

Chapter 8

Meat Consumption and Sustainability: How Might It Be Possible to Change the Behavior of Consumers?

Jana Rückert-John

Abstract Current patterns of meat production and consumption have multiple negative consequences from a sustainability perspective. Nutrition and sustainability are closely linked, and meat production and consumption are widely recognized as environmentally harmful. The widespread adoption of healthy nutritional habits could lead to a more sustainable nutrition system, but this requires not only structural changes within the food system itself but also substantial behavioral change on the part of consumers. This chapter inquires why such a change is so hard to achieve. It examines the debate on the repercussions of meat production and consumption for human health and the environment; discusses meat consumption within the context of nutritional practices; and introduces possible ways of changing the nutritional practices of consumers. It argues that only by understanding the nature of meat-based diets and their associated dietary practices will it be possible to bring about significant change in people's dietary habits.

Keywords Meat production • Meat consumption • Meat-based diet • Nutritional practices • Dietary practices • Health • Environment • Consumer • Change

8.1 Introduction

Nutrition and sustainability are closely linked. Food production and processing, supply and demand, consumer preferences and consumption patterns, and, last but not least, the management of food-waste-induced climate change are only a few of many critical environmental issues in which nutrition and sustainability interact. Other key factors include biodiversity, as well as the use of oil, water and land resources.

J. Rückert-John (✉)
Fachbereich Oecotrophologie, Hochschule Fulda,
Leipziger Str. 123, 36037 Fulda, Germany
e-mail: jana.rueckert-john@he.hs-fulda.de

Meat production and consumption are widely recognized as environmentally harmful. In terms of sustainable development, meat consumption has not only ecological consequences, but also economic, social and, above all, health repercussions. The consumer also plays a central role here, for healthier nutritional habits could lead to a more sustainable nutrition system. This means, first and foremost, less meat in the diet, as well as more responsible behavior on the part of consumers.

It is often thought that such a change must be predicated on a rational approach to consumption. For example, it is often conjectured that a greater understanding of human health and the ecological consequences of meat consumption will lead to modifications in people's nutritional practices. However, many studies in the fields of nutrition and sustainability show that theoretical knowledge is only one factor influencing the formation of daily practices. This is especially true of decisions made regarding alternative practices (such as, for example, eating proportionately less meat and more vegetables). Despite awareness of the harmful effects of a diet with a high meat content, unhealthy and unsustainable behaviors are widely observed among consumers. It is therefore pertinent to ask why a reduction in meat consumption is so hard to achieve.

The following takes a closer look at the debate on the repercussions of meat production and consumption for human health and the environment. The next section discusses meat consumption from a social science perspective within the context of nutritional practices. The last part introduces possible ways of changing the nutritional practices of consumers.

8.2 The Ecological and Health Consequences of Meat Consumption

8.2.1 Status Quo and Prognosis for Meat Consumption

According to the calculations of the United Nations Food and Agriculture Organization (FAO), more than 300 million tons of meat were consumed in 2012. The global average per capita consumption lay at 42.5 kg per year. Though a considerable consumption gap remains between poor and wealthy countries, it is quickly closing. The FAO states that in 2006 the average resident of a developing country consumed 30.7 kg of meat. By 2012, this had risen to 32.7 kg—an increase of almost 7%. Although meat consumption in industrial countries sank from 81 to 79 kg per capita within the same period, it remains high. In Germany alone, 58 million pigs, 630 million chickens and 3.2 million cows are slaughtered annually. Germany now slaughters more pigs annually than any other country in Europe. By contrast, more than 660 million pigs are slaughtered each year in China. However, it must be noted that in Germany meat consumption for 2012 averaged about 2 kg less per resident [1]. Nonetheless, at roughly 60 kg per person, meat consumption in Germany remains considerably above the global average of 42.5 kg.

The increased demand for meat is attributable to population growth, higher income, and changes in eating habits [2]. The FAO estimates that global meat production will almost double from 229 million tons in 1999–2001 to 465 million tons by 2050. This estimate is based on a projected worldwide population of 9.1 billion people by 2050 [2].

8.2.2 The Ecological Repercussions of Meat Consumption

In the debate on sustainable nutrition, the issues most often discussed are the enormous ecological and health impacts associated with meat production. A central theme here is the effect of meat production on the earth's climate. All along the food chain, agricultural production, food processing, food marketing and food retailing generate considerable greenhouse gas (GHG) emissions. In 2006, the European Commission calculated that 20–30% of all GHG emissions in the European Union (EU) are caused by the production, supply and consumption of foodstuffs [3, 4]. For Germany, Fritsche et al. [5] put GHG emissions attributable to food production and consumption at 16%. However, in a study that consolidated several other studies, Nieberg [6] estimated these values at 14–22%. Here almost 70% of the direct GHG emissions can be traced back to products of animal origin. By contrast, only about one third of these emissions are attributed to plant-based products. Throughout their food chain, Germany's 81 million residents produce c. 164 million tons of CO₂ equivalents directly through their nutrition. Almost 67 million tons of this total is attributed to meat consumption alone, while only a tenth is traceable to fruit and vegetable consumption.

In addition, livestock farming is linked to increasing water resource problems. A growing population, as well changes in lifestyles and consumption patterns, translates into a higher demand for water. This, in turn, means that more pressure is placed on natural resources and ecological systems. According to the UNESCO water report, global demand for water will increase by 55% from 2014 to 2050 [7]. Accounting for 70% of total water extraction, the agricultural sector is a major water user. Animal husbandry represents 80% of global water usage, and 7% of this is needed for feed production. Calculations from the German Federal Statistical Office put the virtual water usage in Germany per ton of beef at 16,000 m³. For pork, this figure is 4,000 m³. By comparison, plant products use considerably less water per kilo: wheat (1,300 L), tomatoes (184 L) and bananas (859 L) [8]. Water consumption is not considered the only problem here; there is also the problem of the water pollution that goes along with animal husbandry. This leads to eutrophication, dead zones in coastal areas, increasing health problems, and resistance to antibiotics [2].

Not only are enormous amounts of water used for meat production; a large portion of arable farm land is also utilized for this purpose. Worldwide agricultural production requires a surface area of about five billion hectares. Of this total, 3.9 billion hectares are used for livestock farming, and ultimately for producing food

products of animal origin. Assuming that global demand for meat continues to increase, so too will the need for agricultural land, and the competition for these surface areas. For meat consumption in Germany at today's levels, almost 19 million hectares are needed. This exceeds Germany's available arable acreage. In terms of arable land per person, it is estimated that in less than 20 years, 2,000 m² of agricultural surface area per person will be available [9, 10]. Current meat consumption in Germany, which requires 2,900 m² per person, already exceeds available amounts projected for the future. This problem of land usage does not concern Germany alone, but rather all of Europe; land usage for the production of meat is often shifted onto other countries on other continents, such as South America. Between 2008 and 2010, this included on average more than 30 million hectares that the EU occupied 'virtually'. This equates to the combined surface areas of Hungary, Portugal, Denmark and the Netherlands. Germany's portion of this 'virtual land usage' is about seven million hectares. This is roughly the size of the Federal State of Bavaria [11]. Animal feedstuff is largely responsible for this virtual land usage outside the EU. For soy and soy product imports alone, Germany uses some 2.5 million hectares of net virtual land surface, especially in Brazil and Argentina. To this end, rain forests are lost, soils are saturated with pesticides, and foodstuff prices rise, all on account of increased competition for agrarian surfaces.

8.2.3 The Health Consequences of High Meat Consumption

Meat is consumed on a daily basis in many countries. Indeed, in Germany and other industrial countries, meat is consumed in high quantities [12, 13]. Based on recommendations from the DGE (the German Society for Nutrition), as well as other international organizations such as the World Cancer Research Fund (WCRF), too much meat is consumed in Germany and in Europe in general. In 2008, a national consumption study came to the conclusion that the average adult in Germany consumes more than 120 g of meat daily [14]. By contrast, the DGE recommends a daily average of only 64 g per person [15], with the WCRF recommending 71 g daily for adults [16]. This means that Germans eat twice the amount of meat recommended by nutritional experts.

From the nutritional standpoint, meat is considered an important part of a balanced diet for humans. At the same time, high meat consumption is considered by the DGE and WCRF to be linked with health risks. These risks stem from the high intake of animal fat (especially saturated fats) that accompanies a diet high in meat, as well as the way the meat is prepared. Red meat and meat manufacturing processes such as smoking, pickling and salting are considered particularly problematic [12, 14]. Among the nutrition-related diseases linked with high meat consumption are cardiovascular diseases (such as coronary heart disease or stroke), oncological diseases (such as colon cancer), and type 2 diabetes. In the debate on nutritional physiology, however, it is stressed that the cause of these diseases cannot be

reduced to high meat consumption alone. Thus, renouncing meat does not necessarily lower a person's risk of cancer [12].

8.2.4 Factory Farming

Meat production today is typically carried out by means of factory farming, which puts places severe strains on the welfare of the livestock. Factory farming generally means crowded housing conditions for animals: examples of standard values here are 2,500 fattening pigs, 750 sows, 600 cows or 40,000 chickens per operation. In recent years, the number of individual farm operations in Germany has decreased while their respective size has increased. This is primarily due to technological advances that encourage the production of more animals with fewer personnel. In addition, economic pressures play a substantial role: meat and products of animal origin are often sold at cheap prices.

For the animals, factory farming means that along with crowded living quarters, they are forced to produce unnaturally high outputs and achieve maximum weight in the shortest time possible. Overcrowded and cramped living negatively influences their social behavior and generates stress and frustration. To avoid injuring each other, these animals must undergo surgical procedures (e.g. the dehorning of cattle and the removal of piglets' curly tails). Illness is another common consequence of factory farming. Especially widespread are cardiovascular problems, bone deformations due to excessively rapid weight gain, ulcers, and behavioral disorders. These illnesses require medical intervention and treatment. Here the massive use of antibiotics is particularly problematic. For example, a broiler chicken has an average lifespan of 32 days, and during that time will be treated 2–3 times with antibiotics.

8.2.5 Reduced Meat Consumption as a Possible Solution

The difficulties discussed in the following debate on sustainable nutrition are not comprehensive. Rather, this paper aims to illustrate from various social perspectives the obvious problems linked with meat production and higher meat consumption. These problems, which denote an unsustainable nutrition system, are the starting-point in the debate. By this means, the foundation may be laid for societal change in the direction of more sustainable nutrition.

In Germany, the onus is often placed on consumers to 'vote with their shopping baskets' and choose to consume more responsibly. General recommendations tend to concentrate on reducing the consumption of meat [17]. Consumers are advised to follow the recommendations from the DGE. According to the DGE, Germans should eat 75% more vegetables and 44% less meat [15]. Converting to the recommended diet would reduce the surface footprint per person by about 230 m²

[17]. This method of resolution, however, presupposes a conscious and rational change in the individual's nutritional habits. Such a change cannot simply be assumed in the context of what is in actuality a demanding process. This approach underestimates or ignores the fact that meat is a substantial component of ancient nutritional practices. Meat consumption is structurally enabled by economic and political arrangements in the context of modernization. It is becoming increasingly widespread, and is grounded in a symbolic meaning handed down through the generations. The meaning of meat is firmly anchored in western nutritional culture. Thus the question must be confronted: precisely why is it so hard to get away from meat and change dietary habits?

8.3 Meat in the Context of Nutritional Practices

To answer this question, it is helpful to understand the carnivorously inclined diet as a dietary habit which finds its expression in certain nutritional practices. Social practices are generally understood as routines and familiar actions (e.g. shopping or washing dishes) that become apparent habits (e.g. the preparation of certain dishes and meals). The distinctive feature of practices lies in the fact that they can be reflected upon at greater length. This is because the elements of actions (motive, norms, values, behaviors, structures) are condensed within them. Practices in life are adopted primarily through socialization and stand the test of time by their ordinary and easy implementation. Since practices are oriented around collective values and norms, they generate concrete actions [18]. In this manner, they can guarantee individual capacity for action and security [19, 20]. For carnivorous diets, as well as for every other practice, there are four different elements (see [19, 21]): (1) functional elements or material arrangements such as technology, tools or infrastructure (e.g. slaughterhouses, meat production and supply); (2) motivationally effective elements such as social meanings communicated via values, motives and orientations (e.g. symbols of meat: strength and virility); (3) performative elements, such as physical or linguistic actions existing as skills (e.g. ways of preparing meat); and (4), social settings which offer meat (e.g. company catering, family, school).

8.3.1 The Symbolic Meaning of Meat

The following examines the symbolic meaning of meat as a significant element of a meat-based diet. Even today, meat remains a symbol of power and dominion. Meat stands for domination over nature [22], and embodies ideas of control, strength and virility. This stems from necessity, which links the consumption of meat to the act of killing and shedding blood. The force used to acquire the meat from another living creature is unavoidable. In the process of civilization, this force is engineered and its procedures are hidden from the public. Tucked away in the wings of society,

the realities of the meat supply are increasingly marginalized in human consciousness. Meat has become symbolic of a victorious triumph over nature [23]. However, due to its inseparable link with death, meat is not only the most highly valued food; it is also the food whose consumption provokes the most fear. The enjoyment of meat is bound up with many taboos and regulations: the most explicit dietary taboos concern meat [23].

Because of this symbolic meaning, meat is a socially differentiating characteristic that has experienced various manifestations in human history. A substantial and increasingly topical differentiation category is gender. The gender connotations of meat as ‘masculine’ are often traced back to prehistoric developments. One popular approach of cultural anthropological research assumes that the transition from tribal hunting to deer stalking caused the evolution of gender roles [24].

In this way, hunting for meat increasingly became an exclusively male activity, while female gender roles revolved around reproductive functions and depended on the success of the men’s hunting. Thereby the male hunters won control and the power of distribution, and meat became the food of men. There are, however, doubts about this interpretation of a pre-Neolithic gender-specific division of labor [25, 26].¹ It is more likely that the earliest established farms helped form such a division of labor, which eventually found a corresponding expression in nutritional practices [27]. By this means, ideas of masculinity became closely associated with the concept of power over meat. Fiddes describes the relationship between gender, meat and power as follows: “Men are meat in the sense that meat is full of power. Women, on the other hand, are meat in the sense that it is an expression of power to consume their meat” [22: 184].

Ever since meat has become available to large sections of the population, meats have differentiated themselves gender-wise as red (male) and white (female) meat, with different respective values. Yet not only the quality but also the quantity counts as an expression of gender difference. According to western culinary taxonomy, and with respect to gender role expectations, fruit and vegetables are the weak foods, and are therefore for females. Meat and alcohol are strong foodstuffs, and are therefore masculine [23]. These stereotypical differences are constantly being renewed and reproduced in different social interactions. Prominent examples of this can be found in mass media productions such as food commercials or magazines (e.g. the German *Beef!*, whose headline declares: “For men with taste”). Differences are found not only as regards meat consumption: meat production and processing, as well as slaughtering and butchering, remain traditionally male domains [23]. The process of slaughter is a symbol of nature’s submission to human beings—namely, to men.

¹The archeologist Linda Owen points out that ideas of a strict role division during the early Paleolithic era between male hunters and female gatherers is probably based on a ‘Stone Age cliché’. First, there is no archeological proof and secondly, ethnological observations show that the hunters and gatherers still existing today have females that go on the hunt, even if for smaller animals.

Because of its value, meat is still regarded as an expression of a satisfying, proper meal [28, 29]. Sunday and holiday meals without meat are generally unthinkable. According to a German study from Hayn [30], intensive ‘cheap and cheap meat eaters’ make up about 13% of the country’s total population. In this group, meat is considered the ideal food, because it is easy to prepare in creative ways. The need for simplification also influences lifestyle orientations. The menu of this group is characterized by its pronounced penchant for meat and sausage: one in ten people in Germany eats beef at least every other day. The primary focus of cheap and cheap meat eaters lies with the ‘middle-aged’ group, with an average age of 38. Nonetheless, this style has spread to the 46–60 year-olds as well as to the under 25 year-olds. Middle to lower incomes are the norm for this style, which is also associated with an above-average unemployment rate (15%).

8.3.2 *The Structure of a Meat-Based Diet*

The symbolic meaning of meat is closely related to the structure of a meat-based diet. An important prerequisite of this structure is the meat industry, because social practices acquire structure in the form of arrangements which provide the basis for their execution and reproduction [31].² This means that the permanent and inexpensive availability of meat in modern industrial society has made a meat-based diet possible. At the same time, this availability made the social values linked with meat viable for an increasing number of people. Thus the steadily sinking private household spend on groceries and meat (44% in 1960; 15% in 2013) can be interpreted as an indicator of prosperity.

Today’s meat-based diet has been substantially shaped by developments in the meat industry that occurred in the 1960s. The meat industry had in fact already begun to boom by the end of the 19th century [34: ff.]. To describe this phenomenon, the UN Food and Agriculture Organization plays on the term ‘green revolution’ by coining the neologism ‘livestock revolution’ [35]. This term makes reference to the ‘ultra-efficient, maximum performance and highest possible yield’ credo that is the hallmark of conventional agriculture today. On the one hand, the increasing use of fertilizer, pesticides, irrigation systems and machines has greatly enhanced farming yields. The rise in meat production has also been tied to many other interrelated factors. The widespread globalization and liberalization of the agricultural market took on a new quality and set the tone for the 1980s and 1990s. Massive national and European subsidies led to a substantial reduction in prices. Along with this came new technologies for breeding, animal husbandry, slaughtering, freezing, transportation—and also cheap oil for fertilizer and diesel fuel. The

²This has been also discussed as ‘systems of provision’ [32], adapted for consumption by Brand [33].

development continued, with increasing concentration of production on fewer but larger farm operations (in terms of their livestock levels). Today, industrial animal husbandry is restricted to a few countries, a small number of animal species, and a limited number of companies. The USA, Brazil and China belong to the largest producers of pork, beef and poultry meat worldwide. This trio of countries contributes to between 43 and 59% of worldwide production with these three animal species [17].

The international meat trade continues to grow—and in the last decade alone, it has risen by about 40%. This development is driven by increasing demand from many developing and emerging economies. Between 1990 and 2003 alone, the annual import and export rate of poultry meat rose by 10%. At the same time, pork saw an increase of 6%. Ever since the poultry industry in the EU banned milling slaughterhouse waste into animal feed, this waste has been sold to poor countries at low prices. As a result, the local markets in these countries have been destroyed. This doubled concentration in the meat industry—corporate expansion, intensive production—can be attributed to a couple of factors in particular—for example, today’s low marginal gain in the meat industry due to increased production costs (e.g. through pressure on land), as well as a stagnation in meat consumption in industrial countries [17].

Industrial meat production in Europe is supported by the EU by means of annual financial assistance. EU financial aid includes, among other things, regional subsidies and the provision of transportation infrastructure, and is especially important for the animal feed industry. For investments in animal stalls, the EU offers support covering up to 50% of total costs. This provides a strong incentive to produce more pork, beef and poultry. In addition, the EU’s household budget directly apportions over EUR 240 million to the meat processing industry every year. Meat remains inexpensive partly thanks to the low remuneration rates paid by slaughter houses in countries such as Germany, where a minimum wage for slaughter house workers was only just recently introduced [17].

8.4 How Is a Modification in a Meat-Based Diet Conceivable?

Bearing the powerful symbolic and structural attributes of a meat-based diet in mind, the question must be asked as to how a shift in the habit of eating large amounts of meat might nevertheless be possible. Though meat-eating practices have proven to be (at present) relatively stable, they could nonetheless collapse at some point. The need for interpreting the complex environmental conditions of meat production – as shown in Sects. 8.3.1 and 8.3.2—could in itself initiate a change in dietary practices (see [19, 20]). If the production conditions for meat-based diets change, this could cause dietary practices to experience a crisis. For example, the

BSE crisis and other meat production scandals were linked to a massive loss of consumer confidence. Such events often stimulate consumers to reflect on their own nutritional habits and modify their meat-based diets. Changes in dietary practices might involve, for example, consuming less meat or selecting more organic meats from smaller, regional farms. In such cases, a crisis can lead to demands for incremental change. However, meat-based dietary practices may turn out to be completely unnecessary if meat is completely cut out from the diet (vegetarianism).

As this example shows, dietary practices involving meat can be transformed. Changes in dietary practices can only be initiated by significant disturbances, irritations or surprises. A multitude of opportunities exist for addressing dietary practices that have become untenable. This could involve, for example (along with the structural changes in meat production and consumption mentioned above), events in people's lives such as childbirth, relocation or illness, poignant impressions (e.g. environmental disasters, movies) and even information and knowledge (e.g. the health impacts of heavy meat consumption) [36].

Long-term changes in daily practices however, occur only rarely. Much more commonly observed is a short-term change in dietary practices. As soon as disturbances lose their novelty, whether it is the switch to organic baby food or the latest dioxin scandal, they are quickly forgotten, and the old practices will take over again. This shows the generally short-term nature of the ongoing debates.

For long-term changes in dietary practices to occur, approaches resulting from the disruptions must meet the relevant structural conditions. These approaches must be able to easily conform to daily routines. Alternative practices may reproduce their structures. However, when implemented, the corresponding functional and social relationships must already be present. This is only conceivable as a co-evolutionary change, which in current political discussions is referred to as transformation. In the non-trivial sense, transformation as a contemporary change is more different; it can be understood as mutually referential structures.

If dietary practices fail in certain situations, the question arises as to how well needs can be met through alternatives, or which alternatives are available to meet those needs. Here the next immediate issue is the appropriate infrastructural offers. For modified meat or vegetarian dietary practices, other supply options are necessary (e.g. organic supermarkets) and a different investment (in terms of financial and time costs).

For the transformation of daily practices, four 'reframing' strategies are suggested for political management on the structural level [37]. These can also be applied to daily diet practices. In this way, those elements that are considered problematic can be exchanged (1) This includes for example, supporting organic products. A good example of this in Germany is how, through the federal program, organic agriculture and other forms of sustainable agriculture emerged after the BSE scandal. In this case, this will mean the communication of alternative semantic content. Organic products and supermarkets today should be presented as modern

and disassociated from the ‘tree-hugger’ image. The price image of organic goods would thereby be reinterpreted; no longer would they be perceived as ‘too expensive’, but conventional products would instead seem cheap. New infrastructural offers (like, for example, organic or vegan supermarkets, as well as a thoroughly different approach to livestock farming³) make it possible for not only individual elements but also entire existing (meat-based) dietary practices to be replaced by alternatives (2) Another strategy could involve a network of cross-references and relationships between practices. This means that multiple practices could be changed (e.g. individual dietary practices and practices for school catering). When for example, functional and temporal sequences of routine practices are interrupted, this can lead to their being modified (e.g. extending the eating break times at school) (3) If the relationships between several practices are examined, this leads to a broad perspective where different but relevant actors are taken into account (4) By this means, for example, a new catering concept for a university or company could be initiated. This could be done under the premise of sustainability and health with a nutritional and organizational analysis of practices, which would lead to change. The four strategies clearly refer to each other. However, this also means that only when preferred alternative practices are given the corresponding structural conditions can they have a chance for stabilization through comprehensive diffusion.

8.5 Conclusions

This chapter demonstrates that current patterns of meat production and consumption have multiple negative consequences from a sustainability perspective. These impacts call for a more responsible stewardship of resources and a more humane treatment of livestock. Moreover, this perspective envisages reduced consumption of meat as a possible way of minimizing these consequences. On the one hand, it is clear that meat is a substantial element with deep historical roots in dietary practices, and that it is structurally enabled by economic and political arrangements. These arrangements became increasingly widespread during the process of civilization and are imbued with ancient symbolic meaning. It is not so easy to simply stop eating meat and change dietary behaviors. Looking at social practices more closely allows a necessary understanding of meat-based diets and their dietary practices. Only then can modifying approaches be identified which do not merely

³The recent report on farming emphasized the importance of reducing livestock numbers and seriously taking animal rights into account. However, farmers only fear increasing costs that would cause a weakened position on the global food market [38].

superficially emphasize preventative behavior, but also directly aim at preventative measures.

8.6 Summary: Key Messages

- Current patterns of meat production and consumption have multiple negative consequences from a sustainability perspective.
- Nutrition and sustainability are closely linked, and meat production and consumption are widely recognized as environmentally harmful.
- The adoption of healthy nutritional habits could lead to a more sustainable nutrition system, but this requires a change of practices in the food system for the production as well as for the consumption side.
- Only by understanding the nature of meat-based diets and their associated dietary practices will it be possible to bring about significant change in people's dietary habits.

References

1. Statista (2015): <http://de.statista.com/statistik/daten/studie/36573/umfrage/pro-kopf-verbrauch-von-fleisch-in-deutschland-seit-2000/> (31.3.2015).
2. Steinfeld, H.; Gerber, P.; Wassenaar, T.; Castel, V.; Rosales, M.; Haande, C. (2006): Livestock's Long Shadow. Environmental Issues and Options. Food and Agriculture Organization of the United States.
3. Schaffnit-Chatterjee, C. (2011): Mitigating climate change through agriculture: An untapped potential, Deutsche Bank Research.
4. Tukker, A.; Eder, P.; Suh, S. (2006): Environmental impacts of products: Policy relevant information and data challenges. *Journal of Industrial Ecology* 10(3): 183–198.
5. Fritsche, U. R., Eberle, U., Wiegmann, K. und Schmidt, K. (2007): Treibhausgasemissionen durch Erzeugung und Verarbeitung von Lebensmitteln – Arbeitspapier. Öko-Institut e.V., Darmstadt/Hamburg, www.oeko.de.
6. Nieberg, H. (2009): Auf den Nahrungskonsum zurückzuführende THG-Emissionen. In: Osterburg, B.; Nieberg, H.; Rüter, S.; Isermeyer, V.; Haenel, H.D.; Hahne, J.; Krentler, J.G.; Paulsen, H.M.; Schuchardt, F.; Schweinle, J.; Weiland, P. (Hrsg.): Erfassung, Bewertung und Minderung von Treibhausgasemissionen des deutschen Agrar- und Ernährungssektors. Arbeitsberichte aus der vTI-Agrarökonomie 03/2009. Braunschweig: vTI.
7. UNESCO (2014): <http://www.unesco.de/wissenschaft/2014/weltwasserbericht2014.html> (31.3.2015).
8. Statistisches Bundesamt (2012): Wasserfussabdruck von Ernährungsgütern in Deutschland. <http://www.wasserfussabdruck.org/Reports/Flachmann%20et%20al%202012.%20Wasserfussabdruck%20von%20Ernahrungsgutern%20in%20Deutschland.pdf> (31.3.2015).
9. Doyle, U. (2011): Wie wir überleben? Ernährung in Zeiten des Klimawandels – Fokus Fleisch. Berlin: Sachverständigenrat für Umweltfragen.
10. UBA (Umweltbundesamt) (2009): Nachhaltige Flächennutzung und nachwachsende Rohstoffe. Dessau-Roßlau. UBA.

11. WWF (2012): Klimawandel auf dem Teller. http://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Klimawandel_auf_dem_Teller.pdf (31.3.2015).
12. Alison J. McAfee, Emeir M. McSorley, Geraldine J. Cuskelly, Bruce W. Moss, Julie M.W. Wallace, Maxine P. Bonham, Anna M. Fearon (2010): Red meat consumption: An overview of the risks and benefits. *Meat Science* 84 (2010) 1–13.
13. Berndsen, M., & van der Pligt, J. (2005). Risks of meat. The relative impact of cognitive, affective, and moral concerns. *Appetite*, 44, 195–205.
14. MRI (2008): Nationale Verzehrsstudie II. Herausgeber. Max Rubner-Institut. Bundesforschungsinstitut für Ernährung und Lebensmittel.
15. Dickau, K. (2009): Deutsche Gesellschaft für Ernährung e. V. (Hrsg.): Die Nährstoffe – Bausteine für Ihre Gesundheit, 2. Aufl., Bonn (aid).
16. WCRF (World Cancer Research Fund International) (2007): Zusammenfassung: Ernährung, körperliche Aktivität und Krebsprävention – Eine globale Perspektive. London: WCRF.
17. Heinrich Böll Stiftung (2013): Fleischatlas. Daten und Fakten über Tiere als Nahrungsmittel. http://www.bund.net/fileadmin/bundnet/publikationen/landwirtschaft/140328_bund_landwirtschaft_fleischatlas_2013.pdf (31.3.2015).
18. Schatzki, T. (2002): *The Site of the Social: A Philosophical Account of the Constitution of Social Life and Change*. Pennsylvania State: University Press.
19. Shove, E.; Pantzar, M.; Watson, M. (2012): *The Dynamics of Social Practice*. Los Angeles et al.: Sage.
20. Reckwitz, Andreas (2003): Grundelemente einer Theorie sozialer Praktiken. *Zeitschrift für Soziologie* 32: 282–301.
21. Brand, K.-W. (2013): *Umweltsoziologie. Entwicklungslinien, Basiskonzepte und Erklärungsmodelle. Reihe Grundlagentexte Soziologie*. Weinheim: Beltz-Juventa.
22. Fiddes, N. (2001): *Fleisch. Symbol der Macht*. 3. Auflage. Frankfurt (Main). Zweitausendeins.
23. Setzwein, M. (2004): *Ernährung-Körper-Geschlecht. Zur sozialen Konstruktion von Geschlecht im kulinarischen Kontext*. Wiesbaden: VS Verlag für Sozialwissenschaften.
24. Mellinger, N. (2000): *Fleisch. Ursprung und Wandel einer Lust*. Frankfurt (Main): Campus.
25. Owen, L. R. (2005): *Distorting the Past: Gender and the Division of Labor in the European Upper Paleolithic*. Tübingen Publications in Prehistory. Kern Verlag Tübingen.
26. Röder, Brigitte (2013): Urmenschliche Bürger - bürgerliche Urmenschen. Zur Archaisierung des bürgerlichen Geschlechter- und Familienmodells über die Urgeschichte. In: Dominique Grisard, Ullé Jäger und Tomke König (Hg.): *Verschieden sein. Nachdenken über Geschlecht und Differenz*. Sulzbach: Helmer, S. 243–256.
27. Diamond, J. (1991): *Der dritte Schimpanse: Evolution und Zukunft des Menschen*. Fischer Taschenbuch Verlag.
28. Douglas, M. (1972): Deciphering a Meal. *Daedalus* 101 (1), Myth, symbol and Culture, 61–81.
29. Charles, N.; Kerr, M. (1988): *Women, Food, and Families*, Manchester: Manchester.
30. Hayn, D. (2005): *Ernährungsstile. Über die Vielfalt des Ernährungshandelns im Alltag*. In: *Kritischer Agrarbericht*. 284–288.
31. Schatzki, T. (2010): Materiality and Social Life. *Nature and Culture* 5: 123–149, doi:[10.3167/nc.2010.050202](https://doi.org/10.3167/nc.2010.050202).
32. Fine, B. (2002): *The World of Consumption. The material and cultural revisited*. London: Routledge.
33. Brand, Karl-Werner (2009). 'Systems of Provision' und nachhaltiger Konsum – Erklärungskraft eines systemischen Ansatzes. Diskutiert am Beispiel des Ernährungssystems. In: Weller, I. (Hrsg.). *Systems of Provision & Industrial Ecology: Neue Perspektiven für die Forschung zu nachhaltigem Konsum?* Universität Bremen, artec-paper (September 2009). http://www.uni-bremen.de/fileadmin/user_upload/single_sites/artec/artec_Dokumente/artec-paper/162_paper.pdf (30.8.2016).
34. Osterhammel, J. (2009): *Die Verwandlung der Welt. Eine Geschichte des 19. Jahrhunderts*. Beck: München.

35. Delgado, C.; Rosegrant, M.; Steinfeld, H.; Ehui, S.; Courbois, C. (1999): Livestock to 2020 – The Next Food Revolution. Food, Agriculture and the Environment Discussion Paper 28. IFPRI, Washington D.C.
36. Schäfer, M.; Jaeger-Erben, M. (2012): Life events as windows of opportunity for changing towards sustainable consumption pattern? The change in everyday routines in life course transitions. In: Defila R, Di Giulio A, Kaufmann-Hayoz R (eds): The nature of sustainable consumption and how to achieve it Oekom: München, pp 195–210.
37. Spurling, N.; McMeekin, A.; Shove, E.; Southerton, D.; Welch, D. (2013): Interventions in practice: Reframing policy approaches to consumer behaviour. Sustainable Practices Research Group Report. www.sprg.ac.uk/uploads/sprg-report-sept-2013.pdf [20.12.2014].
38. Bundesministerium für Ernährung und Landwirtschaft (BMEL) (2015): Wege zu einer gesellschaftlich akzeptierten Nutztierhaltung. Gutachten. Wissenschaftlicher Beirat für Agrarpolitik beim BMEL. http://www.bmel.de/SharedDocs/Downloads/Ministerium/Beiraete/Agrarpolitik/GutachtenNutztierhaltung.pdf?__blob=publicationFile (31.3.2015).