paper' (Oxford: Food Climate Research Network, University of Oxford).

Garnett, T. (2014b), *Changing what we eat: A call for research & action on widespread adoption of sustainable healthy eating* (Oxford: Food Climate Research Network, University of Oxford).

Garnett, T., Mathewson, S., Angelides, P. and Borthwick, F. (2015), *Policies and actions to shift eating patterns: what works? A review of the evidence of the effectiveness of interventions aimed at shifting diets in more sustainable and healthy directions* (Oxford: Food Climate Research Network, University of Oxford).

Gerbens-Leenes, P.W., Mekonnen, M.M., and Hoekstra, A.Y. (2013), 'The water footprint of poultry, pork and beef: a comparative study in different countries and production systems', *Water Resources and Industry,* 1, pp. 25–36.

Gibbs, H.K., Munger, J., L'Roe, J., Barreto, P., Pereira, R., Christie, M., Amaral, T. and Walker, N.F. (2015), 'Did Ranchers and Slaughterhouses Respond to Zero-Deforestation Agreements in the Brazilian Amazon?', *Conservation Letters*, 0(0), pp. 1–10.

Gill, M., Feliciano, D., Macdiarmid, J. and Smith, P. (2015), 'The environmental impact of nutrition transition in three case study countries', *Food Security,* 7(3), pp. 493–504.

Gordon, S. and Gilbert, A. (2011), *Healthy Eating: A Guide to the New Nutrition* (Boston, MA: Harvard Health Publications).

Happer, C., Philo, G. and Froggatt, A. (2012), *Climate change and energy security: assessing the impact of information and its delivery on attitudes and behaviour* (London: UKERC).

Happer, C. and Philo, G. (2015, in press), 'New approaches to understanding the role of the news media in the formation of public attitudes and behaviours on climate change', *European Journal of Communication*, doi: 10.1177/0267323115612213.

Hawes, W. (2015), 'Drought in São Paulo: Brazil's Megacity on Verge of Crisis as Water Rationing, Shutoffs Continue', Global Research, online, 28 March, accessed 10 July 2015 at http://www.globalresearch.ca/drought-in-sao-paulo-megacity-on-verge-of-crisis-as-water-rationing-shutoffs-continue/5439225.

Hawkes, C. (2013), 'Promoting healthy diets through nutrition education and changes in the food environment: an international review of actions and their effectiveness', Background Paper for the International Conference on Nutrition (ICN2) (Rome: FAO).

Hedenus, F., Wirsenius, S. and Johansson, D. (2014), 'The importance of reducing meat and dairy consumption for meeting stringent climate change targets', *Climate Change,* 124, pp. 79–91.

HMRC (HM Revenue and Customs, UK) (2014), 'Revenue and Customs Brief 38 (2014): VAT-compulsory charge on single use carrier bags in Scotland', online, 16 October, accessed 22 October 2015 at https://www.gov.uk/government/publications/revenue-and-customs-brief-38-2014-vat-compulsory-

charge-on-single-use-carrier-bags-in-scotland/revenue-and-customs-brief-38-2014-vat-compulsory-charge-on-single-use-carrier-bags-in-scotland#introduction.

IARC (International Agency for Research on Cancer) (2015), 'IARC monographs evaluate the consumption of red meat and processed meat', press release No. 240, 26 October, online, accessed 4 November 2015 at https://www.iarc.fr/en/media-centre/pr/2015/pdfs/pr240_E.pdf.

IFPRI (International Food Policy Research Institute) (2014), *2014 Global Nutrition Report* (Washington, DC: IFPRI).

IKEA (2015), 'IKEA takes a new course in its food offering: veggie balls first of new nutritious and sustainable offerings', online, accessed 10 July 2015 at http://www.ikea.com/ms/en_US/img/ad_content/FY15_IKEA_FOOD_takes_a_new_course.pdf.

Institute of Medicine (2002/2005), *Dietary Reference Intakes* (Washington, DC: National Academies Press).

Instituto Nacional de Salud Pública (2015), 'Reduction in Consumption of Taxed Beverages after the Implementation of the Tax in Mexico', online, accessed 13 November 2015 at http://www.insp.mx/epppo/blog/3666-reduccion-consumo-bebidas.html.

IPCC (Intergovernmental Panel on Climate Change) (2014), *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, UK and New York: Cambridge University Press).

Ipsos MORI (2012), *Acceptable Behaviour? Public opinion on behaviour change policy* (London: Ipsos MORI).

Ipsos MORI (2013), 'Politicians trusted less than estate agents, bankers and journalists', online, 15 February, accessed 5 August 2015 at https://www.ipsos-mori.com/researchpublications/researcharchive/3133/Politicians-trusted-less-than-estate-agents-bankers-and-journalists.aspx.

Johnson, C., Noyes, J., Haines, A., Thomas, K., Stockport,C., Ribas, A. and Harris, M. (2013), 'Learning from the Brazilian Community Health Worker Model in North Wales', Globalization and Health 9(25).

Johnson, E.J., Shu, S.B., Dellaert, B.G.C., Fox, C., Goldstein, D.G., Häubl, G., Larrick, R.P., Payne, J.W., Peters, E., Schkade, D., Wansink, B. and Weber, E.U. (2012), 'Beyond nudges: tools of a choice architecture', *Marketing Letters*, 23, pp. 487–504.

Katz, D.L. and Meller, S. (2014), 'Can We Say What Diet Is Best for Health?', *Annual Review of Public Health*, 35, pp. 83–103.

Keller, I. and Lang, T. (2008), 'Food-based dietary guidelines and implementation: lessons from four countries – Chile, Germany, New Zealand and South Africa', *Public Health Nutrition*, 11(8), pp. 867–74.

Keyou, G. (2011), 'The transition of Chinese dietary guidelines and the food guide pagoda', Asia Pacific Journal of Nutrition 20(3), pp. 439–46.

Larsson, S.C. and Wolk, A. (2006), 'Meat consumption and risk of colorectal cancer: a meta-analysis of prospective studies', *International Journal of Cancer,* 119(11), pp. 2657–64.

Lyons, L. (2013), 'DYNAMIX policy mix evaluation – Reducing plastic bag use in the UK and Ireland', online, July, accessed 2 August 2015 at http://dynamix-project.eu/sites/default/files/Plastic%20bags_Ireland%20and%20UK.pdf.

MacDiarmid, J. I. (2013), 'Is a healthy diet an environmentally sustainable diet?', *Proceedings of the Nutrition Society*, 72(1), pp. 13–20.

Machovina, B., Feeley, K. J. and Ripple, W. J. (2015), 'Biodiversity conservation: the key is reducing meat consumption', *Science of the Total Environment*, 536, pp. 419–31.

Marteau, T. M., Ogilvie, D., Roland, M., Suhrcke, M. and Kelly, M.P. (2011), 'Judging nudging: can nudging improve population health', *British Medical Journal*, 342, pp. 263–65.

Marteau, T. M., and Mantzari, E. (2015), 'Public health: the case for pay to quit', *Nature*, 523, pp. 40–41.

Meatless Monday (2013), 'Los Angeles Public Schools Implement Meatless Mondays for Student Health', online, 11 March, accessed 7 August 2015 at http://www.meatlessmonday.com/articles/los-angeles-public-schools-implement-meatless-mondays-for-student-health/.

Ministry of Health of Brazil (2014), 'Dietary Guidelines for the Brazilian population', 2nd edition, online, accessed 4 November 2015 at http://189.28.128.100/dab/docs/portaldab/publicacoes/guia_alimentar_populacao_ingles.pdf.

Momsen, K. and Stoerk, T. (2014), 'From intention to action: can nudges help consumers to choose renewable energy?', *Energy Policy*, 74, pp. 376–82.

Myhre, G., Shindell, D., Bréon, F.M., Collins, W., Fuglestvedt, J., Huang, J., Koch, D., Lamarque, J.-F., Lee, D., Mendoza, B., Nakajima, T., Robock, A., Stephens, G., Takemura, T. and Zhang, H. (2013), 'Anthropogenic and Natural Radiative Forcing', in Stocker, T.F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S.K., Boschung,

J., Nauels, A., Xia, Y., Bex, V. and Midgley, P.M. (eds), *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, UK and New York: Cambridge University Press).

NDRC (National Development and Reform Commission, People's Republic of China) (2013), *China's Policies and Actions for Addressing Climate Change* (Beijing: NDRC).

Newman, N. (2011), *Mainstream media and the distribution of news in the age of social discovery: how social media are changing the production, distribution and discovery of news and further disrupting the business models of mainstream media companies* (London: Reuters Institute for the Study of Journalism).

NHS, UK (2015a), 'Meat in your diet', online, accessed 10 October 2015 at http://www.nhs.uk/Livewell/Goodfood/Pages/meat.aspx.

NHS, UK (2015b), 'Milk and dairy in your diet', online, accessed 10 October 2015 at http://www.nhs.uk/Livewell/Goodfood/Pages/milk-dairy-foods.aspx.

Nuffield Council on Bioethics (2007), *Public Health: Ethical Issues* (Cambridge: Cambridge Publishers Ltd).

Pew Research Center (2014), 'Public Trust in Government: 1958–2014', online, 13 November, accessed 10 September 2015 at http://www.people-press.org/2014/11/13/public-trust-in-government/.

Provencher, V., Polivy, J. and Herman, P. (2009), 'Perceived healthiness of food. If it's healthy, you can eat more!', *Appetite*, 52(2), pp. 340–44.

Public Health England (2014a), *National Diet and Nutrition Survey: results from years 1 to 4 (combined) of the rolling programme for 2008 and 2009 to 2011 and 2012* (London: Public Health England).

Public Health England (2014b), *Your guide to eatwell plate – helping you eat a healthier diet*, online, accessed 13 November 2015 at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/340869/2014-250_-_eatwell_plate_Final_version_2014.pdf.

Public Health England (2015), 'Sugar reduction: the evidence for action', online, accessed 28 October 2015 at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/470179/Sugar_reduction_The_evidence_for_action.pdf.

Ravilious, K. (2013), 'Cutting Meat Consumption Could Feed 10 Billion', Environment Research Web, online, 27 September, accessed 10 July 2015 at http://environmentalresearchweb.org/cws/article/news/54791.

Retail Council of Canada (2015), 'Government of Canada Launches New Phase of Nutrition Facts Education Campaign', online, accessed 24 June 2015 at http://www.retailcouncil.org/media/newsreleases/government-of-canada-launches-new-phase-of-nutrition-facts-education-campaign.

Retail Forum for Sustainability (2011), 'Labelling', Issue Paper 7, June, published by the European Commission, http://ec.europa.eu/environment/industry/retail/pdf/labelling_issue%20paper_final.pdf.

Rivers Cole, J. and McCoskey, S. (2013), 'Does global meat consumption follow an environmental Kuznets curve?', *Sustainability: Science, Practice, & Policy,* 9, pp. 26–36.

Rothgerber, H. (2013), 'Real men don't eat (vegetable) quiche: Masculinity and the justification of meat consumption', *Psychology of Men & Masculinity,* 14(4), pp. 363–75.

Rouhani, M.H., Salehi-Abarqouei, A., Surkan, P.J. and Azadbakht, L. (2014), 'Is there a relationship between red or processed meat intake and obesity? A systematic review and meta-analysis of observational studies', *Obesity Review*, 15(9), pp. 740–48.

Samson, A. (2015), *The Behavioral Economics Guide 2015*, The Behavioral Science Hub, online, accessed 7 August 2015 at http://www.behavioraleconomics.com/BEGuide2015.pdf.

Sans, P. and Combris, P. (2015), 'World meat consumption patterns: an overview of the last fifty years (1961–2011)', *Meat Science*, 109, pp. 106–11.

Scarborough, P., Allender, S., Clarke, D., Wickramasinghe, K. and Rayner, M. (2012), 'Modelling the health impact of environmentally sustainable dietary scenarios in the UK', *European Journal of Clinical Nutrition,* 66(6), pp. 710–15.

Schlosser, C.A., Strzepek, K., Gao, X., Gueneau, A., Fant, C., Paltsev, S., Rasheed, B., Smith-Greico, T., Blanc, E., Jacoby, H.D., and Reilly, J.M. (2014), *The Future of Global Water Stress: An Integrated Assessment*, Report No. 254, Joint Program on the Science and Policy of Global Change (Cambridge, MA: Massachusetts Institute of Technology).

Schneider, M. and Sharma, S. (2014), 'China's Pork Miracle? Agribusiness and Development in China's Pork Industry' (Minneapolis, MN: Institute for Agriculture and Trade Policy).

Scott, A. (2015), 'ODI cooks up new focus on open data, agriculture and nutrition', online, accessed 20 September 2015 at http://aims.fao.org/activity/blog/odi-cooks-new-focus-open-data-agriculture-and-nutrition.

Short, F. (2003), 'Domestic cooking skills – what are they?', *Journal of the HEIA*, 10(3), pp. 13–22.

Smil, V. (2013), *Should We Eat Meat? Evolution and Consequences of Modern Carnivory* (Oxford: Wiley-Blackwell).

Smith, P., Bustamante, M., Ahammad, H., Clark, H., Dong, H., Elsiddig, E. A., Haberl, H., Harper, R., House, J., Jafari, M., Masera, O., Mbow, C., Ravindranath, N. H., Rice, C. W., Robledo Abad, C., Romanovskaya, A., Sperling, F. and Tubiello, F. (2014), 'Agriculture, Forestry and Other Land Use (AFOLU)', in *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Edenhofer, O., Pichs-Madruga, R., Sokona, Y., Farahani, E., Kadner, S., Seyboth, K., Adler, A., Baum, I., Brunner, S., Eickemeier, P., Kriemann, B., Savolainen, J., Schlömer, S., von Stechow, C., Zwickel, T. and Minx, J.C., eds [Cambridge, UK and New York: Cambridge University Press]).

Smith, J., Sones, K., Grace, D., MacMillan, S., Tarawali, S. and Herrero, M. (2013), 'Beyond milk, meat, and eggs: role of livestock in food and nutrition security', *Animal Frontiers*, 3(1), pp. 6–13.

Smith, L. P., Ng, S. W. and Popkin, B. M. (2013), 'Trends in US home food preparation and consumption: analysis of national nutrition surveys and time use studies from 1965–1966 to 2007–2008', *Journal of Nutrition*, 12, pp. 45–55.

Stanton, R. (2015), 'Food Retailers and Obesity', *Etiology of Obesity*, 4, pp. 54–50.

Statista (2013), 'Largest global advertising in 2013, by ad spending (in billion US dollars)', online, accessed 12 June 2015 at http://www.statista.com/statistics/286448/largest-global-advertisers/.

Statista (2015), 'Brand value of the 10 most valuable fast food brands worldwide in 2015 (in million U.S. dollars)', online, accessed 26 October 2015 at http://www.statista.com/statistics/273057/value-of-the-most-valuable-fast-food-brands-worldwide/.

Stehfest, E., Bouwman, L., van Vuuren, D.P., den Elzen, M.G.J., Eickhout, B. and Kabat, P. (2009), 'Climate benefits of changing diet', *Climatic Change,* 95, pp. 83–102.

Steinfeld, H. and Gerber, P. (2010), 'Livestock production and the global environment: consume less or produce better?', *Proceedings of the National Academy of Sciences* 107(43), pp. 18237–38.

Svenska Dagbladet (2015), 'More and more municipalities in favour of meat-free days' [Allt fler kommuner inför köttfria dagar], online, accessed 20 September 2015 at http://www.svd.se/kottfria-dagar-i-fler-kommuner.

Thaler, R. H. and Sunstein, C. (2008), *Nudge: Improving Decisions about Health, Wealth, and Happiness* (New Haven, CT: Yale University Press).

The Economist (2014), 'Empire of the Pig. China's insatiable appetite for pork is a symbol of the country's rise. It is also a danger to the world', online, 20 December, accessed 10 July 2015 at http://www.economist.com/news/christmas-specials/21636507-chinas-insatiable-appetite-pork-symbol-countrys-rise-it-also.

The Guardian (2014), 'Tesco bans sweets from checkouts in all store', 22 May, online, accessed 5 November 2015 at http://www.theguardian.com/business/2014/may/22/tesco-bans-sweets-from-checkouts-all-stores.

The Guardian (2015), 'Sugar tax could help solve Britain's obesity crisis, expert tells MPs', online, 21 October, accessed 22 October 2015 at www.theguardian.com/society/2015/oct/21/sugar-tax-could-solve-obesity-crisis-says-expert.

Tjärnemo, H. and Södahl, L. (2014), 'Swedish food retailers promoting climate smarter food choices – trapped between visions and reality?', *Journal of Retailing and Consumer Services*, 24, pp. 130–39.

UK Government and Parliament (2015), 'Petition: Introduce a tax on sugary drinks in the UK to improve our children's health', online, accessed 2 November 2015 at https://petition.parliament.uk/petitions/106651.

UNFCCC (United Nations Framework Convention on Climate Change) (2015), 'Technical Examination Process', online, accessed 10 September 2015 at http://unfccc.int/focus/mitigation/technical_expert_meetings/items/8179.php.

UN News Centre (2014), 'More than half of the world's population now living in urban areas, UN survey finds', online, 10 July, accessed 10 September 2015 at http://www.un.org/apps/news/story.asp?NewsID=48240#.VieixitRaao.

UN Newsroom (2015), 'Global Response to Climate Change Keeps Door Open to 2-degree C Temperature', 30 October, online, accessed 5 November 2015 at http://newsroom.unfccc.int/unfccc-newsroom/indc-synthesis-report-press-release/.

United Nations Department of Economic and Social Affairs (2010), *The World's Women 2010: Trends and Statistics* (New York: United Nations).

USDA ARS (United States Department of Agriculture Agricultural Research Service) (2015), accessed 25 October 2015 at http://www.ars.usda.gov/main/site_main.htm?modecode=80-40-05-25.

USDA (US Department of Agriculture) and US HSS (US Department of Health and Human Services) (2010), Dietary Guidelines for Americans, 7th edition (Washington, DC: US Government Printing Office), online, accessed 4 November 2015 at http://health.gov/dietaryguidelines/dga2010/DietaryGuidelines2010.pdf.

US FDA (2013), 'Guidance for Industry: A Food Labeling Guide (14. Appendix F: Calculate the Percent Daily Value for the Appropriate Nutrients)', online, accessed 4 August 2015 at http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm064928.htm.

Vermeulen, S.J., Campbell, B.M., and Ingram, J.S.I. (2012), 'Climate Change and Food Systems', *Annual Review of Environment and Resources*, 37(1), pp. 195–222.

Vranken, L., Avermaete, T., Petalios, D. and Mathijs, E. (2014), 'Curbing global meat consumption: emerging evidence of a second nutrition transition', *Environmental Science & Policy*, 39, pp. 95–106.

WCRF (World Cancer Research Fund) and AICR (American Institute for Cancer Research) (2007), *Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective* (Washington, DC: AICR).

WCRFI (World Cancer Research Fund International) (2015a), 'NOURISHING framework', online, accessed 3 August 2015 at http://www.wcrf.org/int/policy/nourishing-framework.

WCRFI (2015b), 'Restrict food marketing', online, accessed 2 November 2015 at http://www.wcrf.org/int/policy/nourishing-framework/restrict-food-marketing.

Welsh Government (2014), 'Single-use carrier bags', online, 6 May, accessed 20 October 2015 at gov.wales/topics/environmentcountryside/epq/waste_recycling/substance/carrierbags/?lang=en.

Which? and Government Office for Science (2015), *Food system challenges: public dialogue on food system challenges and possible solutions,* online, accessed 25 October 2015 at http://www.sciencewise-erc.org.uk/cms/assets/Uploads/Which-GOS-Food-Report-FINAL6.pdf.

WHO (World Health Organization) (2014), 'Protecting children from harmful effects of food and drink marketing', September 2014, online, http://www.who.int/features/2014/uk-food-drink-marketing/en/.

WHO (2015), 'Healthy diet', http://www.who.int/mediacentre/factsheets/fs394/en/.

WHO, FAO and UNU (2007), 'Protein and amino acid requirements in human nutrition', WHO Technical Report Series 935, online, accessed 4 November 2015 at http://www.who.int/nutrition/publications/nutrientrequirements/WHO_TRS_935/en/.

WildAid (2015), 'Fins from up to 73 million sharks are used in shark fin soup each year', online, accessed 5 July 2015 at http://www.wildaid.org/sharks.

Willett, W. (2001), *Eat, Drink and Be Healthy: The Harvard Medical School Guide to Healthy Eating*, A Harvard Medical School Book co-developed with the Harvard School of Public Health (New York: Free Press).

Wirsenius, S., Hedenus, F. and Mohlin, K. (2010), 'Greenhouse gas taxes on animal food products: rationale, tax scheme and climate mitigation effects', *Climate Change,* 108(1–2), pp. 159–84.

World Bank (2014a), Turn Down the Heat: Confronting the New Climate Normal (Washington DC: World Bank).

World Bank (2014b), 'World Bank International Comparison Program Database', online, accessed 15 September 2015 at http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD.

WWF (2015), 'How many species are we losing?', online, accessed 20 October 2015 at http://wwf.panda.org/about_our_earth/biodiversity/biodiversity/.

YouGov (2014), 'Consumer confusion over food labelling', online, 25 March, accessed 22 October 2015 at https://yougov.co.uk/news/2014/03/25/consumer-confusion-over-food-labelling/.

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