2. Old and new meatways[1]

In this chapter, I will give background to the issues within the meat crisis, explore how humans have been eating non-human animals over time, including in the last half a century, and consider potential reasons for changes in these practices. Subsequently, I will explore the different discourses related to eating animals — with the underlining notion, related to both my research task and research question, that discourses are deeply tied in with practices. Finally, I will look at some future visions for a transformation of the meat system.

2.1 Background

From scientific literature, it is evident by now that the impacts of the production and consumption of animals for human food on the natural world, and consequently on humans, are catastrophic, especially in terms of climate change and biodiversity loss. The meat system is said to be broken, something acknowledged by many members of the research community, and echoed by some media outlets. The topic is very gradually starting to appear in some policy domains. At the same time, most people in the world appear either unaware of the scale and extent of the damage done by the *global meat complex*,[2] or even if aware at some level, unwilling, or seemingly unable to change or critically assess their own food-related practices (see e.g. Hartmann & Siegrist, 2017).

1 The old meatways refer here to traditional (mostly industrial) and abundant meat eating by the current vast majority, and vegetarianism or veganism by a current small minority.

2 The Institute for Agriculture and Trade Policy (IATP) defines the global meat complex as a highly horizontally and vertically integrated "web of transnational corporations […] that controls the inputs, production and processing of mass quantities of food animals", see e.g. https://www.iatp.org/blog/leaders-global-meat-complex. I use occasionally the term Big Meat for this complex, and often just refer to the "meat industry" more generally. The meat system, on the other hand, refers in this book to the general systems of production and consumption of meat.

In addition to being the most important single contributor to both climate change and biodiversity loss, the global meat complex contributes to several other crucial issues. All this will be covered in Section 2.1.1, after which I will explore the history and present of eating animals in Section 2.1.2. In Section 2.1.3, I will reflect on some of the issues often considered to influence the practices of humans eating animals.

2.1.1 The issue with meat

Figure 2.1 shows the growth of total global meat consumption in the last half a century (measured as "supply", see Box 2.2).[3] While the world has doubled its human population in this time, it has quadrupled its meat consumption, thereby the per capita consumption has doubled (for per capita growth, see Figure 2.5). This much-increased consumption of meat has largely been facilitated by industrial meat production methods developed since World War II, constituting one of the biggest changes in the entire food and agriculture industry (van Otterloo, 2012). Increasingly, the meat produced in the Global South is, however, also industrial, and so for example, at least three-quarters of the world's chickens and more than half of pigs were produced industrially in the 2000s (FAO, 2009), and now, ten years later, these proportions are likely to have risen further.[4] A recent investigation concluded that, for the United Kingdom, the so-called megafarms (large CAFOs, confined animal feeding operations) are already widespread (with 800 of them in total in the country) and most of the rest of the UK meat production is likewise intensive.[5]

The impacts of the global meat complex have been covered in literature in quite some detail, especially in the last decade. A recent comprehensive report on the issue is the Meat Atlas produced by the Heinrich Böll Foundation (2014), and a recent peer-reviewed overview is provided, for example, by Godfray et al. (2018). Below is a review of some of the most pressing issues, related mainly to intensive

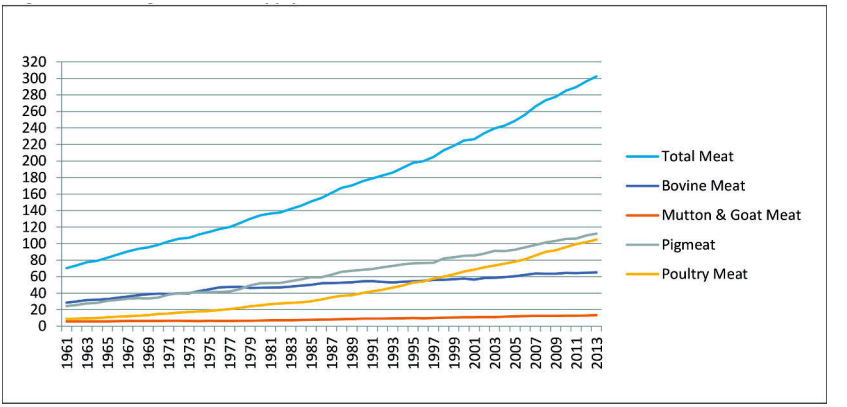
3 As of September 2020, FAOSTAT provides the historical food supply data series only until 2013. However, it can be observed, for example, from the OECD-FAO database that the trend-lines since 2013 are not essentially different from what is seen in Figures 2.1, 2.5 and 2.14 in this book.

4 A 2012 report on India concluded that around 90% of meat chickens in India were factory farmed at that point (MacDonald & Iyer, 2012).

5 A study by the Guardian newspaper and the Bureau of Investigative Journalism, see https://www.theguardian.com/environment/2017/jul/17/uk-has-nearly-800-livestock-mega-farms-investigation-reveals. The definition for an intensive UK farm is that there are more than 40,000 chickens, 2,000 pigs or 750 beef cows. The US definition for a large CAFO (also so called megafarm in the UK) is that there are at least 125,000 chickens, 2,500 pigs, or 1,000 beef cows.

non-organic animal agriculture, rather than organic, or extensive animal farming.[6] Figure 2.2 divides the impacts to four main categories: issues linked to a range of environmental impacts, issues linked more directly to human and animal welfare, and lastly, ethical impacts.

Figure 2.1: Total global meat supply from 1961



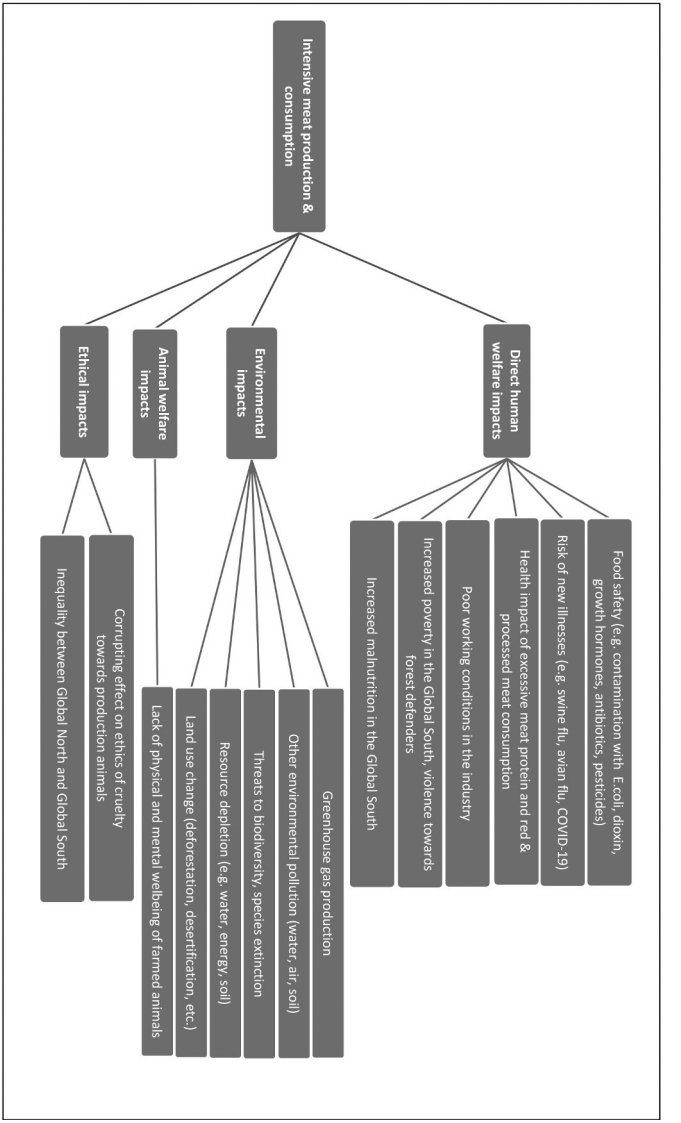
Source: FAOSTAT.

Notes: Data in in millions of tonnes; bovine meat consists of cows and buffalos, but overwhelmingly cows; poultry meat covers chickens, turkeys, ducks, geese and guinea fowl, although mostly chickens; for the difference between supply and consumption, see Box 2.2; all food and agriculture-related data from FAOSTAT is available from 1961.

Firstly, *direct impacts on human welfare* include those generated from the production methods, affecting either food safety or the risk of new illnesses, or both. The domestication of farm animals has most likely brought about most of the common human viral diseases over the last 10,000 years with viruses jumping from animals to humans in close contact. However, the ever-increasing expansion and intensification of meat production — especially in poorer and less regulated conditions in the Global South, but in the Global North as well — has led to the dramatic increase in the emergence and spread of infectious diseases originating in animals, such as avian influenza (e.g. Greger, 2017) or the COVID-19 pandemic. Reducing

6 Organic or extensively produced meat shares many problems with intensively produced meat, especially with its climate impact (see e.g. Steinfeld et al., 2006; Foodwatch, 2009), and cannot offer an all-encompassing alternative to intensively produced meat, also in terms of scale. However, since it is often discussed as a real alternative, some discussion of organic/extensively produced meat will be included (e.g. in Section 2.2.1). Further, switching from conventional to organic meat can have positive or negative spillover effects (discussed in Section 2.3.1).

Figure 2.2: Impacts from systems of intensive meat production and consumption



Source: Figure by author.

global consumption of meat would be a way to reduce zoonotic disease spread (White & Razgour, 2020). The contamination of meat intended for consumption by therapeutic or growth-promoting antibiotics, growth hormones, pesticides animal faeces containing bacteria, such as E. coli, or toxins, such as dioxin, is a related and serious risk to human welfare. Similarly, bovine spongiform encephalopathy (BSE) is a disease caused by prion contaminated meat. The current global crisis with antibiotic-resistant bacteria has also to a large extent resulted from the same antibiotics being given to farm animals, often as a growth promotion agent (e.g. WHO, 2015).

Likewise, direct human welfare impacts are generated from poor working conditions in the meatpacking industry, most importantly from high rates of injury, often extremely low pay, lack of benefits, and enormous stress due to the rapid pace of work, foul working environment and the generally expected ruthless handling of live animals. According to Foer (2009), the annual personnel turnover rates in the United States typically exceed 100%, and are possibly up to around 150%. Often farm level workers, for example, in American intensive animal farming, are immigrants paid under minimum wage levels (e.g. Donaldson, 2016a).

Further, there is conclusive evidence by now that the excessive consumption of meat, and especially red meat and processed meats, contributes significantly to obesity and most serious human illnesses, such as cancer, cardiovascular disease, or diabetes (e.g. Deckers, 2013; Kmietowicz, 2017; Rouhani et al., 2014; Sinha et al., 2009; Wellesley et al., 2015; Willett & Stampfer, 2013). That societies could be consuming too much meat as regards human health has, however, been a controversial issue for decades, at least partly due to pressure from the global meat complex (Nestle, 2018; The Pew Commission, 2008), and has resulted, for example, in governments being reluctant to include limits on meat in official nutritional guidelines. Even when such limits are included, these involve only very modest recommended reductions (Gonzalez Fischer & Garnett, 2016), as discussed later in this chapter.

Finally, for human welfare impacts, and importantly from a global perspective, intensive meat production has an impact on poverty and malnutrition. Tudge (2017), among others, argues that poverty in the Global South is being amplified by the gradual but steady industrialization of meat production there. The human labour input that has helped employ large masses of people on subsistence farms in the South is being cut in the name of efficiency, simultaneously, however, increasing unemployment and decreasing access to food production (Fiddes, 1991; Tudge, 2017). Further, the expansion of CAFOs and supermarkets in the Global South — often favoured by governments (e.g. Heinrich Böll Foundation, 2017) — is cutting down the beneficial smallholder production, and increasing grain prices, as a larger proportion of the grain goes to the CAFOs, with the higher prices being particularly a problem for the poor animal farmers (MacLachlan, 2015). Additionally, growing

feed for meat-producing animals worsens food shortages through deforestation and the displacement of local populations from their traditional lands, and violence towards forest and wildlife defenders.[7]

Although most people would likely prefer not to think about it, producing billions of individual animals globally only to be killed for human food[8] may be considered by some to be one of the worst consequences of industrialized animal agriculture. It can be argued that the question is less about *animal welfare* within the production systems as such, and more about sentient animals' right to be respected, a discussion philosopher Peter Singer set off over 40 years ago, and their right to not necessarily be our food, let alone in such excessive amounts. Animal welfare issues are most closely linked to the treatment of animals in intensive agricultural production systems (see e.g. McLeod-Kilmurray, 2012). The problems are rooted in lack of both physical and mental wellbeing of farmed animals, which also lead to serious human welfare risks, on the one hand, through the use of large amounts of therapeutic antibiotics to contain diseases, and on the other hand, through stressed animals being exposed to diseases that end up infecting humans, as mentioned above. Foer (2009) argues, however, that the meat industry discovered early on that an overall good health of farm animals is not a required condition for making a profit.[9]

The lack of wellbeing of the production animals is also an issue for the third category of impacts from intensive meat production and consumption, relating to the *ethics of meat production*, i.e. questions of morality. Firstly, it can be said that cruelty towards animals is morally wrong. Rawles (2017), among others, has argued that animal welfare should be included in the concept of sustainable development, alongside economy, environment and society, since sustainable development in itself is "ethically aspirational". Further, she suggests that regarding animal welfare as a luxury that societies cannot afford, because of more dire economic or environmental pressures, reflects the instrumental thinking (regarding nature) that is at the root of the problems societies are currently facing.

There has been a strong but ultimately failed effort to include animal welfare in the 2015 Sustainable Development Goals for 2030.[10] However, in October 2016,

7 This phenomenon is increasingly reported in the news. See e.g. https://www.dw.com/en/5-deadly-countries-for-environmental-defenders/a-54298499, published 28 July 2020.

8 Around 65 billion farm animals were slaughtered globally in 2011 (Heinrich Böll Foundation, 2014), around 120 thousand farm animals per minute.

9 The lack of mental wellbeing of the production animals was discussed as an issue for the quality of meat already in the late 1970s (see e.g. Lawrie, 1977, discussing the effect of animal stress).

10 See e.g. https://www.worldanimalprotection.org/news/un-incorporate-animal-protection-2030-agenda-sustainable-development.

the FAO[11] Committee on World Food Security significantly included in their final recommendation, (in line with 2030 Agenda for Sustainable Development) considerations for animal welfare to be aligned with World Organization for Animal Health (OIE) standards and principles. It remains to be seen whether governments take note of these recommendations, and what that might mean in practice for the industry.[12]

Further on the ethical aspects of industrial meat production, as discussed above, the increasing industrialization of meat production in the Global South can be expected to significantly increase unemployment and poverty there (e.g. Tudge, 2017). This creates an ethical problem whereby the technology transfer (i.e. industrialization of meat production) transferred from the Global North to the South increases the welfare divide between the North and the South.

Last, but probably most importantly for the survival of humanity, the enormous *environmental impacts* of industrial meat production stem from the scale of production and lack of consideration for the secondary effects of using the inputs (e.g. land, oil, energy, fertilizers, water, feed, uniform agricultural plant and animal species) and the effects of secondary outputs (e.g. manure, wastewater), which cause air, water and ground pollution, in addition to increasing greenhouse gases, detrimental land-use change (through deforestation, soil degradation, erosion and desertification), and the associated depletion of natural resources and threats to biodiversity.

For example, the water footprint of industrial animal farming is considerable. Hoekstra (2017) gives one estimate of the water footprint of average diets in the Global North. An average meat eater's diet for one single day in the Global North costs 3600 litres of water, while an average vegetarian diet there consumes 2300 litres, still a considerable amount, but much less.[13] The pollution of waterways by fertilizers and manure is a problem not accounted for in these figures. In fact, more than 80% of the nitrogen inputs into animal agriculture are lost (Westhoek et al., 2011), impacting on terrestrial biodiversity in addition to increasing water pollution and disrupting the natural nitrogen cycle. Leach et al. (2012) conclude from their study on the effect of different diets on nitrogen losses to the environment that only a complete change to plant-based protein would result in a significant reduction of the nitrogen footprint.

Agriculture's contribution to greenhouse gas (GHG) emissions is often estimated to be up to a third of all emissions when fossil fuel inputs are included

11 The Food and Agriculture Organization of the United Nations

12 The FAO committee also made recommendations regarding several other negative impacts from the meat system.

13 The numbers for the Global South are lower, 2050 and 1750 litres, respectively (Hoekstra, 2017).

(e.g. Garnett, 2017). Importantly, this figure, however, does not include emissions related to the processing, transport, retail, and consumption of food, or the resulting waste. Industrial meat (and dairy) production has been estimated to contribute at least half of the total food impact on GHG emissions (e.g. Eder & Delgado, 2006), with the largest impact made at the farm stage. In 2006, the FAO (Steinfeld et al.) estimated livestock's contribution to all GHGs from agriculture to be as high as 80%. How much animal agriculture exactly contributes to the total of global greenhouse gases from all sources is still, however, controversial (see Box 2.1 for discussion).

Box 2.1. Contribution of the global meat system to greenhouse gases

The amount of GHG emissions related to animal agriculture has been a controversial topic especially after the FAO (Steinfeld et al., 2006) made their estimate of 18% of all global GHG emissions, including the impact of land-use changes.

The range of estimates made after 2006 is large, with Goodland and Anhang (2009) calculating a contribution as high as 51%, and the FAO recalculating their own estimate at 14.5% (Gerber et al., 2013), this latter number likely being the most often currently quoted. The Meat Atlas (Heinrich Böll Foundation, 2014:34) refers to a range from 6 to 32%, where the correct proportion depends on whether only direct (6%) or total (32%), so also indirect emissions, are considered.

The difficulties in making accurate estimations originate partly in the complexity of the issue, disagreements over which processes, inputs, outputs and impacts should be included, as well as methodological issues, and sometimes even political disagreements over e.g. the relevant time reference point for GHGs, especially methane, in the atmosphere. As Hayek (2019) notes, the errors present in the standard model estimations may not only be compounding, but also often go underreported. He notes that, "although emissions from the models are uncertain, [this] does not mean that they are wrong. It means that how wrong or right they are is unknown" (Hayek, 2019:4).

On a national level, the estimates vary a great deal, depending on the agricultural systems involved, the contributions from other sources of GHGs, whether emissions accounting is production- or consumption-based (for the last, see Wellesley et al., 2015:4), and the methods used. Similar disagreements as for the global level add to the uncertainties of the national estimates. National level comparisons may indeed be rather meaningless (Garnett, 2011). To give but two examples, for Australia, where especially beef production is highly emissions intensive, short-term (20-year) GHG emissions from all agriculture are estimated by some to be as high as 54% of all Australian anthropogenic GHGs, with animal agriculture contributing most of this (Beyond Zero Emissions, 2014). Further, Hayek (2019) estimates GHG emissions from

meat production with a so-called top-down method (measuring directly from the air) and concludes that for countries such as the United States, standard (bottom-up) model estimates seriously underestimate the emissions, due to the high level of industrialization of meat production there. As intensive animal agriculture continues its expansion, this same underestimation affects an increasing number of countries and regions Hayek argues.

These uncertainties (although rarely discussed as such) may have contributed to the uncertainty among the general public as regards the significance of the impact from meat production on climate change (see e.g. Austgulen, 2014; Wellesley et al., 2015), and it may have helped the global meat complex in creating a "safe space" for continuing its business as usual (cf. tobacco industry, Proctor, 2008). Further, using the highest global figure of 51% uncritically may undermine the credibility of some work by animal activists, or even critical animal studies as an academic field (Twine, 2014). In general, the wide range of estimates is likely to be partly due to certain lack of scientific rigour in the assessments that do exist, and partly due to politics being involved.[14] Although very relevant, the controversy about the numbers is, however, largely ignored in discourses (Twine, 2014).

Paradoxically, if the contribution of the meat system to GHGs is more moderate (e.g. 14.5%), reductions need to be radical to make an impact. Whereas, if the contribution is much larger, even a more moderate change could make a significant contribution to climate change mitigation, as also noted by Goodland (2014).

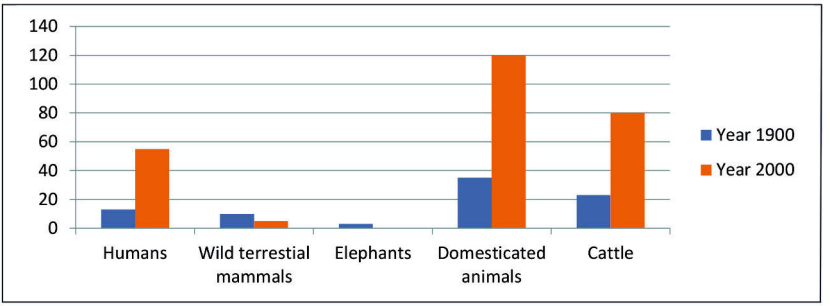
According to the oft-quoted estimate from the FAO (Steinfeld et al., 2006), 70% of all agricultural land and 30% of all land surface is used in livestock production, directly or indirectly. An updated estimate from Poore and Nemecek (2018) is that around 83% of all farmland is used for animal agriculture when including that used for dairy farming and aquaculture. With the associated continuing destruction of rainforests and grasslands, intensive meat production destroys the diversity of species and ecosystems. The third form of biodiversity, within a species (as opposed to between species or between ecosystems), is also threatened by the uniformity of livestock breeds used in intensive farming. Industrial livestock production, in the hands of a small number of multinationals and using only a small number of animal breeds, has, in the recent past, been growing seven times faster than small-scale farming in the Global South, according to the FAO (2007).[15] As a

14 See e.g. a 2012 column in the New York Times: https://bittman.blogs.nytimes.com/2012/07/11/fao-yields-to-meat-industry-pressure-on-climate-change/.

15 Gene banks are often seen as a solution for keeping the genetic variety of livestock and therefore providing resistance to diseases or challenging climate conditions. However, Gura (2010) notes that this may be creating only an illusion of safety. Frozen tissue in gene banks collected from disease-resistant animals cannot keep up with the adaptations that diseases

result, small-scale animal farming with diverse species is gradually being pushed out by intensive farming with uniform species (FAO, 2009).[16] All in all, meat production is the number one threat to global biodiversity and species loss (Machovina et al., 2015). Figure 2.3 illustrates the enormity of the global extent of animal agriculture. According to the estimate provided by Smil (2011), out of all the mammal biomass on land in the year 2000, only a tiny fraction consisted of wild animals, with around a third of total biomass being humans and nearly two-thirds domesticated animals.[17]

Figure 2.3: Global biomass of humans, wild terrestrial mammals and domesticated animals, 1900 and 2000



Source: Based on Smil (2011).
Notes: Data in million tonnes of carbon; estimates for humans, domesticated animals and cattle in 2000 are relatively the most accurate.

Relevant to the issues above, the *efficiency* with which the energy contained in the inputs in typical intensive animal agriculture is converted into energy in the outputs is exceedingly low. According to Smil (2002), for example, 97% of gross energy in the feed for cows in the United States is *not* converted into beef.[18] The European Union imports four-fifths of the protein-rich feed (Westhoek et al., 2011), therefore exporting the problems created by the high demand for energy and other inputs for the feed, as well as the problem of land-use change. Comparing the production and transport of 84 food items in a thorough review, Gonzalez (2011)

themselves make in the real world, and climate change poses a threat to gene banks. New breeding technologies, such as cloning, further reduce the livestock gene pool.

16 Climate change further threatens small-scale animal farming, as severe draughts make pastoralists abandon livestock production (e.g. FAO, 2009).

17 Another recent estimate from 2018 (Bar-On et al.) confirms these proportions, with 4% of terrestrial mammal biomass being wild animals, 60% domesticated animals, and 36% humans.

18 For pork, the number is 91%, and for chicken meat, 89% (Smil, 2002).

concluded that animal-based foods are overall much less efficient than plant-based foods in terms of protein delivery when measured in energy use or emitted GHGs. A third of all calories and a half of all the plant proteins produced globally is fed to animals (Cassidy et al., 2013), instead of humans.

The vast increases in the production and consumption of meat observed in the last half a century, and the widely expected further increases for the future decades carry massive impacts. The future increases are generally argued to be related to the expected rise in world population to nearly 10 billion by 2050,[19] and expected increase in living standards and more intensive meat production, especially in certain countries in the Global South bringing about higher per capita meat consumption. Such increases in a business-as-usual system would greatly worsen the current negative impacts from intensive meat production and consumption, making, for example, addressing catastrophic climate change impossible (see e.g. Kim et al., 2015). The FAO estimate of 455 Mt for the level of meat production in 2050 is a 75% increase from the level in 2005 (Alexandratos & Bruinsma, 2012). If this production level would be realised without tackling the GHG emissions from meat and dairy, while simultaneously following the path to lower emissions from other sources so that the target warming level of 1.5 degrees of centigrade would not be exceeded, 81% of all global GHG emissions would come from the meat and dairy production (GRAIN-IATP, 2018).[20]

Considering the above, the FAO growth estimate does not, in fact, seem feasible within the current frame of science, technology and society. Transforming the meat production methods to adequately respond to the issues most likely has to be coupled with a radical reduction in meat production and consumption itself, if not an actual elimination of the current intensive meat production methods entirely. A recent estimate contained in Springmann et al. (2018) indicates that the planetary boundaries[21] would be far exceeded in the next decades without changes towards more plant-based diets. As Garnett (2017) argues, however, the issues described in this section need to be addressed in an integrated way, rather than by dealing with one problem, such as GHGs, at a time. In any case, alternative protein sources will likely have to be developed further, as well as incorporated into our everyday lives, on a large scale for a transformation towards a feasible future.

19 A 2017 median estimate from the UN is 9.8 billion (from https://esa.un.org/unpd/wpp/Graphs/Probabilistic/POP/TOT/). To compare, in 1960, around the early stages of intensive animal agriculture, the world population was at 3 billion.

20 This scenario is relying on the potentially low 14.5% estimate of the current contribution to total emissions.

21 Planetary boundaries related to GHG emissions, cropland, blue water, nitrogen and phosphorus.

On the one hand, addressing this complex issue adequately seems a huge challenge, especially viewed from the production side; on the other hand, it would seem rather possible, and even "easy",[22] for people in the industrialized, or newly industrialized countries to experiment with, or adapt to new foodways for themselves, considering the motivating evidence against continuing with the current path. People could, in principle, gradually, if not abruptly, just eat less or no conventional animal-based meat, whenever they have alternative plant-based proteins to eat. However, food, or meat eating in particular, cannot usually be dealt with purely at a rational level, as firstly, eating any food involves many more non-rational factors such as social rules, cultural meanings, emotions, and values, secondly, it is largely one of the automated habits and path-dependent practices embedded in the everyday environment people live in, and thirdly, the related industries do their best to give us sub-conscious cues to get us to eat more meat. Further, most people do not want to stop eating meat (e.g. Wellesley et al., 2015; Zaraska, 2016a). Importantly, the topic of eating less meat is rather controversial, still a taboo subject in politics very recently (Lang et al., 2010), and even today "few governments talk even privately of 'hard measures'" (Lang, 2017:330) in meat policy in relation to issues such as climate change and biodiversity.[23]

In addition to formulating a conceptual outline of social practices more generally, this book will consider the role of discourses in connection with the above-mentioned obstacles, and I will explore how discourses around the new meatways, in particular, could enable conscious and radical meat reduction, both at individual and at societal levels. However, first, the next sections will look at some available data on the past and current meat-eating practices, and what may have influenced the practices. I consider these issues relevant to this book, as they have an impact on discourses around meat.

22 See Goodland (2014) using the word "easy", or https://theconversation.com/reducing-meat-and-dairy-consumption-easier-said-than-done-or-easier-done-than-said-4317 by Richard Twine (in The Conversation, 24 November 2011) encouraging experimentation of different diets regarding meat.

23 One recent exception is the Dutch government which has started steps into reducing livestock in the country due to major issues with nitrogen pollution (see e.g. https://www.sciencemag.org/news/2019/12/nitrogen-crisis-jam-packed-livestock-operations-has-paralyzed-dutch-economy). What governments can do more generally is discussed further in Section 2.3.

2.1.2 About meat eating over time

2.1.2.1 A short history of (not) eating animals[24]

From prehistory of the human species, through the beginnings of livestock farming around 9000 BC (Nam et al., 2010), until around 1950 AD (Aiking, 2011), eating meat used to be considered a luxury for most people at a global level, rather than everyday practice. However, there has been a lot of variation in how much meat has been eaten. Firstly, cultural, geographical, and economic differences have had a role in eating, or not eating, meat for millennia, so that for example in Europe, the northern (Germanic and Celtic) cultures were consuming more meat than the southern (Roman and Greek) cultures, more dominated by agriculture (de Boer et al., 2006). Further, in medieval Germany, for example, the level of meat eating was very high for a considerable period of time, especially since people often got their pay in meat instead of money (Bork, 2006). More generally in medieval Europe, people ate meat whenever they got hold of some, and abstaining was seen as a sign of religious heretics, possibly leading to being killed (Zaraska, 2016a). In the United States, eating large amounts of meat on an annual basis was commonplace already in the early 19th century (Smil, 2013), due to the large amounts of wild animals and land for grazing cows, although meat was still more available for the wealthy than to the poor. In Argentina, the historically high consumption of meat in the last centuries has been largely a consequence of the Spanish invasion in the 16th century (Boyer, 2016).

York and Gossard (2004) emphasize the impact of the ecological contexts — factors such as climate and resource availability — and their link to cultures that have developed over time within each context. For example, in Asia, those living in coastal areas would be traditionally eating a lot of fish, those living in hot and humid climates would develop eating cultures around largely vegetarian foods. Medieval Japan, on the other hand, was largely vegetarian due to a shortage of land on which to grow food for domestic animals, although religion played a role too. Similarly, much of the Chinese diet was traditionally vegetarian due to lack of land, but culturally, China was more oriented towards eating meat (Zaraska, 2016a).

The advance of science in the Western world from the 17th century onwards strengthened the belief that humans must dominate nature, and around the same time, the average amount of meat eaten started gradually to rise. Associated with this were frequent claims from the scientific community saying that meat was a source of "strength and vigour", more so than any other foods. With the advances in refrigeration and transport technology in the mid to late 19th century, meat

24 This section will also cover some history of vegetarianism, as it is important for the discourses around both eating meat and not eating meat. Discourses as such will be the topic for Section 2.2.

consumption levels rose further (Fiddes, 1991). The 20th-century world wars ended up promoting meat as a prized food, preceding the meat industry's rise after World War II.

In human history, those who have not eaten meat have usually done so because they have not had any choice. For example, due to their poverty, many have not had access to meat, but when given the chance, they have happily engaged in meat eating. Moreover, there have long been those who have not eaten meat because of cultural, philosophical or religious reasons, such as the Pythagoreans in ancient Greek, or many Hindus in India. In present-day India, around 30% of the population report being vegetarians, according to an Indian government survey from 2014.[25] As Leahy et al. (2010) argue, those not eating meat out of religious reasons, for example, have generally not *chosen* to be vegetarians, but they have been born into vegetarianism. For example, in India, the principle of *ahimsa*, nonviolence, prohibits eating meat within much of Hinduism, Jainism and Buddhism, as harming animals makes a person spiritually impure (Zaraska, 2016a).

The estimate in Leahy et al. (2010) is that 22%, or around 1.5 billion people worldwide, are vegetarians, mostly out of necessity. In contrast, they estimate that out-of-choice vegetarians would number globally only 75 million, or around 1% of the current global population. While the proportion of out-of-necessity vegetarians may have decreased in the last years since these estimates, (see Section 2.1.3 and the discussion on the protein transition), the proportion of out-of-choice vegetarians is likely to have increased somewhat, trends recognized by Leahy et al. (2010) as well. Interestingly, the Faunalytics study (Asher et al., 2014) indicates that there are five times as many *former* vegetarians and vegans in the United States as there are current ones. If the same phenomenon is true at a more international level, there could be a couple of hundred million former out-of-choice vegetarians or vegans in the world.[26]

In modern times, abstaining from meat as a choice existed in some form in different countries, but as a larger movement it has roots in the United Kingdom going back to the late 18th century (Shprintzen, 2011), originally as part of Christian mysticism, but also as a means for curing medical illnesses. It spread from there to the United States in the early 19th century, by which time it had transformed itself to more a movement for social reform. Around the middle of the 19th

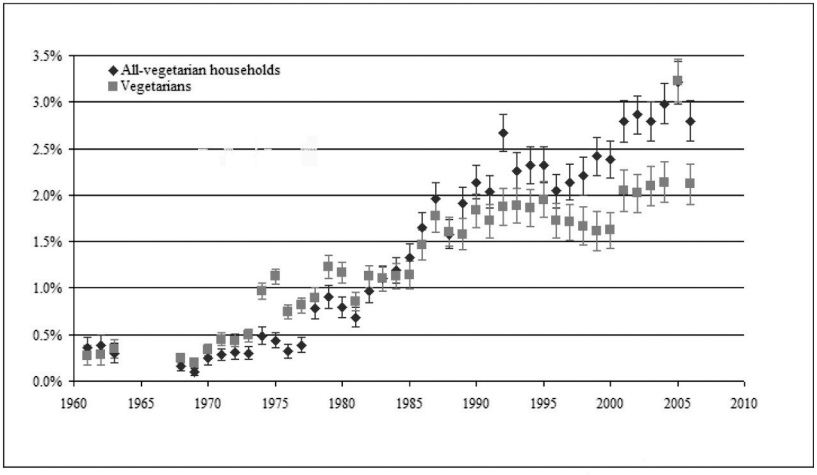
25 This data is from Office of Registrar General & Census Commissioner of India, sample registration system (SRS) baseline survey 2014, and covers all those above 15 years of age. The proportions vary between different Indian states from just over 1% to well over 70% of the population being vegetarian. Note that, in India, a person is *not* counted as vegetarian if s/he eats eggs.

26 According to the Faunalytics study, these former vegetarians and vegans currently eat mostly a flexitarian diet.

century, there was a period where resistance to the radical vegetarian movement created (in the popular media of the time) an image of vegetarians as "frail, weak and sexually impotent" (Shprintzen, 2011:9).[27] By the end of the 19th century in the US, however, vegetarianism "emerged as a way to build individual character and personal health in order to succeed in a society driven by personal gain and monetary advancement" (ibid.), and the lifestyle was connected to physical strength, fitness, athletics, individualism and masculinity. Although numbers of vegetarians remained small, there was a growing commercial interest, and food products (meat imitations) and vegetarian restaurants were marketed to consumers. During American involvement in World War I, meatless meals were encouraged by the United States government as patriotic, in practice saving more meat to be sent to soldiers in Europe.

Regarding ethical vegetarians, an early example includes Leonardo da Vinci (McCurdy, 1932, in Fiddes, 1991), and later on, in the 19th-century Europe, there was an anti-cruelty movement focusing on the immoral treatment of animals. The modern ethical movement is different from this, however, as it tends to put humans more at the same level as non-human animals, instead of assuming that cruelty is wrong only after absolute human needs have been satisfied, as was the case for the 19th-century movement.

Figure 2.4: Vegetarians over time in the United Kingdom



Source: Leahy et al. (2010).

27 Throughout this time, for the mainstream, meat was associated with strength (Fiddes, 1991).

The first vegetarian society (and the term *vegetarian*) was established in the United Kingdom in 1847, and the UK has the most longitudinal data to-date on estimates of numbers of vegetarians, dating back to the early 1960s (Leahy et al., 2010, see Figure 2.4). A 2016 estimate of the number of vegetarians in the UK is 3.25%.[28]

It is usual to categorize modern out-of-choice vegetarians into either mainly ethical vegetarians or mainly health vegetarians (Ruby, 2012), although the motivations people express for their vegetarianism often depends on the social situation in which they express them (Wilson et al., 2004).[29] People may be increasingly likely to make their actual dietary choices considering the entire variety of problems related to food production and consumption, therefore including the environmental issues (Spaargaren, Oosterveer, et al., 2012a). These problems are increasingly part of the current discourses around meat, explored later in this chapter.

Of late, there is an increased presence of vegetarianism and veganism in the public discourses (as discussed in Section 2.2.2). The meat consumption numbers still do not reflect this in actual eating practices, however.[30] The countries reportedly having the largest proportion of people identifying as vegetarians or vegans at the moment, apart from India, include Germany, Switzerland, Israel, Australia and Taiwan, all around or above 10%. However, the results vary from survey to survey and are unlikely to be comparable.

It is noteworthy that vegetarianism as a practice and discourse around vegetarianism are quite apart from each other. This may be partly due to this particular discourse being shaped more by those not actually engaging in vegetarian practices themselves, so for example, by criticism. As I see vegetarianism as an important counterpart to the meat system, I have covered it in this section and will cover it also in Section 2.2 about discourses. Moreover, as regards my empirical analysis in Chapter 5, I will briefly focus on vegetarianism there as an important theme in the discourse.

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28 See https://www.vegansociety.com/whats-new/news/find-out-how-many-vegans-are-great-britain.

29 A related issue, *motive alliances*, appealing to combined benefits of reduced meat eating to health, animals, and environment is considered to be useful (e.g. by Hartmann & Siegrist, 2017; Belz and Peattie, 2009; de Boer, Schösler et al., 2013).

30 FAOSTAT, the frequently used source of fairly comparable global data on meat eating, generally lags several years behind in its publicly available data. As of June 2020, meat consumption data is generally only available until 2013, and does, therefore, not show trends that might have taken place since then. Whether there is actually a decreasing trend taking place, globally or regionally, still remains to be seen. But an indication that the numbers for meat consumption may not have gone down much is that in countries such as Germany and Finland, the national level data shows that meat consumption stayed more or less stable until 2018, despite the vegetarian or vegan "trends".

2.1.2.2 The rise of industrial meat

The rise of industrialized animal agriculture after World War II, the associated increased availability and decreased prices for meat, the (especially US) government policies, as well as industry marketing and advertising, all encouraging meat eating, and the psychological distancing of animals from their flesh through the separation of industrial meat production far away from most people, all resulted in meat eventually becoming an everyday food item for nearly all those living in the Global North, and increasingly for many in the Global South. Regardless of the new everyday character of meat as a food item, it retained its central celebrated role at the centre of the plate. Apart from the enormous increases in overall consumption of meat, in what is lately called the *protein transition* (see Section 2.1.3), the most obvious change has been in chicken meat replacing beef to a significant extent. In other words, levels of per capita chicken consumption started rising faster from around 1990, near the time when per capita beef consumption started decreasing.

De Boer et al. (2006) argue that factors mainly related to globalization, such as increases in the equality of national incomes, global food trade, and internationalization of both industrial animal agriculture and eating habits, have evened out differences in meat consumption between countries, although many differences remain. Figure 2.5 shows trend lines for meat consumption for 12 different countries, representing a variety of societies and cultures from industrialized, or newly industrialized countries.[31]

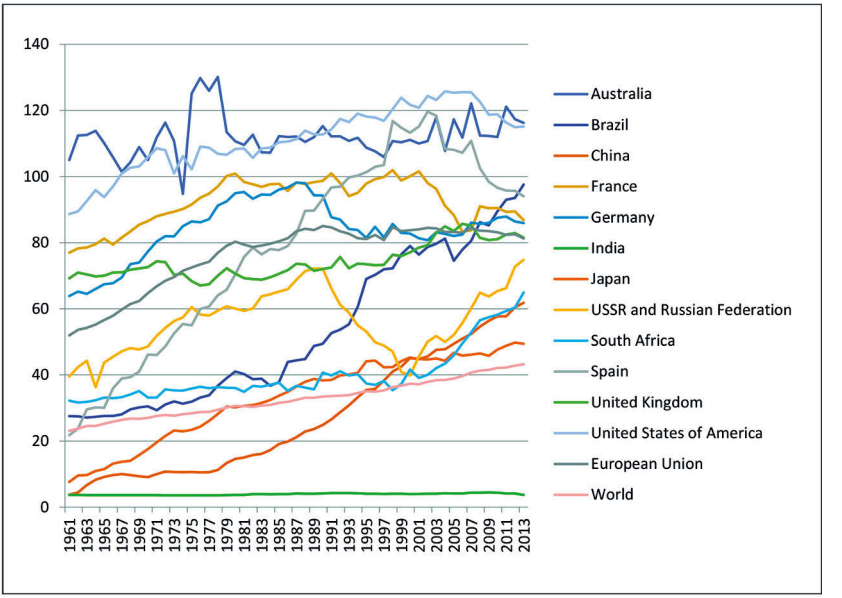
Excluding India where per capita meat eating has not essentially changed (but see later in this section), Figure 2.5 shows that most industrialized or newly industrialized countries have not only increased their meat consumption over the last half a century, but to some extent, approached each other's levels of consumption. Consequently, some of these 12 countries have stabilized their per capita meat consumption, and some are, in fact, consuming slightly less meat per person now than they were 5-10 years ago, while others have been consuming increasing amounts nearly throughout the 50 or so years.

In Europe in 2013, every EU citizen was "supplied" with 81 kg of meat on average, of which she/he actually ate about two thirds.[32] After a longer period of growth, the total per capita meat consumption in Europe has not changed much in the last 25 years, but there is still much variation between countries. For example, by the late 1990's the average Spaniard ate more than five times as much meat as he/she

31 These same countries are also those chosen for the first ever large cross-country survey on public attitudes on meat contained in the Chatham House Report (Wellesley et al., 2015), except that Italy and Poland have been replaced by Spain and Australia, adding more variety to the data.

32 See Box 2.2 for how supply and consumption figures are related.

Figure 2.5: Per capita meat supply in various locations from 1961



Source: FAOSTAT.
Note: Data in kg/person/year; data for USSR ends in 1991, and data for the Russian Federation starts from 1992; for the difference between supply and consumption, see Box 2.2; all food and agriculture-related data from FAOSTAT is available from 1961.

did in 1961 (at that time more along the lines of the Mediterranean diet[33]), but since around 2000, the consumption has come down somewhat. The average French or German eats slightly less meat now than they did 20-30 years ago. On the other hand, the average British person has eaten fairly stable and large amounts of meat throughout the half a century, although the average amount increased somewhat 10-15 year ago.[34]

33 The Mediterranean diet refers to food consumption patterns typical of some Mediterranean regions in the early 1960s, such as Crete, other parts of Greece, Spain, southern France, and southern Italy. The diet emphasizes relatively low consumption of red meat, among other things (Tyrovolas & Polychronopoulos, 2010).

34 The discourse data for the empirical analysis in Chapter 5 comes for the most part from the UK. The notable changes over the last half a century in the UK include a sharp increase in eating chicken, a slow decrease with sheep and goat meat — although the UK still remains one of the countries with most per capita consumption of sheep and goat meat — and a temporary dip in the 1990's (during the time of the BSE crisis) in the otherwise slower decline with beef. The pig meat consumption has remained rather stable throughout the time period.

Outside Europe, the average American and Australian have eaten the most meat compared to those living in the other 10 industrialized, or newly industrialized countries in Figure 2.5. Japan started from very low levels of meat consumption in the early 1960s, and currently, the average Japanese eats an amount just above the world average.[35] Lastly, China started from very low meat consumption levels in the early 1960s, well below the Japanese and at the same level as India, but has climbed steadily upwards, especially since the late 1970s, and the trend line seems to point to the average Chinese reaching the level of most Europeans in the next decade, unless the trends change direction in the near future.

Due to its still very modest level of meat consumption, India is seen by the global industry mainly as a potential future market for meat consumers, although a very large one at that. The per capita consumption of meat in India is projected by the FAO to grow six-fold, from an extremely low current base of 3 kg/year to around 18 kg/year by 2050, most of which would be chicken (Alexandratos & Bruinsma, 2012). Eating meat in India (or "non-veg", as meat is traditionally called there) is increasingly seen as part of a modern and successful lifestyle, with the appreciation for the meat-eating West replacing the previously highly valued Indian vegetarian elites (see e.g. Zaraska, 2016a). Further increases in industrialization, urbanization, growth of supermarket chains, mobility, and secularism are likely to drive growth. It is therefore currently more popular in India to change from veg to non-veg, rather than the other way around, although out-of-choice vegetarianism is an existing phenomenon in India as well. In fact, Bajzelj and Bothra (2016) refer to a "tug of war" between the veg and non-veg groups in society, tangled with the special status of cows, and going up all the way to the top political circles, illustrated by the 2017 attempt by the government to ban beef exports.[36] At the same time, the Indian governments have generally welcomed investments from foreign meat industry companies (Bajzelj & Bothra, 2016), and it is likely that, unless strong and swift political action is taken to prevent the formation of networks of global industrial actors (similar to developments in China), and an alternate path for future protein in India is chosen, the projections for growth may be realised. India's rapid

35 The Japanese differ from other industrialized countries in the world in their consumption of fish and other seafood. The average world citizen has been eating about twice as much meat as fish over the last decades, but the average Japanese has until lately eaten much more fish than meat, up to six times as much in the early 1960's. However, Japan is at a point in time right now when meat and fish consumption are at the same level, or in fact, for the first time in 2013, meat consumption was slightly higher than seafood consumption.

36 See e.g. https://timesofindia.indiatimes.com/topic/beef-ban.

recent rise to be one of the world's top beef exporters[37] is already a big challenge from a sustainability point of view.

An important point for the discussion about increasing global meat consumption is that the recent increases have not been evenly distributed among the *new middle classes* in the Global South.[38] For example, Lange (2016) notes that such increases are rather unevenly distributed, firstly, in the sense that many of the countries in the South are increasing their average meat consumption only marginally, whereas others are increasing it substantially, and secondly, within the higher meat consumption countries (such as China), there is a vast amount of variability, due to various cultural, geographical, political or other factors. However, in addition to the current individual meat eaters eating more meat, there is a large group of people, 1.45 billion, according to Leahy et al. (2010), who are not current, but potential future meat eaters. In other words, these people have been eating a vegetarian diet until now, mostly only out of necessity. This very large group of people could have a significant impact on future trends. In China, some of the substantial recent increases in meat consumption may have been due to the rise of the new middle classes there, benefiting from government policies opening markets to foreign investment in industrial animal agriculture since the late 1970s (MacLachlan, 2015).

Box 2.2. Between production, supply and consumption of meat

There are certain differences in how data related to meat production, supply and consumption is presented in various sources and publications, and what the numbers entail.

One relevant issue is how losses during the *food supply chain* are dealt with and reflected in the data. There are still large data gaps regarding how much food exactly is lost or wasted in the various food supply chains. According to the FAO (2011), about one-third of all food produced, and more than a fifth of meat, is lost or wasted globally, more or less equally in the Global North and the Global South. However, in the North, the main losses take place mostly at the end of the food supply chain, within distribution and consumption. These are defined as *waste*. On the other hand, in the South, the main losses take place at the beginning and middle of the food supply chain, in

37 FAOSTAT data indicates that over five years from 2008 to 2013, India's total meat exports tripled. These exports are almost exclusively of buffalo meat (categorized as beef), and India is now on par with Brazil as the two largest bovine meat (beef) exporters in the world.

38 The new middle classes in the Global South are not "rich" if measured against a Global North standard. Their average absolute income level borders the income of the low-income groups in the North. However, they generally have enough money to buy household appliances (TVs, computers, etc.), and meat.

production, handling and storage, and processing and packaging, together defined as *losses*. For the meat supply chain in the North, waste at the consumption level makes up about half of total meat losses and waste. According to the FAO (2011), as a total, about 24% of edible meat and meat products are lost in the European food supply chain for meat and meat products, between the farm, the dinner plate and the waste bin.

How losses and waste are considered in statistical data on food varies. The FAO *meat supply data*, used for the figures in this section, takes estimates of at least some of the food losses between production and household into account. However, losses during the consumption stage are not included, due to the lack of accurate data up to now. The FAO defines "food supply" data as estimates of food supplies available for human consumption, and remark that "it is important to note [...] that the amount of food actually consumed may be lower than the quantity shown", depending on the degree of losses and waste, e.g. during storage, in preparation and cooking etc. (http://www.fao.org). Presumably, also institutional waste occurring at the consumption stage (in restaurants, schools, hospitals etc.) is not accounted for, and it is unclear whether retail waste is included or not. The losses and waste not accounted for by the FAO can be estimated to be roughly 10-20%.

Finally, it is important to note that the FAO includes much of the bone in the animals in the meat supply data. The FAO data is expressed in *carcass weight* at slaughterhouse exit level (Westhoek et al., 2011). However, different animal species, different types of the same farmed species, and different cuts of the same animal all have different quantities of bone in them. Westhoek and colleagues give a rough estimation of a live cow consisting of about 45%, a pig 55%, and a chicken 60% of *retail meat*. Moreover, comparing retail meat to the FAO carcass weight data, the proportions for different species are 70% for cows, 75% for pigs, and 80% for chickens. Finally, the actual meat consumed after processing and cooking, and taking further losses into account, is around 80% of the retail meat.

In much of the literature using FAO data, "supply" has been taken to represent "consumption", and the latter word is used mostly in this book as well. To get the actual average human consumption based on the FAO supply figures, roughly a third should be deducted, so that the eaten meat is about 60-67% of the FAO supply data, depending on the species in question, according to Westhoek et al. (2011). To note, Hallström and Börjesson (2013) provide a critical discussion on meat consumption statistics and discrepancies within it.

After this review of the actual consumption trends, the next section will look further into potential past influences, along with potential future influences on how and whether people will use animals for food, mostly through a brief review of literature. Understanding influences on meat eating in the past, present or future are

relevant to the sustainability of human life on Earth. How could the global society respond to the meat crisis, radically reduce or change the way meat is produced or eaten, or perhaps eliminate eating animals altogether?

As the Chatham House Report (Wellesley et al., 2015) and others have argued, the necessary and radical future change in responding to the meat crisis cannot apply in just the Global North, where large quantities of meat animals have been used for food for quite some time already, but it has to also take place in the newly industrialized, or industrializing countries in the Global South, where plentiful meat is a much more recent, but often equally problematic phenomenon. The change must be global in its reach.[39]

Finally to note, the industrial production and largely unsustainable consumption of dairy foods, eggs, and seafood, in addition to the overuse of wild seafood, share many of the related environmental, human or animal welfare or ethical issues with those related to meat eating. A shift away from the overconsumption of also other animal-based foods to a more plant-based diet is therefore important (see e.g. Verain et al., 2015). However, these topics cannot be covered in this book, as the scale and scope of the work would be too large.

2.1.3 Potential influences on meat consumption

To some extent, it is possible to evaluate or measure what might have contributed to different levels or trends in meat eating, for example, the often, but not always upward trends in the last half a century, as shown by the graphs in the previous section. In the following, I will consider the discussion in literature.

The ***level of regions and nations***, or the ***global level***, is where changes up or down in meat production and consumption have their main impacts, and at this level, only larger and more persistent trends are significant. The discussion is largely based on connections (e.g. correlations) between different factors that could influence meat consumption. Critical literature on meat production and consumption has also grown in recent years around the growing awareness among the research, media and sometimes even policy communities of the enormous problems related to the global meat complex, as discussed earlier.[40]

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39 Important to note is that the low levels of meat consumption in the least economically developed countries in the process of industrializing often still reflect lack of adequate amounts of protein. Moreover, domesticated animals are used in these countries (as well as in some newly industrialized countries) for purposes other than meat or dairy (or leather, wool etc.), as labour or as economic security, for example, and discussion on changing this system would involve issues beyond the reach of this book.

40 Wellesley et al. (2015) provides an often-referenced report and discussion on the larger trends.

The most dominant factors regarding meat production at this level are often identified as linked to *demand*. There is an obvious demand effect from increasing population, and consequently more people needing food of any kind. However, apart from as a consequence of population growth, demand for meat is generally expected to increase (and these correlations are found) with an increasing *standard of living* linked to *urbanization* and a decreasing *price of meat*, with globalization regarded as the general engine behind much of the other factors, for example, through increased international trade and investment. These three factors are discussed in the sub-sections that follow.

The critical voices regarding this demand focus, on the other hand, are calling more attention to the influence from *industry*, either in terms of the industrialization process itself, in terms of lobbying pressure on governmental policies, in terms of influencing academic research (Nestle, 2018), or in terms of direct marketing and advertisement to consumers. These criticisms are partly incorporated into the following three sub-sections and partly follow as a separate sub-section on the demand vs. supply issue.

There are also *demographic factors* that are linked to the ***level of the individual*** and do not necessarily reflect differences at the level of nations or regions. These include education, age and gender. For example, older age and female gender have both been linked to lower consumption of meat (e.g. Lea & Worsley, 2001), and higher education has also been linked to lower consumption of meat (Regmi & Gehlhar, 2001). The level of the individual is crucial for change, and I will discuss it after the sections focusing on macro-level influences.

Further, *cultural factors* play a significant role in influencing larger trends in meat eating. At least within Europe, cultural and national differences in meat eating may be larger than the demographic or socioeconomic differences within cultures or geographical areas (Evans & Miele, 2012). Culture will be referred to in the following sections when appropriate.

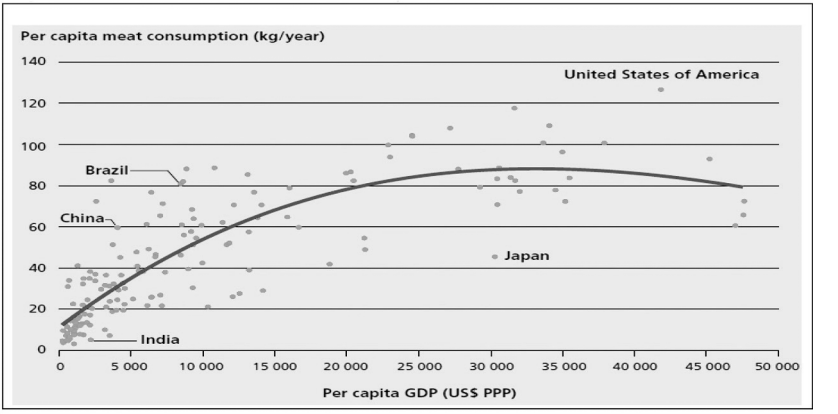
Finally, and partially linked to culture, further large-scale changes to the levels of meat consumption come from factors which can be seen at the ***level of discourse***. Here influential may be food scares, such as the BSE crisis in the United Kingdom in the 1990s, the more general unhealthy image of red meat, and concerns regarding factory farming or climate change. Importantly, discourses can be seen to integrate the individual level with the society, i.e. the regional, national or global level. Section 2.2 will explore discourses around meat.

2.1.3.1 Standard of living — The protein transition

Globally speaking, the biggest phenomenon to do with income and nutrition in the last decades is argued to be the *protein transition*, whereby meat consumption is said to rise together with the rise of economic development and rising incomes.

Although a rising GDP (gross domestic product) per capita — as an indicator of standard of living — may not be claimed to directly cause rising meat consumption levels, a positive association between GDP and meat consumption can be found (see e.g. FAO, 2009; Smil, 2002; York & Gossard, 2004), as the mostly rising curve in Figure 2.6 illustrates.

Figure 2.6: Protein transition — Meat consumption vs. GDP



Source: FAO (2009).
Note: GDP per capita is measured at purchasing power parity (PPP) in constant 2005 international US dollars.
Based on FAO data for per capita meat consumption and the World Bank for per capita GDP.

However, such a positive link (as in Figure 2.6) is more valid at the global level, and not nearly always seen at national levels (see e.g. Wellesley et al., 2015). The relationship between income and meat is, therefore, more complex, even when considering the protein transition an inherent development in human societies.

For example, it is acknowledged that sociocultural factors can have more influence than income growth, as can be seen from countries such as India and Japan (see Figure 2.5), where for India, the level of meat consumption has remained extremely low despite rapid income growth in significant parts of the population in recent decades,[41] and for Japan, where a moderate meat diet has prevailed to some extent, despite Japan being an overall high-income country already for decades. Further, the Chatham House Report (Wellesley et al., 2015) found out in their survey of 12 countries that affluent respondents in China and India (where historically meat has *not* been widely eaten) were more likely than lower earners to want to eat more meat, but in Brazil and South Africa (where meat *has* traditionally been

41 But see Section 2.3.1 for the future of India.

central), higher earners were less likely to want to eat more meat than low earners, similarly to many Global North countries, such as France, Germany, the United Kingdom or the United States.

Correspondingly, York and Gossard (2004) note that on average, people in the Global North and the Middle East have tended to eat more meat the wealthier the nations have become, whereas at least in some parts of Asia, people tend to shift towards eating more fish, rather than meat, when they become wealthier.

As argued by many by now, GDP does not measure human well-being adequately. To explore an alternative, Pradhan et al. (2013) analysed food consumption data in detail for the last half a century for all the countries in the world, using the Human Development Index (HDI) instead of GDP. Interestingly, they found that, similar to GDP, also HDI correlates strongly and positively with the consumption of animal products *at a global level*.

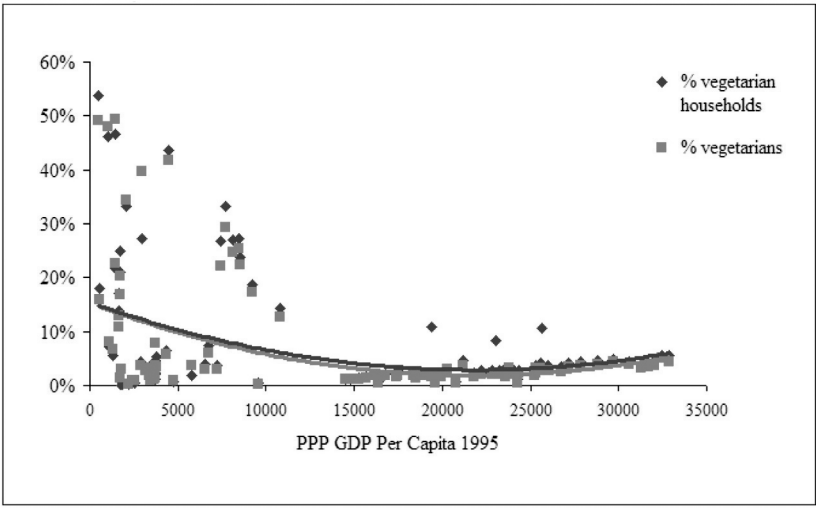
It has also been presented — and the curve in Figure 2.6 would also seem to support this — that meat consumption increases with income according to a Kuznets curve, an inverted U-curve (see e.g. Cole & McCoskey, 2013) or an S-curve (Keyzer et al., 2005; Westhoek et al., 2011), and this curve may already be in the downward or levelling off part in certain countries, especially in the Global North. At some point, so the theory goes, people with higher income cease to regard meat as a sign of wealth, or they start to view eating more meat in a negative light (for various reasons), and therefore, they reduce their meat consumption. According to Popkin (1999), the final stage of a five-stage nutrition transition (where different stages can also co-exist) in effect takes diets back to eating less meat, more unprocessed and simpler foods in general. This would also seem to be in line with the recent fairly stable, or slightly decreasing meat-eating trends, for example, in some European countries. However, for most countries, according to these analyses, the time to reach the income level where consumption would turn down would still be long, and much too long to help with the current global meat crisis (Cole & McCoskey, 2013).

Finally, Figure 2.7 shows results from a study estimating the number of vegetarians and comparing this to income levels at a global level. As can be seen, the inverted U-curve in Figure 2.6 above matches rather well with the U-curve in Figure 2.7, so that the rising part of the curve in Figure 2.7 could reflect the fifth stage of the nutrition transition (Popkin, 1999).

Leahy et al. (2010) distinguish between out-of-necessity vegetarians as those on the downward part of the curve in Figure 2.7 (eating meat when given the chance), and out-of-choice vegetarians as those on the upward part of the curve (increasingly not eating meat).

I would conclude that, while increased income may often lead to more meat being eaten (when it is available), the relationship is more complex, and so, this is by no means an absolute rule. The Kuznets curve, even if reflecting a real phe-

Figure 2.7: Vegetarianism and GDP per capita in different countries



Source: Leahy et al. (2010).
Note: In international dollars.

nomenon, is not, however, practicable as most people, or nations, have not reached the level of income at which meat consumption might start decreasing, as also noted by Cole and McCoskey (2013).

2.1.3.2 Meat prices

According to economic theory, and simply put, the lower the price of a desired item is, the more people will buy and consume it. Many (e.g. Rivera-Ferre, 2009; Westhoek et al., 2011) argue this to be the case with meat as well, in particular with lower-income population segments, and currently more generally in the Global South.

Similarly, when asked what people consider when buying food in a supermarket, price is often one of the top considerations, in addition to taste, health and food safety (see e.g. Wellesley et al., 2015). However, as discussed later in Chapter 3, most behaviour, including routine shopping, is automatic, driven by path dependency and subconscious decisions (based on intended or unintended cues in the environment at home or in shops). It may, therefore, be more that people *think* — or even that they prefer to answer a survey[42] saying that they think — they consider

42 See e.g. Hartmann and Siegrist (2017) for criticism about asking people's preferences about meat eating in surveys.

certain attributes, such as price or healthiness, rather than that they *actually* buy food items based on these attributes, and not some other attributes (such as the aesthetics of the packaging), while engaged in automatic behaviour.[43] In the Global North, prices are also considered to have less relevance for meat purchases than for some other commodities (e.g. PBL, 2008). On the other hand, there is some recent evidence that a tax on meat could be an efficient way to limit or reduce meat eating (Bailey & Harper, 2015; Springmann et al., 2016; Wellesley et al., 2015).

The falling trend in meat prices in the last half a century is most clear for chicken (see e.g. Rivera-Ferre, 2009) which used to be considered particularly luxurious meat still in the early part of the 20th century. At the same time, the last half a century has seen a steeper rise in chicken consumption over other meats in many countries, both in the Global North and South.

The sharp fall in chicken meat prices is, to a significant extent, due to the industrialization of poultry production since the 1950s in the United States and Europe (see e.g. Westhoek et al., 2011), and later also in the Global South, with the speed and scale of industrialization, and also the concentration and globalization (in terms of international trade) unparalleled by any other foods or food products (Marí & Buntzel, 2008). However, there are other, more controversial factors contributing to low meat prices, such as government subsidies, and intentional price dumping by the industry (e.g. Heinrich Böll Foundation, 2014). Also, the externalization of social, environmental or ethical issues arising from meat production in general keeps meat prices much lower than they would be, if these factors were calculated in (e.g. Gjerris et al., 2011). Fuchs et al. (2016) analyse in detail the power mechanisms at different stages of the meat supply chain artificially maintaining low meat prices.

The situation regarding artificially low meat prices is particularly extreme in the United States, as US agricultural policy, in terms of government subsidies to feed crops, makes feed grain and therefore meat cheaper than most other US foods. According to Donaldson (2016a), US meat is, in fact, cheaper than Chinese meat because of the subsidies. McMullen (2016) argues that Big Meat in the US has been supported by the government generally in three ways: with subsidies, advertising,[44] and nutrition advice.[45]

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43 However, most likely price nearly always has some influence on food purchases.

44 For example, the long running and still influential advertising campaign "Beef, it's what's for dinner" originated from a government supported advertising programme (McMullen, 2016:41).

45 Due to industry pressure, e.g. from the National Cattlemen's Beef Association (Simon, 2013), the 2015-2020 US dietary guidelines mainly failed to recommend eating less meat, although the advisory committee supported including a clear message regarding that (see e.g. http://www.npr.org/sections/thesalt/2016/01/07/462160303/new-dietary-gu-id-el-in-es--cr-ac-k--do-wn-on-sugar-but-red-meat-gets-a-pass). The advisory committee for the 2020-

In Europe, apart from chicken, meat prices have not decreased significantly in the last half a century when adjusted with a food consumer price index, i.e. when comparing changes in the price of meat to the changes in the average price of all food items. Kanerva (2013) correlates meat price and meat consumption data for several European countries and finds indications for some relationships between certain meats and certain countries. However, in the United Kingdom, for example, pork and sheep meat consumption have come down together with the prices, indicating that there may have been other, stronger influences on pork and sheep meat consumption. Rivera-Ferre (2009) has made similar observations for the United States from 1955 to 1995, where the consumption of chicken was correlated with price, but the consumption of beef and pork was not.

The policy of the Chinese government since the late 1970s of opening the Chinese market to foreign industrial meat producers (MacLachlan, 2015) has seen not only meat prices drop, but indeed consumption rise (in line with a governmental goal) to the extent that the government turned around in 2016, and issued new nutrition guidelines recommending only modest amounts of meat to be consumed, together with a campaign to curb the current excessive meat consumption, and its negative impacts on the population.[46] In China, lifting the population from poverty has coincided with a rise in meat production and fall in meat prices.[47]

Culture can, however, trump price, similarly to the case of the protein transition discussed above. Westhoek et al. (2011) explore the link between household expenditure and food culture. Southern European countries have traditionally spent considerably more money on food as compared to northern European countries, so, culture may have outplayed prices in southern Europe. Food in general has also occupied a more central place in people's lives in southern Europe, as opposed to northern Europe, where only in the last half a century food's cultural position has gradually gained importance (see also van Otterloo, 2012). De Boer et al. (2006) link this to the contribution of religion to food culture, as their study indicates that traditionally catholic countries in Europe have spent more money on meat than traditionally protestant countries, with the catholic culture appreciating meat specifically as a culinary pleasure.

A conclusion for this section is that meat prices are in many cases intentionally lowered to increase consumption, and while this approach often works (although

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2025 guidelines received criticism for ties to the food industry, see e.g. https://www.nytimes.com/2020/06/17/health/diet-nutrition-guidelines.html.

46 See http://www.fcrn.org.uk/fcrn-blogs/lucy-luo/new-chinese-dietary-guidelines-%E2%80%93-what-do-they-really-say-meat-consumption-and.

47 Recently, China has invested in cultivated meat, possibly seeing it as a partial solution for Chinese meat consumption (http://www.independent.co.uk/news/world/asia/china-israel-trade-deal-lab-grown-meat-veganism-vegetarianism-a7950901.html).

not always), the low prices are a significant problem in and of itself, as exemplified by the Chinese case.

Finally, I would note that price can, in fact, be seen as a supply factor. To explain, arguing that low prices push meat consumption up implies that the process does *not* start from increased demand pushing the industry to produce more (an argument often made), but from the lower prices produced by the industry creating the demand.

2.1.3.3 Urbanization

The degree of urbanization is generally considered to be strongly related to increased meat eating, through changes in lifestyles and diets overall, both in the Global North and increasingly also in the South (e.g. Rivera-Ferre, 2009). For example, double-income families, supermarkets and convenience meat products are linked to urbanization, and indeed, the enormous increases in the consumption of poultry over the last half a century are probably partly due to the convenience factor (Westhoek et al., 2011). Anderson and Shugan (1991) observed a while ago that the perceived high convenience was the main contributor for the shift from beef to chicken at that point in the United States, rather than perceived healthiness of chicken which is often argued to be the main cause for the switch. Likewise, Schroeter and Foster (2004) find that the higher the share of women in the workforce, the higher the consumption of chicken (and fish, which can also be quick to prepare) in the US.

With data for 132 countries, the regression results of York and Gossard (2004) indicate that urbanization generally does seem to increase together with not just chicken, but also total meat consumption. They, however, also emphasize that different geographical regions have had different impacts from the processes of urbanization. Rivera-Ferre (2009) remarks that the relationship between urbanization and increasing meat consumption is not as simple as it might seem, and urbanization is only one aspect in the expansion of industrial meat production. She argues strongly that the complex process is driven more by political and economic interests, than simpler forces such as urbanization.

In conclusion, although the standard of living, urbanization and meat consumption often rise together, and meat prices may have an inverted relationship with consumption, these trends may also be related to other simultaneous factors. Importantly, the industrialization of meat production through related factors, such as marketing and government subsidies for feed crops, may have both increased consumption and decreased prices. The following section explores further the basic chicken and egg question of whether demand for meat drives supply (as often claimed), or the other way around, as also discussed in literature.

2.1.3.4 Supply vs. demand

As an example, the report by OECD and FAO (2014:180) says that "it is mostly consumer preferences, together with income and population growth, that lead and drive the meat sector over time". This is still often an accepted paradigm, but some critical literature argues that consumer preferences are, in fact, largely created by industry marketing and advertising, and the availability of (convenience) products in supermarkets. Early criticism was provided by Galbraith (Galbraith, 1971, in MacLachlan, 2015).

Similar to Rivera-Ferre (2009) above, MacLachlan (2015) argues that the rising meat consumption especially in the Global South — often named the Livestock Revolution — is less a question of demand (from higher-income earners) and more a question of supply. In other words, the spread of both industrialized animal agriculture and supermarkets in cities in the Global South, combined with industry promotion, are driving meat prices down (while also driving grain prices up) and meat "demand" up. A similar process has taken place earlier in previously industrialized countries. He compares this supposedly "demand-driven revolution" to the Green Revolution which was "supply-driven" since it came about from the development of new forms of high-yielding cereal grains and technology transfer to the Global South. I would even argue that, unlike the Livestock Revolution, the Green Revolution could be seen as more demand-driven, since it was largely a response from the Global North to the food insecurity in the Global South.

Also Marí and Buntzel (2008) question the demand/supply relationship in meat. Rather than the increased demand creating markets for industrial meat production in the Global South, the intensification of meat production by large multinationals has created the markets that consumers have adjusted to. They argue further that the vastly increased international trade in chicken meat over the last half a century has also brought about an increase in chicken consumption, rather than the other way around. Rivera-Ferre (2009) also maintains that many development agencies have seen specifically industrial meat as a solution to both malnutrition and increased economic development in the Global South. Further, Zhou (2015) describes in detail how actions by the global meat complex together with government policies in the United States, China and Brazil (together called the Triangle) have shaped production and consumption in different, but equally demand increasing ways. The US has exported its successful model and related technology for industrial animal agriculture first to Brazil, and more recently to China, while also exporting large amounts of meat and feed (for Chinese meat animals) to China.[48] Brazil is the other major supplier of meat and feed to China. In both Brazil and China, the

48 In the early 2010s, the US domestic consumption of meat decreased due to increased exports, according to the USDA (Zhou, 2015). In other words, US consumption was driven by industry decisions to export to the new lucrative markets in China.

governments have seen the entry of the foreign (mostly US) meat industry as a very positive turn for their economies (see also Tian et al., 2016 for China).

One way to examine quantitatively the relationship between the growth of the global meat complex and consumption trends would be to look at developments in industry advertisement and marketing. Detailed data on industry advertisement or marketing expenses is, however, generally difficult or impossible to obtain from public sources, as companies are usually not obliged to disclose such data. Nonetheless, some research on the effect of advertising and marketing does exist. For example, Zimmerman (2011) concludes from his thorough review that both marketing and advertising have had a major, and perhaps the largest, impact on the obesity epidemic in the United States since the early 1980s, while excessive meat eating is related to obesity. Linking advertisement to meat eating directly, Brester and Shroeder (1995) performed a study whereby branded meat advertising had a clear increasing effect on meat eating.[49]

More generally, I would argue that it is not only the marketing and advertisement for specific meat products that increase meat eating, but these advertisements can be seen as a sign of the prevailing meat-eating culture (or carnism, see Section 2.2). Their mere existence is enough to have an impact on meat eating; if there were no advertisements, no marketing for any kind of meat or meat products, not in the media, and not in supermarkets or elsewhere, this could have a significant lowering impact on consumption, as it would likely play down the importance and visibility of meat. The acceptability and desirability of high meat consumption could also be lower in such a scenario, similar to the case of tobacco or alcohol advertising and marketing.

Finally, although often discouraging and challenging for sustainability, the demand paradigm — the default explanation by industries and also policymakers to the supply vs. demand question — could have an upside as well. Industries generally justify many of their actions by saying that the actions are a response to what their customers want. In some cases at least, this claim may be a way to justify either continuing with business-as-usual or doing something new. It can also be a form of "face saving", i.e. not having to admit that the industry needs some reorientation because of environmental reasons, for example. In the case of industries such as the global meat complex, it would indeed be quite possible in theory at least for the food industry as a whole to use such a face-saving justification for an orientation away from intensive animal-based food production, towards either

49 Nestle (2007) notes that the expenses on marketing and advertisement for any single nationally distributed food product in the US far exceed (often by 10-50 fold) the expenditure of the US government on the food pyramid, which supposedly promotes a healthy diet, as opposed to what the industry advertisements usually promote. See discussion on nutrition guidelines in Section 2.3.

(lower yield, but more pricey) extensive meat production, or towards some of the meat alternatives discussed later in this chapter. The scale of change necessary for the industry will be an enormous challenge, and all sustainable alternatives entail radical cuts to meat produced by slaughtering animals, as the Earth system cannot support current levels of meat consumption from organic or extensive meat production (see e.g. Stănescu, 2016).

2.1.3.5 The level of the individual

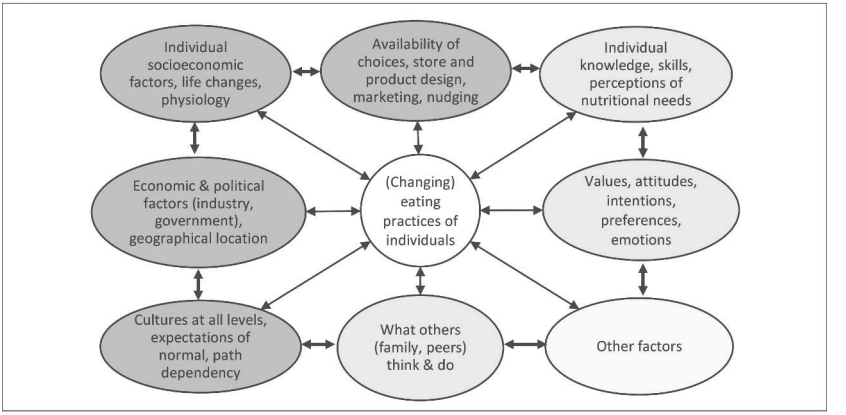
Factors, such as industrialization of meat production, lower prices, and pervasive industry influence, urbanization, increased income, globalization of Western food culture,[50] all indeed have had the potential to increase meat eating, at least to a point. Further, political factors, such as agricultural and food policies, often influenced by industry, and demographic factors, such as age, gender or education may play a role in influencing the level of meat consumption. Finally, food scares or concerns regarding factory farming, health or climate change can run counter to the increasing trends, with some potential to reduce meat eating, or to reduce some environmental or health impacts from eating meat, such as with a switch from eating beef to eating chicken.

Focusing on the level of the individual, all the different factors — and many others not discussed above and beyond the scope of this chapter — combine. Figure 2.8 illustrates different possible influences on meat eating at the level of an individual person.

Figure 2.8 demonstrates how complex the situation is. As regards quantifying the influencing factors, some of them, such as economic factors, can be fairly easily quantified. However, others, such as cultural factors, are difficult to measure, although they can be described. Some tacit factors may not even be describable, let alone measurable. Importantly, the factors also influence each other. For example, one's gender or life situation, or availability of money, will have some effect on how much importance the availability of different options in the shops has, and individual values regarding animal ethics will have some impact on how much the national food culture influences one's meat-eating practices. Balancing between different needs or values, for example, between family and animal ethics, or between cost and taste, also plays a very relevant role (see e.g. Evans & Miele, 2012; Sobal et al., 2006). Many factors often do not directly affect how people eat meat, even though they play their often very relevant part in the bigger picture. However, Shephard and Raats state that:

50 A Western diet is defined e.g. by Popkin et al. (2012:6) as "high intake of refined carbohydrates, added sugars, fats, and animal-source foods".

Figure 2.8: Influences on meat-eating practices at the level of the individual



Source: Figure by author.
Notes: The arrows are only illustrative, and mostly very little of the interconnecting relationships is actually known; the factors marked darker are discussed more in this section, and most of the factors marked in lighter grey are discussed more in Chapter 3.

> …because human food choice is influenced by so many potential factors, there is often a tendency to look at the impact of these factors in isolation rather than trying to arrive at some overall understanding of the interplay between different types of influences.
> Shephard and Raats (2006:ix)

The sheer number of factors, their qualities, and their complicated relationships with each other, make it, therefore, impossible to quantify such a model. It is largely a question of "drowning out by numbers" (Kasper, 2015:29).

To view the issue through a social practice lens, as in Chapter 3, the web of overall factors, as in Figure 2.8, is what makes how people act or behave relatively stable, but it is also what makes practices change on their own over time when different factors change. As Shove et al. (2012) argue, this coinciding stability and change is typical for social practices, of which meat eating is one. However, the crucial question for the near future is how the patterns of many unsustainable practices, including meat-eating related practices, could be purposively and radically changed.

Intentionality can originate top-down or bottom-up, or both. Firstly, it can come from policymakers, advocacy groups, or other macro-level actors, through thinking in terms of the above factor model, whereby individuals could be influenced with or without their explicit awareness. For example, attempts to motivate people towards different behaviour as regards climate change mostly take place

through information sharing and appeals to fear (Hunter & Röös, 2016). Choice architecture also belongs to a top-down approach to behaviour change. However, there are large scale phenomena that prevent such methods from creating the desired change. For example, society is often blind to the countering effect of the most dominant values present, such as the importance still based on (increased) consumption. Generally, decades of research on values (see e.g. Maio, 2011; 2017) has shown that values — or more specifically, value priorities and value dispositions — do matter and they are important for behaviour.

Secondly, change can also originate from the bottom up, from ordinary people. With nearly all practices, however, such bottom-up change can be — and has to be for real and more extensive social change — enabled by, or combined with support from other societal actors, such as policymakers, the industry or various advocacy groups.

An example regarding bottom-up change in eating practices is related to the debate regarding whether those eating only a little meat (flexitarians) or no meat (vegetarians or vegans) have any agency to influence larger trends towards eating less meat. Is the (future) supply of the new meats offered by the industry the only way for ordinary eaters to have an impact within a capitalist system? Some maintain (e.g. Spiller & Nitzko, 2015) indeed that flexitarians or vegans have little market power, as compared to intensive meat eaters. The "humane meat" producers[51] even argue that such people are worsening the situation, by not eating meat and thereby not being able to "vote" as effectively via their purchase behaviour (Stănescu, 2016). However, an individual decision for eating less or no meat, and therefore, for example, pulses, is not a passive act, but an active choice for a different vision of future (idem). These eaters have citizen power, or agency through their choices (Spiller & Nitzko, 2015).

This citizen power may be realised, however, only to the extent that such actions are in some ways public. Therefore, essential elements for intentional and lasting change — i.e. not dependent on situational factors such as choice architecture — include *discourses*, as I will argue further in Chapter 3. Discourses connect the macro level of society to the micro level of the individual, or put in another way, as van Dijk (2015:469) says, "language users as social actors mentally represent and connect [society and discourse]". Discourses can be seen as a prerequisite to an awareness of problematic practices and their solutions — whether at the level of individuals or at the level of societies — especially since discourses can also lead to an increased awareness of potentially conflicting values, emotions, and knowledge.

51 Meat producers, mainly in the US, who call themselves "humane meat" producers, produce mainly organic meat. However, the US market has not been well regulated in this respect, and these producers have received a good deal of criticism for being manipulative towards consumers (Stănescu, 2016).

Without acknowledged awareness, purposive and lasting change at the individual or societal levels is unlikely. Section 2.2 will, therefore, explore recent and current discourses on meat.

2.2 Meat related discourses

In Section 2.1, I touched on discourses around eating, and not eating meat, as, due to the values and emotions attached to eating, it is not really possible to discuss the history of meat without mentioning what eating, or not eating animals has meant to humans over time. In this section, however, I will briefly cover the discourses over the last half a century and then focus on the present day. Chapters 3 and 4 will discuss further the role of discourse in society.

2.2.1 Rise of discourses

Nearly 30 years ago, Fiddes (1991) noted that meat eating could be considered just as ideological or political an issue as vegetarianism, as it involved an abundance of social rules and meaning. He went on to say that, consequently, the habit of meat eating required justification just like vegetarianism, and it could not therefore just be passed as something obvious. It should rather be a conscious choice.

When questioned, meat eaters have generally justified their diet as something natural, traditional or necessary for humans. In prehistory, meat eating is argued to have been an integral part of the development of our species (e.g. Zaraska, 2016a). Meat was also considered necessary for religious reasons (e.g. Swatland, 2010), and nowadays people often justify their practice simply because meat tastes good, and it is an important part of social eating. These lines of thought go back a very long time. However, before the rise of industrial animal farming, there was a certain "eat with care" attitude to eating meat (Foer, 2009).

For our age of industrial meat, Joy (2010) talks about the three Ns of justification regarding eating meat: Normal, Natural and Necessary. People have internalised these so well that the four Ns have usually been considered truths rather than opinions, and therefore, any moral considerations regarding eating animals have not even entered the picture for most people. Joy introduced the term *carnism* to indicate the culture, or the invisible belief system of meat eating, and the discursive hegemony that the culture of meat enjoys. Piazza et al. (2015), add a fourth N for Nice to the three Ns from Joy.[52] Further, Monteiro et al. (2017) develop

52 Some of the literature discussing the three or four Ns use capital initials. I decided to use these as well, in particular since I see these concepts as frames, and frames are often capitalised in frame analysis (see later in Chapter 4).

a distinction between *carnistic defence* (justifying meat eating) and *carnistic domination* (justifying killing animals for meat), with the first relating more to Normal, Necessary and Nice, and the second more to Natural. Before the term carnism, other authors, in addition to Fiddes above, have linked meat eating to an ideology. Adams (e.g. 1991) claims that meat eating has become an ideology whereby the ideology itself makes meat eating appear natural and predestined. Indeed, she argues that killing animals for food has changed from something we do to them into something that is "part of animals' nature" (idem:135). Palmer (1997) includes an early discussion of human domination over domesticated animals potentially being legitimized through a *social contract*.

Meat eating has traditionally symbolized masculinity, strength, higher socioeconomic status, and human dominion over nature (e.g. Allen & Baines, 2002; Ruby & Heine, 2011). There are some signs, however, that the image of meat may be changing (e.g. de Bakker & Dagevos, 2012; Ruby, 2012), or that the symbolic meaning of meat could even be successfully manipulated (Allen & Baines, 2002). The ideas of what is "normal" tend to shift considerably over time (Shove, 2003; see also Chapter 3), so has also the meaning of meat changed and will continue to change.

As mentioned earlier, meat, and especially red meat, has been discussed negatively, not only in academic literature but also in many media stories, especially concerning its healthiness. However, conflicting dietary advice for health, and especially weight loss, can be found in many places, especially in popular media, with governmental dietary guidelines being only a minor source of information for many people who tend to be persuaded simultaneously to two, often opposite directions. On the one hand, people have become more conscious about the links between eating habits and health, encouraging them to follow a diet less heavy on meat, among other things. On the other hand, certain popular diets have pulled some health-conscious people towards eating more meat. In particular, the "low carb" diet has often been understood as a high-meat diet. Coinciding with the rise of such diets, also the so-called lipid hypothesis (i.e. that saturated fats and blood cholesterol are major factors in cardiovascular disease) has been questioned, even in some scientific literature (e.g. by Siri-Tarino et al., 2010).

Clear cultural differences have been seen in the discourse. Halkier et al. (2007) make a comparison between four European countries in terms of the discursive framings of food consumers and conclude that there are fairly large national or cultural differences within Europe. Further, they argue that conflicts in northern European countries may be more between different food-related issues, such as food safety, quality, nutrition and ethics, while in southern European countries they may be between different types of actors, such as public authorities, the food industry and the retail sector. Likewise, Kjærnes and Torjusen (2012) find some regional differences in that, people from southern and eastern Europe tend to be lately more pessimistic about food than especially Scandinavian consumers. More-

over, a comparative study by Bauer et al. (2006) in Germany, Finland, Italy and the United Kingdom on the impacts of the BSE crisis illuminates, how national media influences the perception of risk.

Priorities and framings also change over time as a result of changing practices, scientific research, and public debates. Framings of food (and often, meat) related concerns in general have varied a lot just in the last half a century. In the 1950s and 1960s, they were mostly about safety, convenience and prices, in the 1970s and 1980s, about fertilizers and pesticides, in the 1980s and 1990s, about risks and taste, and in the 2000s, about animal welfare and fair trade (Spaargaren, Loeber, et al., 2012).

Often in the last decades, public and media discussions around meat eating have largely arisen from issues related to intensive animal agriculture. Larger health scares, such as the European BSE crisis in the 1990s, the avian influenza epidemic taking place mostly in Asia from the early 2000s onwards, or more local crises of meat contamination with dioxin or other toxins, have generated much discussion which has often led to a wider debate on the issues related to a diet relying heavily on eating meat. The COVID-19 pandemic has largely been blamed on both live animal markets widespread in certain countries, and on the global destruction of the natural world, often for industrial animal farming.[53]

Several narratives have existed for significant time already as to how problems related to the global meat complex could be solved while continuing to consume meat from slaughtered animals. Organic meat has been a popular answer to those concerned with industrially produced meat. However, as mentioned earlier, large scale organic meat production shares many of the same problems as conventional production, especially in term of climate change or deforestation (e.g. Foodwatch, 2009; Steinfeld et al., 2006), and organic meat producers can also deceive consumers by marketing "humane" meat from "compassionate" farmers with few regulatory constraints (see Stănescu, 2016). Further, grass-fed cows have been suggested even as a solution to the contribution of meat to climate change (by the grazing locking away soil carbon), and such discourse has been popular online as well. This account has, however, also been firmly disputed (see a thorough review of the issue by Garnett et al., 2018), although there remain arguments that a *small* number of *well-placed* grazing cows may be relatively harmless as regards climate change (see Garnett et al., 2018; Röös et al., 2016). There is another popular "less, but better" narrative which acknowledges the array of serious problems, and the urgent need to find solutions, but aligns with the paradigm of the necessity of meat eating. An example of this is the Eat well -campaign in the United Kingdom. The idea is that decreasing meat eating, and concentrating on better quality, i.e. less

53 See e.g. https://www.theguardian.com/world/2020/mar/25/coronavirus-nature-is-sending-us-a-message-says-un-environment-chief

intensively produced meat, can help solve the meat crisis. Although this is an appealing idea to many, and probably designed to cause less antagonism (Santini et al., 2015), the lack of radical absolute reductions in this model, however, casts doubt on its viability as a sustainable global solution. The question is about quantities: a truly small amount of grazing cattle could be beneficial, if it would replace the current mass production of beef. The focus of any such "less, but better" -campaigns would, therefore, better be more strongly on the "less", rather than the "better".[54]

The FAO prediction of 75% increase in the demand for meat by 2050 carries a message of "people will want meat", and assumes that there cannot be a radical reduction in the meat that people eat globally, and more generally, that humans have to keep eating animals. Even though this business-as-usual approach requiring growth of production is also criticized by food production-related organisations (see Soil Association, 2010), the growth paradigm is also included in at least some of the alternative meat discourse.[55]

Less visible in the public discourses have been, on the one hand, the answer from the global meat complex and from some international organisations to the anticipated increased future demand for meat, and, on the other hand, their answer to the contribution of meat production to climate change. The suggested and researched solution to the issue of demand has been to make intensive animal farming even more intensive, widespread and efficient, and the answer to the issue of climate change has been to intensify science's focus on developing animal breeds, or animal feeds that are less harmful in terms of the production of GHGs, so for example, reducing the methane emissions from cows (e.g. in many FAO reports on the issue). This discourse, especially related to the increased intensity, has largely stayed out of the media focus, and presumably might not always be well received by the publics. Neither would all stakeholders necessarily want to draw attention to the realities of intensive animal agriculture. However, as for example, Garnett (2011) or Springmann et al. (2018) conclude, it is not possible to make the meat system efficient enough to take account of climate change. Reductions in consumption must be an integral part of the picture. Further, the assumption that intensification significantly decreases GHG emissions from extensive animal farming has also been called into question (see Hayek, 2019).

Despite the narrative of especially red meat being bad not only for humans, but for the environment as well, no very large scale, or radical changes in the image of

54 Some, for example de Boer, de Witt et al. (2016) argue, however, that switching to eating organic meat can have positive spillover effects to other, more environmentally beneficial behaviours.

55 See for example Paul Shapiro, Vice President of Policy, the Humane Society of the United States, and a self-declared vegan, talking at a Stanford University panel discussion on cultivated meat at http://www.gfi.org/stanford-on-meat-without-animals.

meat have been widespread until now, as the Chatham House Report's (Wellesley et al., 2015) findings about (especially red) meat in the United States still being strongly associated with being American demonstrate. Similarly, all the different discourses on ethical and other problems related to eating animals have not, until now, led to a more permanent increase in the numbers of vegetarians, which in Europe, for example, have ranged in recent decades from around 1% to between 5-10%, or vegans which number generally under or around 1% of a population.[56] Temporarily, these numbers have changed, e.g. in France, the share of vegetarians rose reportedly to 6% around 2001, possibly as a consequence of the BSE crisis, but soon after, the figures fell towards what has been more typical for modern day France, i.e. only 1-2% of the population (Kjørstad, 2005).

Additionally, there have been narratives countering the superiority of a vegetarian or vegan diet, as regards environmental impacts from the food system. For example, the *vegetarian myth* (Keith, 2009) claims that vegetarians or vegans falsely believe that their diets can be a solution to the crisis of industrial animal agriculture. Further, there has been a debate on whether those eating grass-fed animals or those eating no meat end up killing more animals, with the arguments being between accidental killings during plant harvesting and intentional killings in animal agriculture, a discussion largely initiated by Davis (2003), and mostly revolving around ethics. While convincingly aiming to end the fight as regards numbers of animals killed, Lamey (2007) points to the new discourse over not *whether* animals deserve protection or not, but *which kind* of protections produce the best results. He points out that field animals do get killed even within the production of a vegan diet, in other words, his argument is for the importance of choice in farming methods. He further emphasizes that "not all meats are created equal" (idem:344), so that, while both produce the same amount of meat, killing 100 chickens is ethically worse than killing one cow.

The disconnection between meat production and consumption is largely due to the industrialization of meat production and the growth of supermarkets. Gouveia and Juska (2002:384-385) argue that the popular media has been falsely reconnecting production and consumption by "framing food and cooking as a lifestyle" by discussing, for example, seasonal and locally produced foods, or engaging celebrity cooks to visit rustic small farms, while in reality, most eaters are still faced with the same industrially produced supermarket meat. In this narrative, the reintegration of production and consumption is, therefore, made into a matter of individual

56 The numbers also depend on the definition of what counts as a vegetarian or vegan diet. Unfortunately, there is sparse longitudinal or geographically comparable data available on the share of vegetarians or vegans in different countries, and the estimates tend to be using different definitions, and carrying various methodological issues with them.

choice, while actually the two realms are perhaps even further distanced from each other with this framing.

As the following section will discuss, the (conscious) awareness of the enormously challenging and critical issues related to the current meat system is still low among most people, but has increased in the last years in the scientific community, some media outlets, and even within policymakers and the industries involved. New solutions have been considered, and new discourses have been born, taking some of the focus away from more modest or incremental changes to the system, or the narratives that are based on disputed science, to more radical alternatives. As a result, the older discourses mostly keep on existing while new discourses are born, and so, the numbers of different, and often contradicting, narratives around meat are increasing in the public sphere.

2.2.2 The new discourses

There seems to currently exist new and diverging narratives, or discourses, around the various solutions to the meat crisis, at least in the Global North. Two of the most obvious strands include, on the one hand, the necessity of overhauling the current meat system, and on the other hand, apparent denial of the need for large-scale changes. The *new meats*, such as cultivated meat, plant-based meat, or insects, as well as flexitarianism — as an additional *new meatway* — are an important theme in the first strand of discourses.

Firstly, there is a great deal of excitement among start-up businesses developing cultivated or plant-based meat,[57] major investors,[58] and organisations[59] involved with the start-ups in building the new industry (see the next section and Table 2.1 for more on some of these developments). There is a degree of hype

57 The developers of meat analogues have developed the term *plant-based meat* to emphasize the fact that these products aspire to resemble meat in every way, the only exception being that their origin is from plants, rather than animals. Recent terms used by the companies developing meat cultivated from animal cells are *cellular agriculture* (from 2015), *cultured meat* (around in wider discourses from around 2016), *clean meat* (from 2016), and *cell-based meat* (from 2018). *Cultivated meat* is the latest term, entering the wider discourses only in 2019, judged to be the most appealing term, based on consumer research performed by the Good Food Institute (see https://www.gfi.org/cultivatedmeat). I mostly refer to cultivated, plant-based and animal-based (conventional) meat in this book. See Chapter 3 for some more discussion on the names.

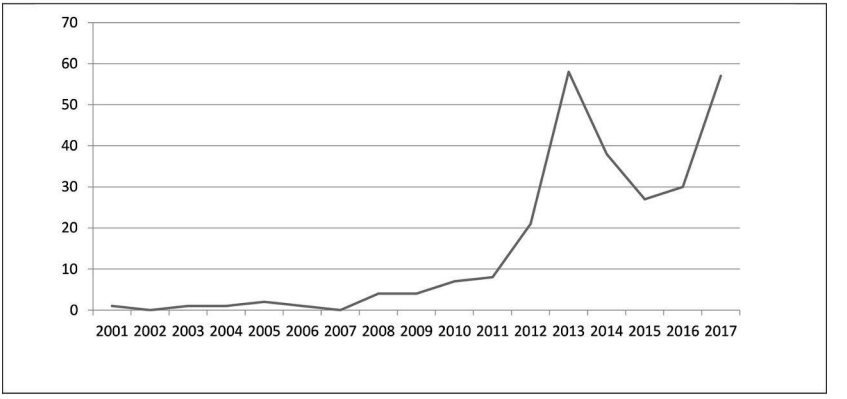
58 See e.g. FAIRR (2016), or https://www.cbinsights.com/research/future-of-meat-industrial-farming/.

59 Such as the Good Food Institute (www.gfi.org) and New Harvest (www.new-harvest.org), promoting the alternatives, and financing research in cell- and plant-based meats.

attached to these alternatives. Some policy circles are supporting these developments,[60] and through increasing media reporting in recent years, many citizens have had a chance to learn about the new potential directions.

Figure 2.9 shows the number of articles in the Guardian newspaper on different alternatives to eating conventional meat (including insects and flexitarianism, discussed later). The media event in 2013 where the first-ever cultured beef burger was prepared and eaten in London caused the peak around that year. However, the overall trend is clear. The number of articles was rising between around 2007 and 2017.

Figure 2.9: Number of mentions in the online Guardian of different alternatives to eating conventional animal-based meat from 2000 to 2017



Source: Based on the Guardian archives.
Notes: The keywords used in the search for articles include the following: "cultured meat", "artificial meat", "lab-grown meat", "synthetic meat", "in-vitro meat", "clean meat", "eating insects", "plant-based protein", "impossible burger", "beyond meat", "flexitarian", "reducetarian", "semi-vegetarian", "meat alternative"; many articles mention several such keywords, therefore the numbers do not refer to the number of articles, but to the mentions of these keywords; the term "cell-based meat" was only invented in 2018, and "cultivated meat" entered discourses outside academic literature mainly only in late 2019, therefore, these terms are not included in the search.

In these discourses, conventionally produced meat from slaughtered animals can actually be seen as the "wrong technology" to produce meat, "convenient, but incredibly inefficient", and the future Earth citizens may look back at people eating animals (for their flesh) as something weird and archaic.[61] However, more of-

60 For example, at the EU level, a research project called LikeMeat (Likemeat.eu) was EU-funded. Further, the Dutch government has funded research on cultivated meat (see http://www.new-harvest.org/mark_post_cultured_beef).

61 From Pat Brown, the founder of Impossible Foods, on BBC programme The Inquiry in January 2017.

ten cultivated meat creates controversy, with the discussion often moving from stronger initial reactions of disgust, or "wow", to concerns for health or social consequences on the one hand, and environmental and ethical benefits on the other hand (see e.g. Laestadius & Caldwell, 2015; Onwezen & van der Weele, 2016; Verbeke et al., 2015). The perceived unnaturalness and high-tech character of cultivated meat, and the perceived naturalness and low-tech character of (intensively produced) conventional animal-based meat, are also apparent in the discourses. On naturalness, Ethan Brown, the founder of one of the new plant-based meat companies has argued that intensively produced conventional animal-based meat has already become "artificial", as it is, in fact, so unnatural (Stănescu, 2016).

Special about the discourses around the new plant-based meats is that these products are not aimed so much at vegetarians or vegans, but at those who until now have been conventional meat eaters, i.e. the majority of people.[62] Similarly, cultivated meat is not presented as another product for vegetarians or vegans, but for non-vegetarians, although Hopkins (2015) argues that the media may sometimes do a disservice by assuming otherwise.

Another narrative is built around eating farmed *insects*, as something exotic and good for us. Since the technological input is much smaller, and since insects represent something either formerly, or currently, rejected (mostly in the Global North), something mundane, or something very traditional (in some parts of the rest of the world), the excitement, or the hype — related to other promising, but more technological solutions (such as cultured or new plant-based meat) — is less obvious, although still existing. Largely, the initial reception by the publics in the Global North has been disgust (e.g. Looy et al., 2014). Insect start-ups tend to be dwindling businesses in many cases (Ana C. Day, personal communication, 9 April 2016),[63] although policymakers in the Global North are gradually making an effort to accommodate them.[64] Insect eating eventually gaining ground in the Global North has been compared to sushi's rise in popularity in the North outside Japan. However, the two differ from each other to a significant extent, even if the initial yuck-factor or the exotic nature of these foods are common features. Sushi in the Western world has been an additional, by now normalised food choice without any

62 Indeed, Beyond Meat estimates that 70% of its customers eating Beyond Burgers are meat eaters (https://www.foodnavigator-usa.com/Article/2018/01/12/An-estimated-70-of-Beyond-Burger-fans-are-meat-eaters-not-vegans-vegetarians-says-Beyond-Meat).

63 Ana C. Day is the founder of 4Ento.com, an organisation promoting insects as primary future protein alternative for human consumption.

64 For example, EU food regulations changed from 2018 to accommodate insects as food. Further at the EU level, a research project called PROteINSECT (Proteinsect.eu) was EU-funded. Moreover, the Dutch government supported the 2012-2013 Edible Insects -project carried out by Wageningen University and the FAO (see Paul Vantomme interview at https://www.youtube.com/watch?v=TyIfq4Azhr4).

meaning of transformation attached to it, whereas insects are attached to the narrative of challenging the conventional animal-based meat-eating related practices, and potentially transforming the conventional meat system.[65]

Contrasting the above *solution narratives*, the narrative around eating traditional and minimally processed plant-based proteins, *pulses*[66] (various beans, and lentils, chickpeas and dry peas) — nutritionally rich (see e.g. Mudryj et al., 2014), beneficial from an agricultural point of view (e.g. FAO-FNS Forum, 2016), and inexpensive replacements for meat — has been attracting much less attention. Such discourses do exist among some mostly development-oriented researchers, some similarly directed international organisations (e.g. parts of the FAO), and perhaps some of the people who are actually eating pulses regularly, i.e. (part- or full-time) vegetarians and vegans. Eating pulses is already normalised for the latter group of people who have often been doing it for years, or even all their lives, either in the Global North, or in the South, out of choice or, more often, necessity. Generally, pulse consumption is however low, especially in the Global North.[67] An indication of the weak or

65 Considering the Global South and discourses on the new meats, the number of articles from the last few years seems to be fairly modest, and there have been usually few if any reader comments. Here are, however, examples of such articles: A couple of Mexican English-speaking newspaper articles (in Mexico News Daily and The News) about insects are very enthusiastic about Mexico's culinary history in the sense that insects have been part of the Mexican diet for centuries, and still are very much so (for example, https://mexiconewsdaily.com/news/insects-the-answer-to-global-food-shortage/). A Hong Kong article in South China Morning Post about insects is positive as well (https://www.scmp.com/lifestyle/health/article/1309183/lead-de-bugging-nutrition), as is their article about cultivated meat (https://www.scmp.com/comment/insight-opinion/article/1295106/why-stem-cell-hamburger-tastes-future), and their article on plant-based meat (https://www.scmp.com/lifestyle/food-drink/article/1995239/bleeding-plant-based-burger-coming-trendy-restaurant-new-york). An article from the Indian newspaper The Hindu is also relatively optimistic about cultivated meat (https://www.thehindu.com/todays-paper/tp-in-school/qa-on-the-science-of-growing-hamburger-in-the-lab/article4996660.ece). A South African article in the Mail & Guardian about insects is also fairly positive, although some personal disgust is expressed by the journalist (https://mg.co.za/article/2013-07-05-waiter-open-up-a-can-of-worms/). Finally, an Argentinian article in the Clarin newspaper is optimistic about plant-based meat (https://www.clarin.com/espectaculos/si/animal-salio-lastimado-hamburguesa_0_4100G2MEb.html).

66 In the FAO definition, pulses are also called grain legumes; they are plant species from the Fabaceae family, harvested annually and only for dry grain, so not for oil or as vegetables. Soy is not considered to be part of pulses in this definition.

67 FAOSTAT data shows that world per capita pulse consumption decreased between 1961 (start of FAO statistics) and the early 2000's, after which there has been a slight increase. However, in most countries there has been a decrease in per capita consumption, or the consumption has been rather marginal to begin with.

non-existing new narrative around pulses is the lack of media attention to pulses,[68] lack of research on pulse varieties until recently (see e.g. FAO-FNS Forum, 2016), or the fact that the 2016 UN International Year of Pulses passed mostly unnoticed in the Global North at least.[69] Pulses seem to create modest enthusiasm, they are mainly covered in the discourse as an obligatory mention of an existing option (see e.g. FAIRR, 2016), albeit with less potential for big profit margins, unless processed into further products, such as ingredients into plant-based meat products.

Additionally, pulses receive a good deal of criticism, sometimes accompanied by humour, of being difficult to digest, difficult to cook, or plain boring. In their article discussing the necessary large-scale meat reduction and replacement, Schösler et al. (2012) themselves present lentils as "cumbersome" and "out of fashion". This negative narrative about pulses may work as an excuse to not to have to see them as real alternatives, or to move away from meat. There seems to currently exist a narrative whereby people would cook vegetarian food more often, if only they knew how. Schösler et al. (2012:39) argue that "in particular, a lack of familiarity and skill hampered the preparation of real vegetarian meals" among the Dutch. This is noteworthy, seen in the context of the Global North where cooking, including exploring new recipes, is considered a common hobby, and there is an abundance of cookbooks, including those with only vegetarian recipes.[70]

However, there may indeed be a point about a need to update the *image* of pulses (Jallinoja et al., 2016; Schyver & Smith, 2005), when researchers involved with sustainable food themselves (such as Schösler et al., 2012) call pulses in effect "boring". There is current research going on, for example, on developing new more productive and resistant varieties of pulses, easier or quicker to prepare, and more integrated into current food systems (see e.g. Global Pulse Confederation, 2016 for a 10-year research plan). Much of the research is directed on solving food insecurities in the Global South. Section 2.3.4 will focus some more on pulses.

Independent of the low status of pulses, of late, a new rise of vegetarianism or veganism in public discourses in the Global North is visible. This rise is likely to originate partly from the (still low but) seemingly rising conscious awareness of

68 For example, the two UK based newspapers the Guardian and the Daily Mail have hardly any articles regarding pulses, apart from some cooking recipes. However, both Guardian India and Daily Mail India do have several articles (usually without reader comments) from the last years, with pulses being culturally and nutritionally important in India.

69 For example, in the online Guardian, there have been almost no articles referring on the 2016 Year of Pulses.

70 A search in the online New York Public Library catalogue with the word "cookbook" produces a list with many more titles included in the collection in the last 20 years (331 titles for the period 1998-2017) than in the century that preceded (140 titles for the period 1898-1997). The proportion of entirely "vegetarian cookbooks" in these English language titles is over 10% for the last 20 years (38 titles). The trend in cookbooks in Europe has been similar.

issues around the global meat complex, and partly from the availability of more vegetarian or vegan products in Western supermarkets and restaurants, and recipes in cookbooks. However, meat consumption figures are still not reflecting such a trend. Looking at collections of surveys on the numbers of people identifying as vegetarians, or vegans, e.g. in Wikipedia[71] — a source of information many turn to — it would certainly seem that the numbers are up from the 1-5% of people in most countries that have seen themselves as (out-of-choice) vegetarians in the last decades, or the no more than 1% that have identified as vegans. Several surveys from the last couple of years quoted in Wikipedia indicate that around 10% or more of people identify as vegetarians or vegans in several countries. Although the data as such may not be reliable, there does seem to be a rise in numbers of vegetarians and vegans in these surveys.[72]

This rise in survey figures can be explained in several ways. Firstly, it may actually reflect more people not eating meat. Secondly, it could indicate that more people allow themselves to say publicly that they identify as vegetarians or vegans. Thirdly, it may be that people consider being vegetarian or vegan more morally correct now than before, and since survey often tend to capture the ideal person rather than the real person (e.g. Lalwani, 2009), the rise in numbers may be a reflection of this. Fourthly, it could be that the definition of vegetarian or vegans diets is becoming looser,[73] and so, a considerable number of those identifying as vegetarians might still eat meat (see e.g. Haddad & Tanzman, 2003). The concept of *flexitarianism*, or part-time vegetarianism, also plays a role here, discussed below and in Section 2.3. The last three alternatives could explain the "veggie trend paradox" of why meat consumption levels have not (yet) come down in the Global North despite the recent vegetarian or vegan trend at the level of discourses. The first option — actually increased numbers of people not eating meat — could be accurate, but not show up in statistics, if those identifying as meat eaters are correspondingly eat-

71 See https://en.wikipedia.org/wiki/Vegetarianism_by_country.

72 However, for the same country, and around the same time, different surveys may give fairly different results. See also Hartmann and Siegrist (2017) for criticism on surveys asking people about their meat-eating practices.

73 The survey definitions of vegetarianism or veganism may also have changed over time.

ing more meat,[74] or if the meat industry is able to channel more meat into other consumption.[75]

Further on discourses around vegetarianism or veganism, Rothgerber (2014:34) refers to Adams (2001) in arguing that "the mere presence of vegetarians reminds omnivores of their [own] behaviour, causing guilt, anger, and a host of other negative emotions". His empirical results support Adams' theory. These negative emotions can be seen expressed in the discourses of the last decades, for example in the references to a "veggie lobby" — particularly popular in online discussions[76] — that supposedly tries to influence governmental policy to reduce or ban meat eating. In reality, however, governments have been very reluctant to discuss or implement any actual meat-reduction related policies (e.g. Laestadius et al., 2014; Wellesley et al., 2015). Devaluing vegetarians or vegans has been part of this discourse as well, and as Rothgerber (2014) argues, it is another coping mechanism of meat eaters, aroused by the presence of vegetarians and vegans, and used to overcome the cognitive dissonance created from eating animals, while knowing what it means for the animals being eaten, or what some other impacts from this practice are. Loughnan et al. (2010) coined the term *meat paradox* to describe our love for meat (dead animals) and our love for (live) animals as pets, for example, and Loughnan et al. (2014) explore how different people use different coping mechanisms regarding meat paradox and the associated cognitive dissonance and strategic ignorance, topics discussed further in Chapter 3.

Next to the vegetarian and vegan related discourses, there is a new discourse whereby a more relaxed attitude is applied, as regards radical change in eating animals. Here belong the discourses around flexitarianism, a new name for an older idea of a low contribution of animal-based meat in the diet.[77,78] While the end re-

74 There is also a new trend, seen by some as a backlash against veganism, the "carnivore diet", whereby a person's diet is mostly based on animal foods. Such a person ends up consuming considerably more meat than an average meat eater. See https://www.theguardian.com/lifeandstyle/2018/may/11/the-carnivore-diet-all-meat-health-benefits-dangers from the Guardian on 11 May 2018.

75 For example, the meat consumption by domestic cats and dogs is significant (about a quarter of total meat consumed in the US is eaten by cats and dogs), and does also include meat that could be eaten by humans (see Okin, 2017).

76 See, for example, reader comments to the Daily Mail article https://www.dailymail.co.uk/health/article-2113986/Red-meat-early-death-study-Eating-regularly-increases-risk-death-heart-disease.html published online 12 March 2012.

77 See e.g. https://www.theguardian.com/lifeandstyle/2017/jun/25/vegans-vegetarians-and-now-reducetarians published online 25 Jun 2017.

78 Globally speaking, flexitarianism has been, and still is, the most common and normal way of eating conventional, animal-based meat, even if it is not called by that name (e.g. Hicks et al., 2018). As regards Europe, Dagevos et al. (2012) found nearly 20% of the Dutch in 2011 to eat in a manner comparable to either strong flexitarianism or vegetarianism/veganism, and

sult from reducing the amount of animal-based foods in one's diet may be very similar to being a flexitarian, the term *reducetarian* refers to action or process of reducing meat eating, rather than already being a semi-vegetarian, or flexitarian. It seems that even some of the vegan discourse is positive about the idea of simply reducing, rather than eliminating animal-based foods. However, to some, it may be counterproductive to focus on small reductions, rather than radical change.[79] Finally, while "reducetarian" or "flexitarian" (or even "vegetarian" or "vegan") do not directly distinguish between different motives on cutting back on meat eating, other new terms for diets do, such as *climatarian* or *sustainitarian*,[80] which focus on the environmental consequences of food, or more specifically the meat that is eaten.[81] Focusing on co-benefits to human health, animals and the environment (motive alliances, see Belz & Peattie, 2009; de Boer et al., 2013; Hartmann & Siegrist, 2017) may, however, be more beneficial than focusing on single benefits, as discussed further in Chapter 3.

There seems to be some division between optimism and pessimism about change in the meat-eating related discourse within academia. Certain optimism is contained in the writings about flexitarians, for example in the Netherlands (e.g. de Boer et al., 2013) or Germany (e.g. O'Riordan & Stoll-Kleemann, 2015), while there seems to be certain pessimism about the proportion of vegetarians or vegans being low and unchanging, for example in France[82] or the United States.[83] This might be a reflection of (un)willingness to tinker with food cultures (e.g. in Germany vs. in France), or, it could be reflecting higher tolerance and freedom contained in flexitarianism vs. stricter vegetarianism or veganism, or both.[84]

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the majority of the Dutch (77%) to qualify as weak flexitarians. However, when asked, only 13% of the respondents identified with being a flexitarian.

79 See e.g. http://veganstrategist.org/2015/11/06/compromise-isnt-complicity-four-reasons-vegan-activists-should-welcome-reducetarianism-and-one-big-reason-reducetarians-should-go-vegan/

80 See https://www.lessmeatlessheat.org and https://grist.org/food/climatarian-vegavore-reducetarian-why-we-have-so-many-words-for-cutting-back-on-meat/.

81 In this book, the term *flexitarian* is used as a general, most common and rather neutral term for someone eating less (smaller amounts or more infrequently) meat than the average person in the Global North.

82 Around 10% of the French see themselves as vegetarians in the future, yet only 2-3% report being currently vegetarian (Opinionway survey, http://www.20minutes.fr/societe/1808807-20160318-journee-viande-pourquoi-deviennent-tous-vegetariens). Ouedraogo (personal communication, 21 February 2017) argues this to be a sign of food "malaise" in the French society. Arouna Ouedraogo works for the French National Institute for Agricultural Research (INRA).

83 See https://www.psychologytoday.com/us/blog/animals-and-us/201109/why-are-there-so-few-vegetarians. The author Harold Herzog is a Professor of Psychology in the US.

84 Additionally, researchers' personal optimism or pessimism may colour their arguments.

At the same time as all these narratives exist, the vast majority of people, and seemingly a large proportion of policymakers, have still been either unaware of the critical issues to do with the broken meat system (see the meta-study by Hartmann & Siegrist, 2017), or even if aware, reluctant to change their own practices (see also e.g. Wellesley et al., 2015) or push for policies encouraging others to do so.[85] Similarly, even many NGOs have not pushed the issue, for example in their campaigning (Laestadius et al., 2014), and even those that do, tend to advocate for small reductions in the consumption of meat, rather than for radical reductions or an overhaul of the meat system together with larger adoption of plant-based diets (Linnea Laestadius, personal communication, 19 October 2017).

There are recent attempts within international organisations, such as the European Heart Network (2017), the International Panel of Experts on Sustainable Food Systems (IPES FOOD, 2017) and the World Bank (2017), to recommend reductions in meat consumption, combining benefits for human and planet health. A report from the International Food Policy Research Institute from 2011 was an early voice in this, suggesting around 20% reduction to the global baseline growth scenario for 2030, in effect bringing consumption of meat back by 2030 to the level it was in 2000 (Msangi & Rosegrant, 2011). At the same time, a 2018 opinion piece from the EU Observer (an independent online newspaper writing about EU matters) suspects that in terms of denial, meat is "the new climate change".[86]

Looking back, the meat crisis reached awareness even in the wider scientific community mostly only after the publication of the 2006 Livestock's long shadow report by the FAO (Steinfeld et al., 2006). Newspapers did eventually report on the issue.[87] During the period after the 2006 report, there were high-profile calls for change. In 2008, the then head of the IPCC, Dr. Rajendra Pachauri, called for people to significantly reduce their meat eating.[88] In 2009, the Meat-free Monday campaign was launched.[89] In the same year, Lord Nicholas Stern took a significant political step as a high-profile climate change expert when he said that "meat is a wasteful use of water and creates a lot of greenhouse gases. It puts enormous pressure on the world's resources. A vegetarian diet is better" in an interview by the Times newspaper.[90] His comments created a lot of, often negative, media at-

85 See e.g. https://euobserver.com/environment/127407 from 2015. Among other things, this EU Observer article discusses a European Commission report on sustainable food that the Commission planned to publish by 2013, but then subsequently "buried".

86 See https://euobserver.com/opinion/141344.

87 See e.g. https://www.theguardian.com/environment/2009/may/16/ghent-belgium-vegetarian-town-environment.

88 See e.g. https://www.theguardian.com/environment/2008/sep/07/food.foodanddrink.

89 See https://www.meatfreemondays.com/about/.

90 See https://www.thetimes.co.uk/article/climate-chief-lord-stern-give-up-meat-to-save-the-planet-2j9kv8btjsr from 27 October 2009.

tention,[91] and since then, he has apparently not returned to publicly say that, for climate change mitigation, a vegetarian diet would be better than a diet with meat.[92] In an interview by an Indian newspaper the Indian Express in 2017, when questioned, he referred to his comments in 2009 and said that he "did not advocate vegetarianism", and that "diet is an individual choice".[93] Further, in his recent book on climate change mitigation, Stern (2015) does not discuss meat's contribution to climate change at all, although the book does include one very short mention of cultivated meat (on p. 78) as an example of potentially helpful private-sector innovations.[94] In the decade since the FAO report and the high-profile calls for meat reduction, not much seems to have changed, other than that the new alternatives to meat are becoming a reality, and at least partly due to them, the spread of discourses has widened. Meat consumption as such has only increased at a global level and has not significantly decreased for any individual country.

There are multiple explanations for the low awareness — or denial — and the related lack of action until now. They include the discursive hegemony of carnism (discussed in this chapter and Chapter 3), strategic ignorance as a coping mechanism for the internal conflict rising from the meat paradox (see Chapter 3), the disconnection between the production and consumption of meat (this chapter), the seeming lack of certainty in terms of the proportional contribution of the global meat complex to climate change (see Box 2.1)[95] or to many of the other related problems, and the overall complexity of the issues related to the global meat complex (this chapter). Another psychological factor may be the underestimation of impacts from behaviour within which changes are perceived as (personally) difficult (de Boer et al., 2016; Tabi et al., 2013).[96]

Notably, there is relatively little research focusing on the pressure from the conventional animal-based meat industry to maintain the status quo, although this pressure is possibly a major contributor to the lack of action, similar to the impact of some other industry lobbies, e.g. in the fossil fuel industries. Fuchs et al. (2016) offer an analysis of the often hidden power, including discursive power, the

91 See https://www.theguardian.com/commentisfree/cif-green/2009/oct/27/vegan-vegetarian-stern-climate-change in the online Guardian on 27 October 2009.

92 An indication of this is that e.g. Google search results regarding Lord Stern talking about vegetarianism being good for the climate generally only refer to the interview in the Times in 2009, in other words, there are very few newer internet search results on this.

93 See https://indianexpress.com/article/explained/costs-ignored-climate-change-a-function-of-market-failure-says-lord-nicholas-stern-world-bank-4593123/ from 31 March 2017.

94 He also says that discussing such innovations would be "beyond the scope of this book" (p. 78).

95 However, in current discourses, a certainty is usually asserted by using a number (usually 14.5% or 18%) without reference to any uncertainty of the science behind it.

96 However, this can also be seen as a coping mechanism, linked to strategic ignorance.

meat industry has. Joy (2010) blames the media for having framed the meat-related discourses in a way that has often supported the existing state of affairs, by for example framing cases of clear animal cruelty in intensive agriculture as exceptions, omitting the discourse, or even sometimes prohibiting it. Stibbe (2018) demonstrates how the global meat complex tries to manage the images of meat and of the industry itself, reinforce the positive stories around meat that benefit the industry, and create uncertainty about the science on the negative impacts from the meat system. Nestle (2018) points out how the meat industry produces its own biased research in order to keep meat's image positive, or at least neutral.[97] Austgulen (2014) suggests that lack of consensus on the issues around meat, and in particular around negative and positive aspects of meat production and consumption present in the public discourse, confuses the public debate, and may act against change. It may be argued that this not only benefits the global meat complex but could even be encouraged by them (see also Stibbe, 2018).[98] Complexity gives an advantage to those opposing reductions in meat eating (e.g. the industry), as it is easy to create uncertainty from complexity (Wellesley et al., 2015). Such tactics would then compare to the tactics used earlier, for example, by the tobacco industry "to fatally undermine public understanding and encourage ignorance in even the most clear-cut of public health issues" (Christensen, 2008:266).

The data I have analysed and will discuss in Chapter 5 reflects some of the narratives and discourses described above. In the rest of the current chapter, however, I will explore some issues related to the transformation of the meat system.

2.3 The sustainable future of protein?

Reducing or eliminating meat from our diets is considered "outstandingly" efficient as a way for people to have a positive impact on climate (e.g. de Boer et al., 2016). Further, for example Davis et al. (2016) agree in their study with many other researchers that societies simply cannot move into sustainable global food production and reduce our water, nitrogen, carbon and land footprints enough to account for the growing world population, unless the intake of animal-based proteins is radically reduced. The next sections will look at the possible pathways to changing the course. The options proposed as replacements for (at least some) conventionally

97 Nestle (2018) points to a new tactic by the industry in positioning meat as a health food.

98 An unexplored issue is whether the food industry has attempted to shape discourses by e.g. purposefully participating in online discussion, similarly to what has happened in (other) political online discussions (see e.g. https://www.theguardian.com/us-news/2017/oct/14/russia-us-politics-social-media-facebook).

produced industrial meat, such as plant-based or cultivated meat, and insects will be examined, and simply eating less meat will be discussed as well.

2.3.1 Peak meat

Similar to keeping much of the oil in the ground to move to a sustainable, fossil-free future (the *peak oil* discourse), there could be a peak meat moment.[99] In other words, industrial meat production and consumption could have reached its peak, at least in the Global North, and be eventually on its way down — unintentionally, or intentionally.

Scenario research indicates that reducing meat production and consumption can have a significant effect on GHG emissions. For example, Westhoek et al. (2014) calculate that a 50% reduction in all meat, dairy and egg (production and) consumption in the European Union could reduce agricultural GHG emissions in the EU up to 42%, in addition to leading to what is currently considered a healthy level of saturated fat and red meat consumption. Further, Röös et al. (2016) build scenarios based on agroecological principles whereby meat (production and) consumption would be cut by 60-80%; such diets could be produced using globally fair land attribution, and the climate impacts would be within the 2-degree pathway.

There are basically two main approaches discussed in literature for intentional reduction in meat (production and) consumption, reviewed e.g. in Verain et al. (2015). The first can be called *weak* sustainable meat consumption, as it includes relatively minor adjustments to consumption patterns, choosing products that are less burdening to the environment, either by being more sustainably produced meat products or by having a lower meat content. More sustainably produced meat could consist of a switch between beef and chicken, or it could originate from overall more efficient production. The latter option would most likely result in further global expansion of intensive animal agriculture which could, however, produce lower GHG emissions per unit of production, although the extent of this benefit may have been overestimated (see Hayek, 2019). Advocating for minor reductions in meat eating would belong to this approach. While such "green" meat production or consumption might be preferable by most stakeholders, it has been argued that it would not result in large enough, and fast enough absolute reductions in the negative impacts from the meat system, especially concerning the dual crises

99 The term "peak meat" has been used e.g. by Spiller and Nitzko (2015), and also in the media, e.g. in a 2013 Guardian article https://www.theguardian.com/sustainable-business/sustainable-meat-vegan-vegetarian-celebrities. In these contexts, it refers to a reduction that is not collectively and purposively designed.

of climate and biodiversity.[100] Indeed, if it entailed a further expansion of intensive animal agriculture, it could even lead to an increase in negative impacts (see e.g. Henning, 2016, on FAO's recommendation to accelerate the intensification of animal agriculture in the Global South). Likewise, any rebound effects, such as increased meat exports as a response to falling domestic consumption would be likely to cancel any positive impacts at a global level. Weak sustainability as such could be an entirely separate trajectory, not leading to strong sustainability, as argued by Voget-Kleschin et al. (2015).

The second approach can be called *strong* sustainable meat consumption, and it involves radical changes to the system, substantial reductions in, or the elimination of, intensive meat production, and radical behavioural dietary change, at a global level wherever this is achievable. The far (and as of today, very unlikely) end of this path is a world where everyone is vegan. This approach relates to the *sufficiency* concept in sustainable consumption policy and research (see also Verain et al., 2015).[101] An option less explored in theory, this approach would likely lead to faster and more relevant changes, bringing about large absolute reductions in meat production and consumption and the related negative impacts. Subsequently, this pathway would result in large positive impacts, e.g. in terms of human health, significantly reduced GHGs and air and water pollution, and in terms of rewilding of landscapes.

The scale of transformation in the strong sustainability approach is daunting. However, meat consumption can be argued to differ somewhat from certain other areas of consumption. Firstly, the challenges are felt at two levels, very personal — most people are strongly attached to eating animals, even with the conflicts involved — and systemic (changing the protein production systems). To compare, transformation in transport may have some common features — e.g. with people arguing for a right to own private cars — but an energy transformation tends to be more about changing the system, and to some extent less about equally personal or identity related issues. Secondly, there can be considered to be an aspect of "people power" in meat eating. In other words, in principle, and to some extent at least in practice as well, many people *can* have some say in what they buy, cook and eat, and therefore they can be, to some extent, steering the change. Especially

100 See e.g. Garnett (2011); Davis et al. (2016); Johns Hopkins Center for a Livable Future (2018); GRAIN-IATP (2018); Springmann et al. (2018); and Benton et al. (2021).

101 In this book, sustainable consumption generally refers to "sustainable resource consumption, taking into account the complete product life cycle", and involving the "consumption patterns of industries, governments, households, and individuals" (Lorek & Fuchs, 2011:36). More specifically, the Oslo Roundtable (1994) has defined sustainable consumption as "the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations".

due to the disruption the new meats bring, this can be so *despite* the power structures in societies.[102] Again, to compare, bringing change from the bottom up in transport or energy is likely to be even more challenging for individuals. Chapter 3 will further discuss such potential agency, while the next section of this chapter will look at existing attempts by societal actors at changing things around meat. Subsequently, Sections 2.3.3 and 2.3.4 will still review the main current or future options for replacing meat.

2.3.2 Potential and real action for change in the present

At the level of the discourse, there are changes taking place (see Section 2.2.2), spurred by increased scientific knowledge of the various crises related to the meat system, and with the media playing a large role in the new discourses, and with some NGOs raising awareness. As mentioned earlier, at the level of actual meat consumption, data up to date shows no real change from business as usual, although there does *appear* to be an increasing number of people in the Global North experimenting with a vegetarian or vegan diet in the last few years. While the global meat complex is generally likely to prefer, or even try to maintain ignorance (see e.g. Stibbe, 2018), a small but increasing number of industry-related actors have responded with new technologies, products and investments (such as cultivated or plant-based meat).[103] The internet is inevitably assisting the spread of doubt about the relevance of the issue, but campaigns for change can likewise spread through the internet.[104] Finally, and perhaps most importantly, governments have been largely inactive in terms of policy measures until now (see e.g. Spiller & Nitzko, 2015; Wellesley et al., 2015). Wellesley and colleagues refer to a *cycle of inertia* to describe the negative feedback loop between low awareness, policy priorities and overall inaction (see Figure 2.10).

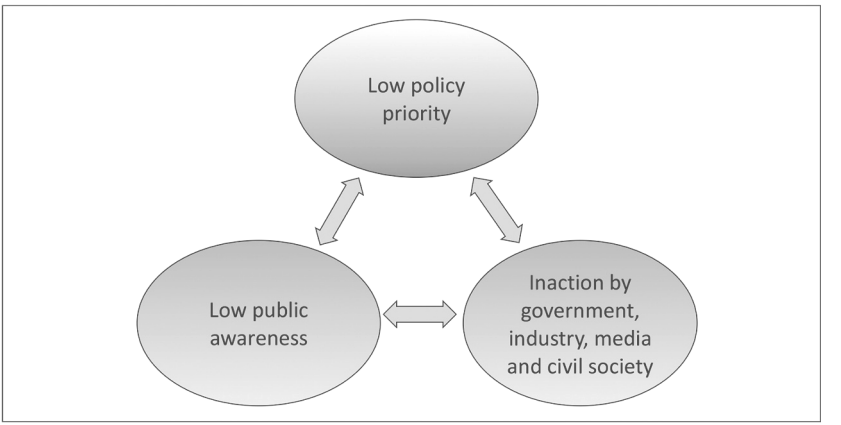
Breaking this cycle must be a policy priority, according to Wellesley et al. (2015). They argue that the governmental inaction regarding meat comes from fear of public backlash (seeing meat as taboo), fear of industry resistance, lack of (evidence-based) research, lack of issue visibility in discourses (until very recently), and possibly lack of awareness among policymakers until recently. Governments have perceived the issue as too controversial and too challenging. However, Wellesley and

102 See Fuchs et al. (2016) for a critical discussion of the power structures that tend to inhibit change towards sustainability.

103 Some major investment funds have also encouraged food companies to shift more to plant-based foods, see https://www.reuters.com/article/us-investors-food/investors-urge-food-companies-to-shift-from-meat-to-plants-idUSKCN11W0KH from Reuters on 26 September 2016.

104 See e.g. https://www.lessmeatlessheat.org which "aims to devote all of its effort to addressing the most powerful driver of climate change (livestock agriculture) through the cheapest and fastest way possible (behavioural change)".

Figure 2.10: The cycle of inertia



Source: Modified from Wellesley et al. (2015).
Note: The essential difference to the original figure is that its unidirectional arrows (clockwise) have been replaced by bidirectional arrows.

colleagues maintain that "public outrage and tacit acceptance should not be considered mutually exclusive" (idem:16), and their own research indicates that initial public resistance to changes can be overcome. This matches with the understanding that value dispositions can change during the process, rather than them having to change first (as I will discuss in Chapter 3).

Further, Wellesley et al. (2015) assume that governmental intervention at national and international levels would be necessary for larger-scale action among populations themselves to reduce meat eating, and similarly, businesses lack incentives to reduce production on their own and therefore need governmental support. Indeed, the focus group research done by Wellesley and colleagues suggests that populations (in otherwise diverse societies)[105] feel that governments must take the lead, and when they do not, this is a signal of the unimportance of the issue.

In general, governments tend to assume individual behaviour change as the solution to many areas within sustainability (e.g. energy use), but seemingly not so within meat.[106] I see this as a kind of (governmental meat) paradox, as opposed to the other meat paradox, mentioned earlier and discussed further in Chapter 3, as

105 The focus group research was done in the US, the UK, China and Brazil, and similar results in this issue were found in all four countries.

106 And meat is treated differently to other foods, where governments do encourage people to eat differently. Arguably in an obesogenic environment, eating fewer fattening foods as such

effective individual change is in principle *more* feasible within meat consumption than within many other areas of consumption, and yet, it has not been supported by governments. This is so in particular at the present moment with an increasing amount of seemingly good alternatives available. Individual action, especially in something where it is more feasible, can be a prerequisite for political change. As discussed in Chapter 3, political change can also change individual attitudes and values. These two combined could enable a *positive* feedback loop, a cycle of action for change.

Lastly, Wellesley et al. (2015) discuss industry power. Food businesses hold enormous sway over influencing the publics in terms of advertising,[107] and therefore, "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" (idem: 13).[108] Although they do not go into details regarding what the industry buy-in could entail, it is considered essential by Wellesley and colleagues and should cover a variety of industries with a stake in meat production, such as feed, livestock, meatpacking, pharmaceutical and food retail industries.[109]

As regards further recommendations on how to make real change, Box 2.3 highlights two in-depth discussions on how to transform meat-eating related practices towards radically lower meat consumption. The first is from the book by Marta Zaraska (Zaraska, 2016a) on the long-term human species' dependency on meat, and the second is from the Chatham House Report (Wellesley et al., 2015) looking at different pathways to lower meat consumption. The recommendations as regards these two documents are similar, with Wellesley and colleagues being more detailed, however. Both sources focus more on shrinking the consumption side, albeit comprehensibly, and on changing production mainly by indirect financial means. While they do not include more radical methods of transformation, they do both include discourses, changing meanings, the new meats and the idea of co-responsibility (at least between governments and civil society, including individual citizens), topics for Chapter 3. The results of adopting the suggestions could in principle fundamentally change the system, and radically reduce consumption, which already implies following the principle of strong sustainability.[110]

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can be difficult. Of course, some of those foods, such as hamburgers, have had conventional animal-based meat as an essential element.

107 Six of the ten largest global advertisers in terms of spending in 2013 were food and beverage companies (Wellesley et al., 2015).

108 On the other hand, Wellesley et al. (2015) argue that governments could well use tactics similar to industry advertising and marketing in their anti-meat messaging.

109 Fuchs et al. (2014) offer another important contribution on meat industry power.

110 One more comprehensive list of measures, similar to the ones in Box 2.3, but in fact closely following the elements of social practices in Shove et al. (2012) are included in Jallinoja et al. (2016, see especially their Table 5 on p. 11). Further, Rothgerber (2013) includes several sug-

Box 2.3. Ideas for a transformation towards sustainable meat production and consumption

Zaraska (2016a) discusses the main elements of a purposive stage five nutrition transition, mentioned earlier in this chapter as a more "natural" phenomenon of societies moving towards eating less meat after a certain level of income is reached. Zaraska's main points about this transition include:

- Raising awareness about the "factors that drive our food choices, instead of blindly following our routines, our culture, and [industry] advertising" (p. 201) should be the first step in the change. Zaraska believes that cultivated and plant-based meat and insects will change our attitudes towards meat, and result in us radically cutting the consumption of animal-based meat: "once the idea catches on, it may quickly gain traction" (p. 198).
- Incorporating new meats (such as plant-based or cultivated meat) into diets gives people the taste of meat, while pulses satisfy the "protein hunger".
- New governmental policies can divert subsidies, establish a meat tax, and change certain laws, such as the United States ag-gag law favouring the meat industry.[111]
- A certain amount of "propaganda" for vegetarian diets is necessary. Using imagery similar to what the meat industry uses, such diets should be presented as convenient, economical, positive, and as something that can make a person strong and beautiful. Some of this, Zaraska argues, can be done by people themselves, for example, creating positive associations of vegetarian meals by pairing them with a delicious dessert, or by grilling vegetables in the summer barbeque, instead of sausages.
- It would be important to be flexible with dietary purity, in the form of seeing part-time vegetarianism (flexitarianism) as positive, rather than as negative.
- It would be essential to try to work with the meat industry, rather than be against it.[112]
- The actual impact (e.g. in terms of the environment) of changes is crucial, and considering this, Zaraska points out that strong flexitarianism may be better than vegetarianism with a lot of cheese, milk and eggs.

Wellesley et al. (2015) argue that short-term change should focus on reducing meat consumption, i.e. eating in moderation, rather than entirely substituting meat, while

gestions for changing attitudes and perceptions of norms, raising awareness and redefining the link between masculinity and meat eating.

focusing on larger shifts in the status of plant-based and meat-based diets. Their further recommendations include the following:

- National debates should be initiated on meat consumption by considering different national contexts (political, social, cultural); focusing messaging on co-benefits of reducing meat (health, price, local environmental concerns, food safety, food security), and using simple messaging ("hard-hitting facts and visual linkages between meat, dairy products and climate change", p. ix). Further, governments, academia and civil society groups should be connected to media around the issue, and responsible businesses and celebrities used in messaging about new social norms and reduced consumption.
- Comprehensive approaches should be pursued by making meat alternatives (plant-based or low-meat) better available to consumers in shops, cafeterias etc.; using public procurement to promote alternatives (e.g. in schools and hospitals, or agreeing targets with firms); focusing on pricing (meat more expensive, vegetables and meat alternatives less expensive) and taxes (carbon tax); removing subsidies for meat and subsidizing existing plant-based alternatives; being prepared to review and revise policies, as more knowledge is built up regarding what works; supporting innovation regarding the development of new plant-based (or low-meat) alternatives, along with cultivated meat; increasing education about what a well-balanced diet consists of (against the current *protein transition* to more meat and increasing use of industrial foods), as well as education regarding preserving food traditions and knowledge about food preparation.
- The case for governmental intervention should be built by figuring out economic costs of inaction, and gains from action (reduced consumption); aligning with sustainable development goals and Paris climate agreement; focusing on new sustainable food guidelines with recommendations to reducing meat; generating more research on encouraging individual behaviour change (comparing to other nutrition interventions, e.g. with sugar); developing *consumption-based* national GHG emission targets (current ones are production-based and not as effective); and making consistent policy, i.e. taking the issue into account across various governmental ministries.
- Finally, *change agents* should include, firstly, celebrities who can reach socioeconomic groups that can otherwise be difficult to reach, and secondly, women who can be first movers in a transition to eating less meat (an indication from many of the surveyed countries in the Chatham House Report), due to their generally lower will to eat meat, and their often central role in food provision.

Box 2.3 focuses on medium- to high-level meat consuming populations everywhere. Regarding the low-meat consuming populations in the Global South, Garnett (2012) notes that there needs to be much more research on what a healthy and sustainable diet could look like in many, especially low-income developing country contexts. Also the InterAcademy Partnership's report (IAP, 2018) suggests further research in this area.

Some small signs of actual change are emerging in treating interventions in meat eating as less of a societal taboo. For example, there have been sessions within the UNFCCC (COP) meetings on meat consumption in both 2015 and in 2017, although only on a very limited and unofficial scale.[113] Further, the SR1.5 report (IPCC, 2018) includes reduced meat eating as an option for limiting global warming to 1.5 degrees centigrade, and the land-use report (IPCC, 2019) discusses the relevance of reduced meat production. There has been some research at the EU level into a "what if" scenario, i.e. investigating the impacts from a more substantial reduction in meat eating in high-income countries (see Santini et al., 2015), although this scenario considers only an 11% reduction between 2014 and 2024, involving a doubling of the number of both vegetarians and flexitarians in this time.[114]

Until recently, options for governmental interventions explored in practice include some attempts at obligatory vegetarian days (perhaps most famously in Ghent, Belgium, already since 2009), fat tax (in Denmark, however, abolished soon after its enactment), and new nutrition guidelines, based on both the most up-to-date science on human health and environmental sustainability aspects. This last option is perhaps the safest for governments, being a rather low profile, and a passive form of policy action, yet at the same time, such guidelines can send a powerful message to society. They are also the basis for nutritional education in schools. In the following, I will give a brief review of the current state of affairs as regards dietary guidelines.

The official dietary guidelines in European countries and elsewhere, generally adopted after World War II, have been going through several periods of adjustment, and the national dietary guidelines have been quite diverse. Some of the newest guidelines aim to bring more consistency with the current science and between different (European) countries, while taking local food cultures into account

111 The ag-gag laws make it illegal in the United States to record animal rights abuses (with video or photos) within industrial animal agriculture facilities.

112 Zaraska mentions the Dutch brand Vegetarian Butcher as an example of one type of working with the industry.

113 See https://euobserver.com/environment/139869, an article in EU Observer on 14 November 2017. Further, COP24 in Katowice, Poland, and the COP25 in Madrid, Spain, included some more discussion on meat.

114 The number of vegetarians was estimated at 3%, and the number of flexitarians at 15% (eating 50% of the average per capita meat consumption) in 2014.

(see EUFIC, 2009). The Mediterranean diet (already part of the national guidelines in Greece) which encourages the consumption of red meat only occasionally, is supposedly taken into consideration. However, until lately, recommending a limit to meat for health purposes has been rare, and considering sustainability rarer still. The guidelines are generally a compromise between the priorities of different interest groups, such as the food industry and scientific experts, and are often published by governmental departments or agencies dealing with the food industry as well (Korthals, 2016). Such is the case in the United States where the USDA is responsible for both nutrition guidelines and the promotion of the food industry. Consequently, the USDA has had an informal policy to avoid saying that the US population should be eating less meat, or any other food for that matter (Foer, 2009).[115]

Gonzalez Fischer and Garnett (2016) and Springmann et al. (2020) have reviewed official dietary guidelines from recent years. Currently, there are guidelines for over 100 countries.[116] Of these, only a handful of countries (such as Germany, Brazil, Canada, Sweden, Denmark, UK, and China) have published official dietary guidelines that include some (implicit or explicit) aspects of sustainability of foods and eating.[117] Some countries (such as the US and Australia) have attempted to include these, but (at least in some cases mainly due to industry pressure) the final guidelines have excluded sustainability aspects. Several other countries do include some sustainability in unofficial guidelines. Generally, however, even when environmental sustainability is included, the messages are not radical, as the limits on meat are often not very far from the average intake (Gonzalez Fischer & Garnett, 2016), and demand for meat-like alternatives to meat is not stimulated by these guidelines (Korthals, 2016). However, it is still significant that pulses are promoted as a healthy protein alternative, in at least some of these new guidelines.

The 2021 Danish guidelines remarkably take food related CO_2 emissions into account, and consequently recommend limiting the amount of meat, especially

115 The USDA dietary guidelines for 2015-2020 were the first US guidelines to include a message about some people (teenage boys and adult men) potentially eating too much meat. They implied that limiting red meat might be a good idea. However, 111 g of meat (red meat, chicken, eggs) a day was recommended for a 2000 kcal diet, and this is still a rather substantial amount nonetheless. The 2020-2025 US guidelines maintain the recommendation, and no longer imply that there could be population groups eating too much meat.

116 At the time of the publication of the report in 2016, there were 83. Since then the number has grown significantly, which is something to note in itself. See http://www.fao.org/nutrition/education/food-dietary-guidelines/en/ for up-to-date details.

117 Sustainability is mostly focused on environmental sustainability in these guidelines (except for Brazil), not social or economic sustainability.

red meat. They also recommend high intake of pulses, as much as 100g a day.[118] Similarly, the new Canadian guidelines from 2019 seemingly encourage people to eat more plant-based proteins, e.g. pulses, than meat. They are also very comprehensive in offering food, nutrition, and eating-related advice.[119] One of the other somewhat stronger messages in terms of cutting down on meat eating comes from the newest 2016 UK guidelines where meat is far down the list of proteins to choose from: "Eat some beans, pulses, fish, eggs, meat and other proteins".[120] Moreover, the new guidelines in France (a traditionally meat-heavy food culture) from 2017 include some limits to meat, while giving pulses a greater role.[121] Finally, the official Chinese dietary guidelines from 2016 include a recommendation to limit meat consumption to about 50% of current consumption among the Chinese. Tian et al. (2016) consider that the most important reasons for the policy shift would be, firstly, that the increased meat eating is negatively affecting the health of the Chinese population, and secondly, that meat production is consuming too much grain that could be eaten by people instead. The Chinese Nutrition Society launched a Less Meat Less Heat -campaign in China in 2016 seemingly aiming for cuts in meat eating to also reduce GHGs.[122] Different from the national guidelines dependent on national politics, a Planetary Health Diet was developed in 2019 (Willett et al., 2019). These universal diet guidelines take into account both planetary boundaries and human health, and could become a significant reference source.[123]

Further, how an intentional increase in meat prices, for example, through a meat tax, or through eliminating governmental subsidies for animal agriculture, would affect meat eating, is not only largely unexplored (but see Springmann et al., 2016), but still a controversial matter (see e.g. Dagevos & Voordouw, 2013; Laestadius et al., 2014). Likewise, Hunter and Röös (2016:151) argue that "government policy [regarding food] rarely leverages such tools [as direct price intervention, taxation or limiting access] because they are deeply unpopular with consumers and not

118 See https://altomkost.dk/raad-og-anbefalinger/de-officielle-kostraad-godt-for-sundhed-og-klima/spis-mindre-koed-vaelg-baelgfrugter-og-fisk/ (in Danish).

119 See https://food-guide.canada.ca/en/.

120 From http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/united-kingdom/en/.

121 See e.g. https://www.foodnavigator.com/Article/2017/01/30/French-agency-ANSES-slashes-recommended-meat-intake-in-new-guidelines.

122 See http://www.fcrn.org.uk/fcrn-blogs/lucy-luo/new-chinese-dietary-guidelines-%E2%80-%93-what-do-they-really-say-meat-consumption-and for the interpretation of the Chinese guidelines from 2016, and for the (originally Australian) Less Meat Less Heat campaign which aims to have a global impact.

123 According to the Planetary Health Diet, a healthy daily meat intake (healthy for the planet and for humans, considering a 2500 kcal diet) of meat and eggs is 56 g and the same for pulses is 100 g.

without political risk". Although research has indicated that meat pricing might not be very effective in directing people's consumption, especially in the Global North (e.g. PBL, 2008), other recent empirical evidence offers some support for the idea of a meat tax (Bailey & Harper, 2015; Wellesley et al., 2015). When asking focus groups in China, Brazil, the United States and the United Kingdom, Wellesley et al. (2015) found that meat tax was considered unpopular and unfair (towards the poor), but still possibly efficient.[124] Comparing to sustainable mobility, pricing measures are seen equally unfair, but restrictions and banning (car use in certain locations) can actually be considered both fair and effective by people, even if it restricts their freedom of choice (Gärling & Friman, 2015).

An issue less often considered when discussing reductions in meat production and consumption, is the rebound effect. In this context, it can take two forms. Firstly, at an individual level, reduced eating of intensively produced meat may be replaced by eating correspondingly more other unsustainable animal protein, such as fish, cheese or eggs (Hartmann & Siegrist, 2017), or organically produced meat which shares many problems with intensively produced meat (Foodwatch, 2009; Steinfeld et al., 2006).[125] Secondly, there can be a rebound effect at the global level whereby a decrease in meat eating in the Global North leads to increased consumption in the Global South, via production or exports moving more towards the South, and/or by lower world market prices for meat (resulting from lower demand in the North) enabling the creation of new, or higher level meat consumers in the South (Spiller & Nitzko, 2015). The more inclusive in terms of conventional animal-based products and more global the transformation, therefore, the better such negative impacts (for sustainability) can be avoided.[126]

In addition to such negative spillover effects, there can be positive spillover effects (de Boer et al., 2016) whereby a change in meat eating at a personal level can lead to positive changes in other areas of personal life, such as energy use, due to interconnected goals or shared underpinning values being engaged by such action (Sanderson, 2014). Even eating organic meat — although not better, and sometimes slightly worse, than intensively produced meat in terms of climate change or deforestation — can have such positive spillover effects (while potentially having negative spillover effects, as mentioned above). More generally, studies done by

124 See Springmann et al. (2016) for an evaluation of such a tax.

125 Also, people may engage in moral licensing whereby they compensate one moral behaviour with another immoral behaviour (see e.g. Nash et al., 2017).

126 Thirdly, if the production side is the primary focus, and not consumption, increased efficiencies in livestock production (e.g. through increased crop yields or livestock feeding efficiencies) can result in a rebound effect and actually increase consumption or provide incentives for increased production, e.g. farming more land (Smith et al., 2014).

Lacasse (2016) indicate that labelling someone (after them having behaved pro-environmentally) as an environmentalist can lead to stronger positive spillover effects than not labelling them.

Even when policymakers have difficulties engaging in the issue, there would be ample space for environmental and other civil society organisations to campaign for meat reduction more efficiently and on a broader scale than they have until now (see Laestadius et al., 2014), using methods such as those in Box 2.3.

As I will argue in Chapter 3, both the new meatways and the related new discourses can have their own agentive power. In the next section, I will, therefore, review the new meatways, as real current and near-future food choices.

2.3.3 Some comparisons of the new meatways

2.3.3.1 Radical vs. incremental change

Shove (2010:1278) argues that radical innovations "redefine the rules of the game; […] render previously important forms of competence redundant; and […] reconfigure interpretations of value and significance". I suggest that the new meats — such as cultivated meat, insects ("new" in the Global North), or the new plant-based meats — can be considered radical innovations. I would consider even *strong flexitarianism*, whereby flexitarians eat conventional, animal-based meat occasionally (and various alternatives, including pulses, as their more typical diet), a radical innovation for the present, even if it is, at the same time, a very old way of eating, and globally, most people actually are flexitarians to some degree at least, even if they do not call themselves that (Hicks et al., 2018).[127]

If adopted widely as new practices of eating meat, these new meatways (eating new meats and flexitarianism) could have huge impacts on existing multi-billion industries, while creating new ones. They could redefine what meat, or meat eating, signifies for most people. They could also partly reconfigure the values people attach to different ways of eating. For example, the strictness inherent in vegetarianism and veganism loses ground to the flexibility in flexitarianism. Eating meat occasionally is considered normal in strong flexitarianism, whereas it is usually seen in a negative light in vegetarianism or veganism, by both vegetarians/vegans

127 Using the Shove (2010) definition for radical innovation, strong flexitarianism redefines the rules of the game with the idea of sufficiency, i.e. accepting much lower levels of production and consumption than would be "possible". Further, strong flexitarianism can render previous forms of competence redundant, if it leads to a large scale, or global, transformation of massive intensive production to smaller scale extensive production of meat. Moreover, strong flexitarianism reconfigures interpretations of value and significance by, for example, redefining what eating meat signifies in a system and society where it is eaten only occasionally, as a special treat. Finally, incorporating the new meats into flexitarian diets would redefine the meaning of "meat" as such.

themselves and those around them. A potential breach of identity as a vegetarian or vegan may lead people to give up their vegetarianism or veganism and join the ranks of *former* vegetarians or vegans who, in fact, often end up being flexitarians, even if they would not identify as such (Asher et al., 2014).

Weak flexitarianism,[128] whereby change is only small-scale and incremental, is unlikely to lead to radical impacts on its own. It is, however, easily argued to be a possible stepping stone for more radical change. The potential downsides to this approach range from the case where such a process from incremental to radical takes too long to have a timely and large enough impact, to the case where the development from weak to strong flexitarianism truly never takes place, and the incremental "first" step remains the only step (for this, see a review by Nash et al., 2017). Similarly to weak and strong sustainability (see Voget-Kleschin et al., 2015), weak flexitarianism may well be an entirely separate trajectory from strong flexitarianism, where the first does not lead to the second. Taking only a small step into flexitarianism could also create a rebound effect or engagement in moral licensing (whereby people engage more in other unsustainable actions) negating any positive impacts from the incremental change. The behaviour-impact gap is a crucial, but frequently overlooked concept (see Csutora, 2012; Geiger et al., 2018; Gjerris et al., 2016).

In their discussion on various pathways towards sustainable meat eating, Verain et al. (2015) distinguish between radical and incremental change. However, they look at the definition from the point of view of the eater, so that in radical change, fundamental changes are made in meat consumption patterns. I would argue that, although fundamental changes may be required in terms of consumption (or production), the principal difference between radical and incremental change might be better defined in terms of impacts, rather than in terms of how difficult such change may be to consumers or other parts of society. Defining the radical/incremental contrast in terms of impacts helps us focus on what really matters — a way out of the crises — rather than how difficult the change may, or may not be. Radical change is very often difficult as such, and although focusing on the difficulties may be important for achieving change, the radical reduction in impacts is the ultimate goal.[129]

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128 Terms "heavy flexitarianism" and "light flexitarianism" exist as well (see e.g. Dagevos and Voordouw, 2013). However, there are two reasons why "strong" and "weak" may be better terms. Firstly, they align with strong sustainability and weak sustainability, and the radical vs. incremental nature of change in these. Secondly, "heavy" can be seen as negative (e.g. referring to weight of a person), whereas "strong" is normally seen as positive, and vice versa, "light" is more likely to be seen as positive, and "weak" as negative. The signals are therefore pointing to the wrong direction with "heavy" and "light".

129 Radical change in terms of impacts might mean, for example, that less land is needed for agriculture in the future than currently, even with the expected global population increases,

2.3.3.2 The new meats

The new meats — cultivated meat, the new plant-based meats[130] and insects — have created high *expectations*, even hype. Donaldson (2016b) refers to "redefining the game" with the new meats.[131] Cultivated meat is promoted by its advocates as a wonder solution to the meat crisis,[132] similar to those promoting the new plant-based meats.[133] Apart from the obvious difference in origin and production methods, one of the main differences between these two new meats is that cultivated meat is only gradually becoming a real available product,[134] whereas the new plant-based meats have already been that for some time. However, even the high-tech plant-based meat is still rather new, and only available in somewhat limited locations, which on its own may increase the hype. Further, even insects have created some degree of hype, although considerably less so.[135] Insects are of course an ex-

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or that the species extinction rate decreases rather than increases. Or, it might mean that GHGs produced by agriculture are made as low as possible, not in the current system, but in a transformed agricultural system. Or, that waterways recover and become less polluted by agriculture, even with population increases.

130 Plant-based meat substitutes as such are of course not a new phenomenon, with tofu being the oldest and going back two thousand years in Asia. Tofu and other somewhat older meat analogues, developed in the last few decades, are not covered in this book, as they have mostly been considered and marketed for vegetarians or vegans until now, rather than for meat eaters. While tofu never even intended to resemble meat, also the older meat analogues have actually not resembled meat very much, except perhaps in appearance. In comparison, the new plant-based meat is intended to be much more meat-like, and the more they develop, the more meat-like they are expected to become, in texture, appearance, mouthfeel, smell and taste, up to the point of being identical to meat in these respects. In this book, I usually refer to new (or new generation/high-tech) plant-based meats when referring to these meat substitutes. For an overview of both cultivated and plant-based meat, see Dance (2017).

131 Some of the related popular book titles from the last couple of years include: "The future of meat without animals" and "Clean meat: How growing meat without animals will revolutionize dinner and the world".

132 This was clear, for example, in a panel discussion at Stanford University https://ethicsinsociety.stanford.edu/events/meat-without-animals-considering-cellular-agriculture, from 12 January 2017. See also https://gizmodo.com/behind-the-hype-of-lab-grown-meat-1797383294.

133 See e.g. https://www.theguardian.com/commentisfree/2017/apr/18/veggie-burger-clean-meat-revolution-plant-foods-animals from 18 April 2017.

134 A significant step was taken in late 2020 when food authorities in Singapore approved cultivated chicken for sale. See https://www.theguardian.com/environment/2020/dec/02/no-kill-lab-grown-meat-to-go-on-sale-for-first-time. It is currently possible to taste (but not buy) cultivated chicken at a restaurant in Israel. See https://www.theguardian.com/food/2020/dec/04/no-kill-lab-grown-chicken-burger-restaurant-israel.

135 See e.g. https://www.theguardian.com/lifeandstyle/2013/aug/05/can-eating-insects-feed-world from 5 August 2013, or https://www.ted.com/talks/marcel_dicke_why_not_eat_insects, a TED talk from 2010.

isting food, but not on the scale (and not with the price) that would be required, if they were to replace a significant part of currently produced animal-based meat.

It is only relatively recently that meat analogues have been marketed and regarded as food for those eating conventional animal-based meat, i.e. non-vegetarians,[136] and the new plant-based meat, such as the products from Impossible Foods or Beyond Meat have non-vegetarians as their main target market. This is a significant change and can have an impact on redefining meat. Chapter 3 will discuss further the question of what meat is.

As such, new technologies tend to create hype, which is argued to be a necessary part of their development (see e.g. Magneson Chiles, 2013). A central idea in the *sociology of expectations* is that "speculation upon what might happen tomorrow makes things happen in the present day", i.e. expectations are performative (idem:514). Usually, there is a contrast between positive and negative expectations, and the media plays a central role in creating and maintaining these expectations, and therefore, it also plays an important role in creating the future.

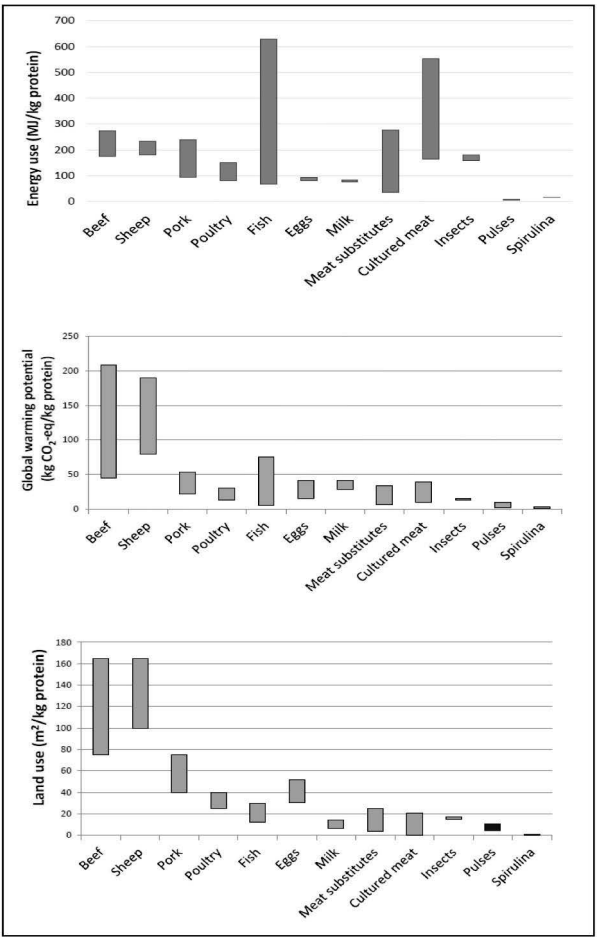
To help avoid a significant behaviour-impact gap (Csutora & Zsóka, 2016), the real-world impacts of the various alternatives need to be thoroughly estimated. However, there is still little precise information on the impacts of especially large-scale replacement of conventional animal-based meat by any of the new meats, such as cultivated meat, new plant-based meats or insects. Figure 2.11 shows some comparisons of impacts as life cycle analyses, including pulses, and comparing the alternatives to the production of beef and other conventional animal-based meats and other protein sources. These graphs indicate that, although the range of estimates is rather large and quite high for energy use, especially for cultivated meat, the included new meats do come out well for GHGs and land use.[137]

Further, in some situations, different studies can produce rather different results. With cultivated meat, the estimates are based on a handful of life-cycle analyses (mainly Mattick et al., 2015; Tuomisto et al., 2014; Tuomisto et al., 2017; Tuomisto & Teixeira de Mattos, 2011), and these results vary a great deal. Importantly of course, as cultivated meat is only in the process of becoming a real product, it is reasonable that estimates of impacts have a large degree of uncertainty, as different production methods related, for example, to bioreactor design and growth medium, are considered in different studies (see Tuomisto et al., 2017), and the future technology to produce cultivated meat most efficiently

136 An indication of this can be seen already in this 2012 news article https://vegnews.com/2012/3/market-for-fake-meat-booming.

137 Water use was not estimated in this study. Moreover, the meat substitutes do not include the new generation plant-based meat, but tofu, tempeh etc. (original data for these is from Blonk et al., 2008).

Figure 2.11: Energy use, greenhouse gas potential and land use of different protein sources



Source: Tuomisto et al. (2014) and Tuomisto et al. (2017).
Notes: The height of the pillars indicates the range of different results; cultured meat refers to cultivated meat; water use was not estimated in this study; moreover, the meat substitutes do not include the new generation plant-based meat, but tofu, tempeh etc. (original data for these is from Blonk et al., 2008).

may not even be known yet.[138] The eventual scale of production can make a large

138 One near future option for both cultivated meat (for the growth medium) and plant-based meats (directly) could be to use fermented protein produced directly from CO2, water and

difference as well. In particular, the large energy footprint of cultivated meat could come considerably down in the future (e.g. Smetana et al., 2015).

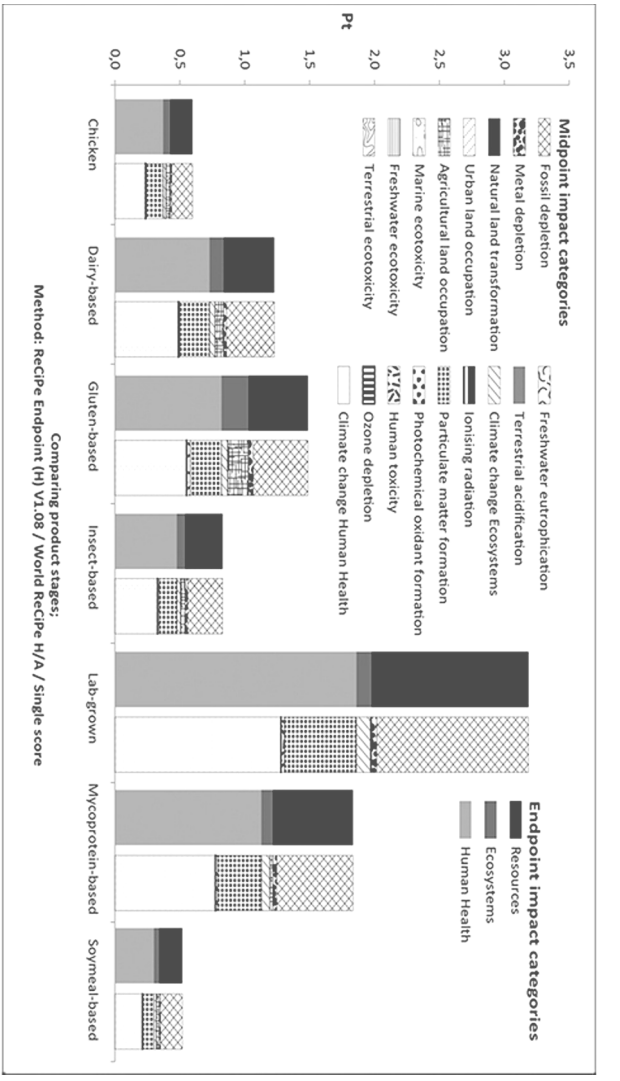
Moreover, Figure 2.12 shows a detailed comparison of different impacts from chicken, the most environmentally friendly from conventional animal-based meats, and various other protein sources, such as cultivated meat and insects, along with substitutes based on soy, mycoprotein (Quorn) and gluten. However, the newest meat analogues are not included.[139] In conclusion, cultivated meat does badly in this comparison, mainly due to the amount of energy currently required to produce it. Soy-based meats seem to have low impacts, and chicken and insects do not perform badly either in these estimates. On the other hand, Figure 2.11 indicates clearly that pulses[140] have the lowest environmental impacts of all the discussed alternatives, with a very narrow range of estimates.

electricity. Pioneering start-up company Solar Foods has called their protein product Solein. Such "farm-free" food innovations could affect the footprints and prices of the new meats significantly. See e.g. https://www.theguardian.com/commentisfree/2020/jan/08/lab-grown-food-destroy-farming-save-planet.

139 Such as the products made by Impossible Foods, or Beyond Meat, i.e. products that are a focus in this book.

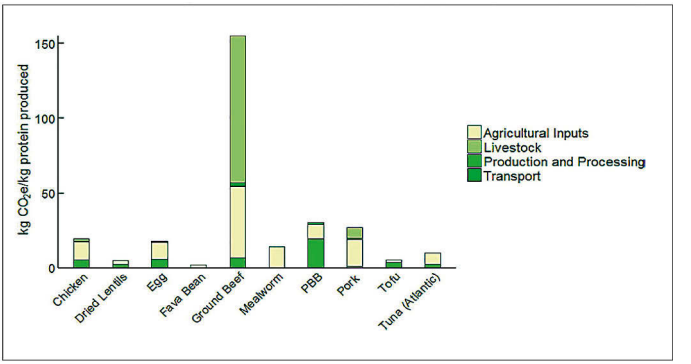
140 Together with spirulina, an algae.

Figure 2.12: Life-cycle analyses — Comparing chicken with alternative protein sources



Source: Smetana et al. (2015).
Notes: Data unit is 0.3 kg of digestible protein; dairy-based alternatives refer mainly to milk and cheese; LCA methodology does not measure all impacts, such as animal welfare impacts; further, land-use change impacts are not included in the methodology of Smetana et al. (2015), although they argue that these are not substantial for soy meant for direct human consumption; Pt refers to points given for the scale of impacts.

Figure 2.13: Greenhouse gases embodied in different foods, including the Impossible Burger



Source: Goldstein et al. (2017).
Note: GHG emissions are measured in kg CO2e/kg protein produced. PBB stands for a plant-based burger, and the Impossible Burger, made by Impossible Foods, has been used for the calculations.

As regards the newest plant-based meats, such as the products made by Impossible Foods or Beyond Meat, there are, as of yet, few comparable life-cycle analyses done. The companies have done some of their own estimates, at least partly in cooperation with outside researchers, and in these, plant-based meat performs well, at least when compared to beef. One such study has been done by Goldstein et al. (2017) and contains a life-cycle analysis of the Impossible Burger. Figure 2.13 shows a comparison between the Impossible Burger (PBB) and other protein sources in terms of GHGs embodied in these foods.[141]

141 For water and land use, the company itself estimates that "one Impossible Burger uses about one quarter of the water [and] 5% of the land" as compared to a burger made from typical US-produced cows. (IF Sustainability Report 2017, available at https://impossiblefoods.app.box.com/s/edwcfyvojzsvzn5d633dxt4c4ehyzqq3. The energy requirements for Impossible Burger, on the other hand, are currently comparable to the low end of beef production (Rebekah Moses, Sustainability and Agriculture Manager of Impossible Foods, personal communication, 27 August 2018).

Table 2.1 gives a brief overview of the three new meats, cultivated meat, insects and plant-based meat, in terms of some of the main actors, issues and developments.[142] The most important aims with all such alternatives are, on one hand, to make something radically better from an environmental point of view as compared to conventional animal-based meat production, and on the other hand, to achieve wide acceptance of these foods as meat, as long as "meat" is considered a necessary element of food cultures.

Strong flexitarianism, which could be defined — in light of the new meats — as including any kind of meat, also plant-based or animal-based meat, or insects, only occasionally, and relying more on pulses for protein, seems overwhelmingly the best option for environmental impacts, while being a healthy option, and arguably healthier than processed foods in general, while fairly likely being ethically more just. Although the question remains, how to mainstream strong flexitarianism (occasionally eating meat), as opposed to weak flexitarianism (occasionally avoiding meat),[143] flexitarianism as a phenomenon is seen as a significant step towards sustainable meat future (see e.g. Verain et al., 2015).

However, it could be that the mere availability of the new meats can function as a way to open up, not only what meat is, but the daily practices of meat eating as well, and change the values attached to eating meat.[144] Because of the new meats, it could be possible for people to experiment with, not only the new meats themselves, but also with flexitarianism. The oppositional positioning between meat eaters and meat avoiders (vegetarians/vegans), which have until now determined each other (Arouna Ouedraogo, personal communication, 15 February 2017), might be eroding with the new meats and with the newly discovered option of flexitarianism which is less dogmatic and, therefore, creates less resentment (de Boer et al., 2014). Chapter 3 will discuss these issues further. But first, the next section will still have a look at pulses, as they are inevitably an important part of a sustainable future of protein.

142 The developments and the expansion of the number of actors within especially cultivated meat are rapid, and therefore, Table 2.1 only captures some of the main ones. The Good Food Institute is a good source for up-to-date information (www.gfi.org).

143 The term "flexitarian" originally referred to flexible (occasionally meat-eating) vegetarians, or semi-vegetarians, but now includes meat eaters who do not eat meat every day (de Boer et al., 2014). Strong flexitarianism can be seen to refer to the original meaning and weak flexitarianism to the newer meaning. In fact, many vegetarians are strong flexitarians, as they do occasionally eat meat, even if they identify as vegetarians.

144 Similar to what de Bakker and Dagevos (2012) argue could happen with extra focus on promoting organic meat.

Table 2.1: Some of the main actors, developments and issues related to new meats

	Cultivated meat (Bhat et al., 2014; Dance, 2017; Ferrari, 2016; Post, 2012; Stephens et al., 2018; Verbeke et al., 2015)	**Insects (DeFoliart, 1999; EFSA, 2015; Lundy & Parrella, 2015; Tan et al., 2015; van Huis et al., 2013; Yen, 2015)**	**Plant-based meat, the new generation (Dance, 2017; Sexton, 2016)**
References (for technical details etc.)			
Examples of production and sale	Start-ups: Mosa Meats (NL), Memphis Meats (US), Modern Meadow (US), SuperMeat (IL) etc.; no consumer sales yet	Wild harvesting, semi-domestication, and some farming in the South, for domestic use and exports, e.g. Thailand; small, often online start-ups in the North, e.g. Snack Insects (DE), Tasty Bugs (NL), Dimini Cricket (FR), Tiny Farms (US); some North small to medium-scale farming, and restaurants with insect dishes	Start-ups: Impossible Foods (US), Beyond Meat (US) etc.; possibly included in this generation: Vegetarian Butcher (NL); restaurants and supermarkets especially in the US selling the new generation products, but expanding to other parts of the world
Other orgs supporting with research & PR; other investors	New Harvest (US), Good Food Institute (US); ShojinMeat (JP); conventional meat companies, e.g. Tyson, Cargill investing; Bill Gates, Richard Branson; IndieBio (US, start-up accelerator); China (trade agreement with Israel)	FAO produced a landmark report in 2013 (van Huis et al., 2013); relatively large amount of academic interest in research; some EU funded projects, e.g. ProteINSECT; policy interest in China (to note, 2nd global conference Insects to Feed the World was held in China in 2018)	New Harvest (US), Good Food Institute (US); IndieBio (US, start-up accelerator); Leonardo DiCaprio, Bill Gates; venture capital firms
History and state of play, what makes it special	Over ten-year scientific development until now; many prototypes exist; tasting is currently possible in Israel (with SuperMeat) and Singapore will allow commercial sale in 2021 (chicken from US company Eat Just); animal-based without killing animals (in principle); several production techniques exist; a lot of media attention; part of a new discourse on clean meat (products) and cellular agriculture (field of science); promises to open up meat production (currently done behind closed doors)	Existing food for thousands of years, and still forming a relevant part of diets in many countries in the South; there are around 2000 edible species known; existing food in the North as animal feed, e.g. for pets, chicken, and fish; in terms of human food in the North, there has been low interest over decades, but increasing media attention in the last 10 years or so	Existing product ("bleeding hamburgers" etc.), a new, more high-tech generation following from older plant-based meat substitutes (e.g. Quorn, Tempeh); more meat-like; a lot of media attention, especially in the US; part of a new discourse on meat alternatives; can be seen as plant-based cellular agriculture; see Dance (2017) for a review of the new meats produced without animals
Main issues for the future	Finding inexpensive animal-free growth medium; scaling the production up, bringing the price down; making it safe (e.g. from pathogens) and efficient enough especially in terms of energy use; image building, overcoming disgust; legislative issues; critical issue: what would be the environmental impacts of large scale production of cultivated meat if it were to replace conventional animal-based meat?	Legislative issues partially solved in the North; lack of data on harvesting, consumption & trade in the South; overcoming disgust, image building (not only food for the poor, while also supporting food security); scaling production up in the North, moving into farming or sustainable harvesting in the South; making farming safe and more efficient without environmental damage, research on feed for the insects; risk issues; ethical issues; critical issues: is this alternative supporting the global meat complex (as feed for meat animals), or is it a real alternative as food for people? Is mass production of insects better than mass production of chickens?	Legislative issues in terms of producers being able to call their products some form of "meat" (e.g. France banned the use of words referring to meat, e.g. "sausage" in 2018 for plant-based products; other courts have considered similar bans); making the product enough meat-like to attract large numbers of meat eaters; image building; market building; environmental impacts of large scale production, if intended to replace meat?

2.3.4 Pulses – The future new meat?

Since beans, lentils and other pulses are an important option for global future protein, they are included here, although pulses cannot yet perhaps be considered a new meat as such.[145] While being an important part of the diet in many countries, especially in the Global South, and traditionally in some European countries, especially in Spain,[146] pulses have not until now generated much interest as part of the solution narrative to the meat crisis, as mentioned earlier in Section 2.2.2. This is despite them being excellent from a nutritional point of view (see e.g. Asif et al., 2013; Mudryj et al., 2014), and from an agricultural point of view, especially in terms of soil health (see e.g. FAO-FNS Forum, 2016). There are some recent research developments, such as efforts to breed short-cooking beans (see e.g. Meadows, 2016) or to collect better data for assessing the production possibilities (Cernay et al., 2016), and the United Nations International Year of Pulses in 2016 has inspired new research in the area, especially within the new ten-year research strategy on pulses (Broom, 2016) coinciding with the UN Decade of Action on Nutrition 2016-2025. Further, a Global Pulse Brand[147] has been launched to help the food industry promote pulses, e.g. by incorporating them in other foods. There is therefore also some image improvement going on. However, for wider discourses, media visibility of the Year of Pulses was fairly non-existent, at least in the Global North.[148] Moreover, at least in some contexts where the International Year of Pulses was seen as successful (e.g. in Australia), its success was claimed to originate from pulses being promoted as an additional food to meat, not as a replacement for meat.[149] This obviously goes against seeing increased pulse consumption as a way to help solve the meat crisis.

Already in 2002, Schneider called for a strategy for lifting the image of pulses in the Global North, calling for communication campaigns, development of more modern, convenient and varied pulse products, more research and the coordination of integrated chains from domestic producers to industry to consumers. Further, she noted that in Australia, there was a remarkably rapid and steep rise in domestic pulse consumption in the 1980s (reaching above the levels in Spain), and argued

145 But see e.g. Jallinoja et al. (2016) where pulses are treated as an outstanding meat alternative for meat eaters.

146 However, many traditional meals in Spain include both pulses and meat, although considering from a nutritional point of view only one of these would be desirable.

147 See http://pulses.org/pulse-brand.

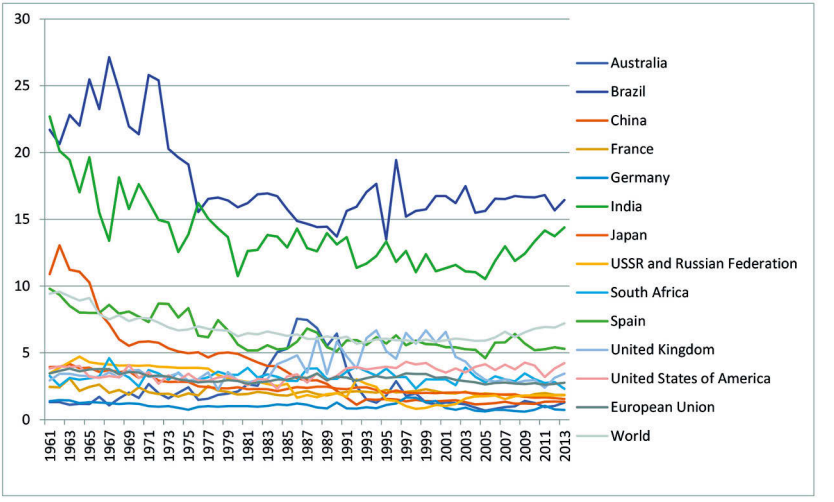
148 For example, there were no news articles in the UK Guardian in 2016 regarding the International Year of Pulses, although alternatives to meat as such are a common topic in the Guardian.

149 See http://www.farmweekly.com.au/news/agriculture/agribusiness/general-news/campaign-promotes-pulses-globally/2753776.aspx.

that this was due to the image of pulses being changed in Australia. However, the FAOSTAT data shows that the rapid increase was followed by a rapid decline about a decade later, which may have been due to increased exports, especially to India where markets were opened to other countries from the mid-1980s (Siddique & Sykes, 1997). It, therefore, remains an open question why the domestic Australian pulse consumption rose so rapidly. If this was due mostly to industry strategy and marketing, it was very efficient indeed.

Figure 2.14 shows the trends in pulse consumption over the last half a century for 12 countries. Although world consumption has risen slightly in recent years, the longer trend has been towards lesser use of pulses. Of the top ten pulse consuming countries, seven are in Sub-Saharan Africa, with Rwanda and Niger currently at the top[150] and with both countries' per capita consumption, surprisingly, more than twice as much as India's.

Figure 2.14: Per capita pulse supply in various locations from 1961



Source: FAOSTAT.
Notes: Data in kg/person/year; data for USSR until 1991, for the Russian Federation from 1992; the 12 countries are the same as those in Fig. 2.5 for meat; the data is supply, not consumption; there is no exact information on how much various losses account for with pulses; all food and agriculture-related data from FAOSTAT is available from 1961.

Pulses can hardly compete with the excitement related to the high-tech start-ups working on cultivated meat and new plant-based meats. As they are, how-

150 These countries are not shown in Figure 2.14.

ever, the original and arguably the best meat alternative, for human, animal and environmental health, it may be unfortunate that pulses even have to compete. Although pulses as basic products without much further processing do not create big profits for the food industry, people can, however, already incorporate them into their diets. Pulses do not necessarily need further development, although the research investigating breed varieties of beans that cook faster, or are more weather resistant can certainly make acceptance easier in the Global North, and contribute to food security in the Global South. In terms of the giving pulses a "makeover" to make them more appealing, Jallinoja et al. (2016:12) argue that new associations are necessary to see pulses as "festive, fulfilling, energizing and pleasurable food", similar to how meat has been seen until now.[151] Associations can change through practices, and a new food can be accepted through frequent exposure. So, could pulses also change from being associated with only vegetarians or vegans to being a relevant meat alternative — a new meat — for everyone? For a new "bean-eating practice" to develop in Europe, elements of "positive meanings, appropriate materials, and skills and competences" (idem:6) need to be in place. Jallinoja and colleagues call for the promotion of flexitarianism and seeing meat eating and vegetarianism (or veganism) not as opposites, but as points on the same continuum. This could make moving along that continuum easier, and replacing (some) meat with plant-proteins a more relaxed affair, and therefore more easily a routinized and embodied practice.

Although, for example, Verain et al. (2015) note that flexitarianism can just be a food style among many others, rather than a step towards eventual vegetarianism, it could still be that the different clusters of eaters — such as those identified by Verain and colleagues — are on the same continuum or journey from avid meat lovers to vegetarians and vegans, but just at different points on that journey. While some might never move much forward, others walk all the way.

151 Schyver and Smith (2005) also call for work on changing the image of soy.

2.4 Conclusion and discussion

Considering the new meats on a practical level, even if cultivated meat would be a significantly more environment and climate-friendly option than animal-based meat, and even if it could compete in price and quality with animal-based meat soon, I suspect that the production of it could not replace the massive production system for animal-based meat in a short enough time, nor would it seem sensible to perform such full-scale replacement, at least from the environmental impact point of view. Further, even if farming insects would be more climate or environment-friendly than farming conventional animals (per kg of protein), farming insects at a scale even remotely similar to current animal farming in the near future, and without causing damage at the same scale, would seem rather challenging. As an illustration, the meat from one single modern meat cow would correspond close to 2 million mealworms.[152] The new plant-based meat replacing processed animal-based meat would likely be a feasible option. Combining different alternatives in individual strong flexitarian diets — such as some plant-based meat, some cultivated meat,[153] some insects, with a small amount of extensively raised more conventional meat animals (at least in the Global South) — might work. However, this would still amount to a radical change in how "meat" is produced, and in what people eat when they eat "meat", and how much "meat" they eat.

Increasingly the necessity of changing practices related to producing and eating meat is being recognized, although still often in minor ways.[154] Survey results indicate that many people might be willing to cut down on their meat eating or even change to the new meats.[155] It could be argued, however, that these surveys reflect the ideal self more than any realised action at the level of daily practices (Lalwani, 2009).

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152 This estimate is based on the following: one average meat cow from conventional production has approximately 200 kg of meat and one (currently) average size mealworm weighs just over 0.1 grams.

153 Or cultivated fish — another product under development — to counter the depleting fish stocks.

154 For example, the new scientific IPCC SR1.5 report (IPCC, 2018) recognizes a need to look into meat consumption, but this has not yet been recognized officially at the policy (COP) meetings.

155 For example, survey results in Lee and Simpson (2016) suggest that 29% of the UK population had cut their meat eating in 2013-2014. Other survey results claim that the Generation Z (those born from around the turn of the millennium, although definitions vary) is leading the change from meat to plant-based meat (http://uk.businessinsider.com/generation-z-is-eating-fake-meat-2017-10?r=US&IR=T). Similarly, a 2017 YouGov poll in the UK found that 56% of the respondents agreed that meat is not necessary in order to have a good meal. See https://yougov.co.uk/news/2017/04/06/over-half-happy-have-meat-free-meals/.

At the same time, in other surveys, awareness of the particular issues related to the broken meat system, especially regarding its connection to climate change, still seems to be low (e.g. Wellesley et al., 2015). In line with this, the meat consumption data still does not show any significant declines for most countries, the global per capita consumption is still going up, and the FAO still predicts enormous future rises in the "demand" for meat.

I would suggest that the willingness of survey respondents to cut down *in the future*, but not today, may be linked to a phenomenon called *ethical mirage* (Tenbrunsel et al., 2010), whereby we expect to behave in line with our ideal self (or our should-self) in the future. Further, it may be that the low awareness (when asked in a survey question) is, in fact, partly strategic ignorance, a coping mechanism for the difficulty in accommodating both the ideal self, and the values related to it, and the daily practices of eating animals. Even those who claim to have already reduced their meat eating in the past may be influenced by ethical mirage, whereby we use our ideal self to explain our past behaviour, and thereby give more inaccurate assessments. Chapter 3 will explore these issues further.

In conclusion, the world needs to question the meat demand paradigm (Garnett et al., 2018), and the broken meat system needs to be fixed, if not entirely unmade, redone or replaced. Currently, however, there is no societal action plan for any of that. Rather, there is still large-scale denial and doubt among much of the public, and even policymakers, about the problem in the first place. The new meatways, however, offer an alternative (Zaraska, 2016a), even if this is not yet given much emphasis. Purposive change may often start from the level of discourse — in terms of some agreement about a problem, and a search for solutions — and I suggest that perhaps the most important role of the new meatways in the very near future is and will be at the level of discourses. Fortunately, discourses as regards both the necessity of change and the new meatways already exist. These discourses are by no means universal and are still limited to certain media, of which the UK Guardian newspaper is an example.

In Chapter 5, I explore, through the data from the Guardian, answers to my research question related to how the new meatways and discourses around them could enable radical changes in meat-eating related practices, importantly bringing the related values closer to the ideal self, and thereby hopefully reducing the need for coping mechanisms regarding meat.

First, however, Chapter 3 will focus on explaining the above concepts in more detail. It will combine and expand on different concepts within social practice theories. It will also argue for the relevance of discourses as regards changing practices purposively. Bridging social practices and discourses has still not been explored much in detail in literature, and as mentioned in Chapter 1, I hope to offer some insights into the connections in the next chapter.