



Meat consumption and consumer attitudes – A Norwegian perspective

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ABSTRACT

Norway has lower meat consumption than other North European countries. Meat is acknowledged as important for food security in Norway, as Norway's agricultural possibilities are best suited for free-ranging and self-foraging animals. Meat has a strong position in the Norwegian diet, particularly as a centerpiece for special occasions. Good taste, product variety, and affordable price make meat a convenient choice. Norwegian consumers are not worried about animal welfare in local production, nor highly driven by environmental motives for reducing their consumption. Meat analogues have a very small market share, and taste and processing level do not make it a primary replacement for meat reducers. Still, Norwegian consumers' attitudes towards meat have become more diverse in later years. More consumer segments display meat-reducing behaviours citing both health and sustainability reasons. Females are particularly interested in reducing meat consumption, young age and urban lifestyle are other characteristics of meat reducing segments.

1. Background

Meat consumption in Norway have long traditions, although both consumption and perception have changed over the years. Until the 1970's meat was expensive, consumed in sparse amounts, and considered the ultimate food for special occasions (Bugge, 2019). In the 1970's meat became more available for the average consumer, production increased, and prices were reduced. The increase in per capita meat consumption rose from the 1950's to the present (2020), from 35 kg/person/year to 72 kg/person/year (Helsedirektoratet, 2021).

However, since 2007 the curve has flattened (Animalia, 2021; Helsedirektoratet, 2021). A visible reduction in meat consumption has been seen in other comparable Northern European countries, while in Norway the meat consumption has just recently reached a consolidated level. In this perspective it is interesting to note that the public debate has until recently evolved around two contrasting discourses concerning meat production (Austgulen, 2014). On the one hand, meat production has been highlighted as environmentally problematic, and on the other hand, meat production in Norway has also been presented as important from a food security perspective. The debate, its complexity, and the involvement of factions with different agendas, have potentially made it difficult for consumers to form own, unbiased opinions (Austgulen, Skuland, Schjøll, & Alfnes, 2018).

Factors important for meat consumption in Norway, must be understood considering history, current practices, and future scenarios.

Meat consumption is related to several different, but intertwined conditions influencing how meat is perceived in Norway. These are: 1) Norway's geographical and, consequently, agricultural possibilities that have laid the foundation for food production and food security, policy development and industrial development. 2) The Norwegian population's historical ties to agriculture and agricultural production. 3) Meat as a bearer of values related to tradition, social standing, and health. 4) Recent developments signalling a change in consumers' meat perception particularly related to health and sustainability.

2. Development of meat production in Norway – prerequisites for consumer choice

2.1. Meat types and production conditions

During the last 60 years meat consumption per capita has doubled in Norway, Table 1 (Helsedirektoratet, 2021). There was a relatively steep growth in consumption from the 1950's and up to the 1980's, which followed the public increase in spending power. Meat consumption continued to grow during the following decades, but at a slower rate. Since 2007 the consumption has been at an almost steady level just around 70 kg per person per year, despite a continuous growth in wages since the 50's (Animalia, 2021). In 2020 the average Norwegian used 11% of the salary for food (all types of food), while that share was 45% in 1959. Compared to the other Nordic countries, the Norwegians have

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the lowest meat consumption; the Swedes, Danes, and the Icelandic people eat, respectively, 5, 12, and 22 kg more meat per capita per year than Norwegian consumers (Nordic Council of Ministers, 2021).

Pork was the dominating meat served on the plate in 2021, as it was in 1959. Beef was consumed in almost the same quantity as pork in 1959, approximately 14 kg per capita (Table 1). Currently Norwegians eat slightly more chicken than beef, roughly 20 kg per person per year. In 1959 chicken was almost non-existing as food, at the same level as horse meat. Conversely, in 2021, horse meat has practically disappeared from the dining table (See Table 2 for details from 2010 to 2020).

The Norwegian countryside is very well suited to sheep farming with extensive free range grazing possibilities. Thus, Norwegians eat more mutton (approximately 5 kg per person per year), which has been almost constant during the last 60 years, than consumers in most European countries. Iceland and Greece are the only nations in Europe that eat more lamb meat per capita than Norway. Another feature of Norway is the harsh winter climate in the north of Norway which is eminently suited for reindeer production. Therefore Norway, like Sweden and Finland, harvest a relatively small quantity of reindeer each autumn. The total meat volume from these animals is roughly 2000 t per year, which has been practically constant over time. The large, relatively uninhabited forest and mountain range areas in Norway also allow for game hunting. Moose and deer hunting give annually 7000 t of meat (Helsedirektoratet, 2021). Although the volume of game meat has increased significantly over the last decades, its contribution to the total meat consumption is still marginal.

In the 1950's almost every edible part of the animals, including by-products such as liver, lungs, and blood, were consumed by humans. Today a large fraction of the by-products is used for petfood. In 1959, 7% of the consumed animal products were by-products, while the corresponding value for 2021 is 3% (Helsedirektoratet, 2021). Most of the pork liver is still consumed as liver paste. Tongues and hearts are also widely used as cold cuts. Meat from head and midriff is defined as by-products, which is utilised in sausages and minced products. Most of the beef and pork meat consumed in Norway today are processed meat in the form of minced meat and sausages. Annually more than 35,000 tons of sausages are consumed, and minced meat consumed in dishes such as taco have become the most common Friday dinner in Norway (personal communication).

The Norwegian topography and climate influenced by arctic conditions have led to domestic agricultural production, and animal husbandry having a strong position among the Norwegians. Only 3% of the land area is arable land. This may partly explain the level of Norwegian meat consumption. In addition, Norway has a long coast which makes fish an important protein source. The per capita consumption of fish is 50 kg per year, while Danes eat 20 kg (Nordic Council of Ministers, 2021). Norway has twice by referendum refused to be a member of the EU, and domestic meat production is supported by additional tax on imported meat. Independence and food security, by domestic supply have always been important for the government (White paper 40, 2020).

2.2. Meat consumption development

In the 1970's the economic conditions improved greatly for the general Norwegian population as an effect of income from oil production. This enabled Norwegian consumers to increase their purchase of coveted products such as meat, that were previously only available to well-endowed people (Table 1). Recent focus on health aspects related to meat consumption have motivated the authorities to estimate how much meat Norwegians actually eat, because the official gross values given in Table 1 are based on wholesale figures, including bones, and not net consumed meat from stores and restaurants. These calculations showed a net consumption of 53 kg meat per person in 2019, 23% less than the reported gross value (Helsedirektoratet, 2021).

Another recent development is the Norwegian market for plant-based meat analogues which has increased dramatically in the last five years (Grimsby, Gøner, & Ueland, 2021). This is in line with what is observed in other countries (PBFA, 2019). Fig. 1 shows that sales in NOK of plant-based meat products increased 300% from 2016 to 2020. Still, in 2020 meat replacers accounted for only 0.5% of the total consumption of meat (Animalia, 2021; Grimsby et al., 2021).

3. Consumer attitudes: Cultural and health perspectives

3.1. Cultural perspectives and daily meat consumption

To understand Norwegian consumers' attitudes towards meat, it is necessary to understand the extrinsic and intrinsic attributes attached to meat and meat consumption. Until about a 100 years ago, meat was a scarce commodity, available mostly to well-endowed people and valued highly because of this. Thus, meat consumption has a traditional component highlighting its importance as a bearer of high symbolic value and for marking special occasions (Bugge, 2019). This is particularly evident for Christmas dinner, the most traditional and highly regarded meal in Norway, where 44% of the population choose pork belly and 35% choose cured lamb ribs (Matprat, 2021). Other dishes consumed for Christmas dinner are turkey (7%) and pork roast (5%). While 4%, respectively, eat rice porridge, cod, vegetarian dish, pizza, or other, and 3% eat lutefisk.

Furthermore, meat is still the most common constituent in daily dinner meals (Bugge & Alfnes, 2018; Gronow & Holm, 2019). Most Norwegian consumers design their dinner menus around the protein part of the meal, with a rotation of either red meat, chicken, or fish, many driven by the tradition of "potato dinner"- meat, potatoes, and sauce (Austgulen et al., 2018; Varela et al., 2022). However, potatoes are increasingly exchanged with pasta and rice, and vegetables also play a more prominent part on the plate, particularly among younger generations. The large variety of familiar and convenient meat dishes contribute to its popularity (Bugge & Alfnes, 2018). Bugge and Alfnes (2018) find in a recently published study from Norway, that a common complaint from consumers is that they do not know what, or how, to prepare dishes with, for instance, fish or just vegetarian components. In

Table 1

Domestic meat consumption (1000 t) in Norway, wholesale based on carcass weight (Helsedirektoratet, 2021).

	1959	1969	1979	1989	1999	2009	2019	2021 ^a
Beef	48.3	55.9	79.6	73.6	90.5	91.0	100.0	103.0
Pork	50.3	66.9	86.2	82.6	102.8	122.5	133.1	138.3
Sheep	15.1	18.3	22.4	24.9	23.6	24.8	24.4	25.9
Goat	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Horse	2.2	1.0	0.9	0.8	0.6	0.4	0.0	0.0
Poultry	2.5	5.5	10.9	19.3	37.5	85.3	107.4	116.0
Other ^b	1.9	1.6	2.0	2.9	2.4	2.2	2.1	1.7
Per capita ^c	34.0	39.1	49.7	48.3	57.7	67.6	68.7	71.3

^a Estimated numbers.

^b Reindeer and deer (farmed).

^c kg per person.

Table 2
Domestic meat consumption (kg/person) for the years 2010–2020^a.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Beef	18.6	19.1	19.4	18.9	18.3	20	20.1	19.5	18.9	18.7	19.5
Pork	25.5	26.4	25.6	24.9	25.6	26.3	26.2	25.8	25.6	24.9	26.1
Sheep	5.4	5.1	5.1	5.3	5.1	5.0	4.8	5.1	5.0	4.6	4.8
Poultry	16.7	17.4	18.5	20.7	19.8	18.3	19.3	19.5	18.8	20.1	20.2
Total ^b	66.2	68	68.6	69.8	68.8	69.6	70.4	69.9	68.3	68.3	70.6

^a Data obtained from the annual reports (Animalia, 2010; Animalia, 2019; Animalia, 2021). The figures in Tables 1 and 2 vary slightly between the two sources: The Norwegian Directorate of Health and Animalia, due to differences in what is included of the animal in the calculations.

^b Goat, horse, game, and imported meat are not included.

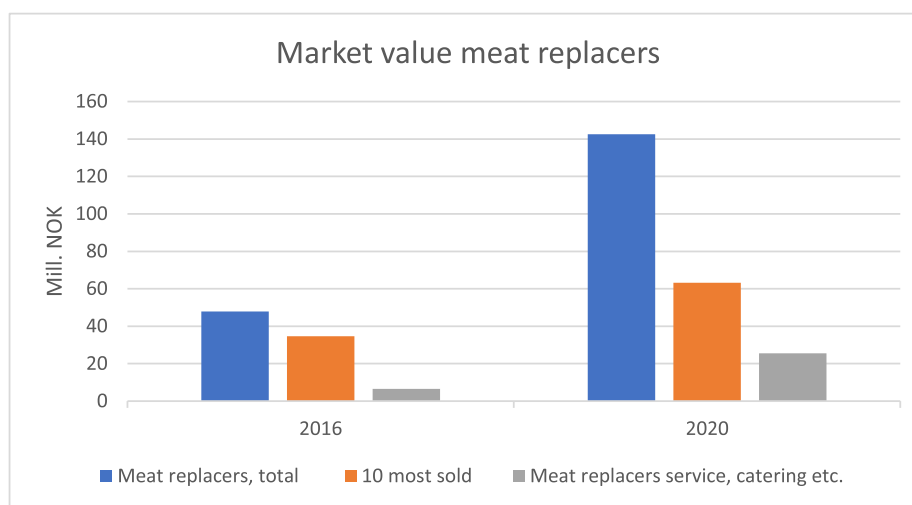


Fig. 1. Market value in mill. NOK for meat replacers sold in Norway in 2016 and 2020.

addition, meat, particularly the wide variety of minced meat products, is an affordable product for many families. From a situation where it was a high priced and scarce commodity, meat is now comparatively cheap and therefore a convenient dinner choice for many families with stretched resources. The large variety of easy to prepare minced meat products is also popular in families that are stretched for time and need something quick, that tastes good, and is filling. While previously meat dishes included pieces of whole meat which often needed long preparation time, processed meats are easier and quicker to prepare and less food preparation skills are needed. Such products may be dinner sausages which is very popular in families with children, or minced meat consumed as taco. These products are both easier to prepare and eat, perceived as tastier, and are cheaper for consumers, and family preferences, particularly in households with children, are important drivers underlying meal choices in Norway (Djupegot et al., 2017; Varela et al., 2022). Goner et al. (2021) showed that consumer segments characterised by families in the time-pressure phase and those with little food interest were among the consumers of convenience products.

3.2. Perceived healthiness of meat

Meat has also been highly prized for its nutritional content symbolising strength and health (Kildal & Syse, 2017). As meat contains proteins of high quality, as well as minerals and vitamins, this is an important factor for consumers' choice and preference for meat (Kildal & Syse, 2017). Varela et al. (2022) found that Norwegian and French consumers perceived nutritional content of red meat as superior to other protein sources (e.g. plant based, meat analogues), particularly towards consumer groups with special nutritional requirements, linked by some to “the blood” in red meat. The Norwegian Directorate of Health monitors food and nutrient consumption in Norway on a yearly basis and launch advice for the population regarding compliance with health

recommendations (HelseDirektoratet, 2021). In the Nordic nutrition recommendations meat features as an important part of a nutritious diet, although to be consumed in limited amounts (Nordic Council of Ministers, 2014). The launching of the EAT-Lancet report in 2019 further advocated the need to lower meat consumption from a health perspective in addition to the sustainability aspects of meat production (Willett et al., 2019). Still, Norwegian consumers are slow in changing their consumption behaviours. Thus, although for many Norwegians health is an important reason for consuming meat, it is also put forward as a reason for not eating meat (Bugge & Alfnes, 2018). This is in line with studies from other countries (Malek, Umberger, & Goddard, 2019). In surveys, the health question is often unspecified, but given the publicity concerning risk of heart disease and cancer associated with meat consumption, one could infer that these health aspects are on top of consumers' minds when they express worry about meat consumption (Van Wezemael, Verbeke, de Barcellos, Scholderer, & Perez-Cueto, 2010).

3.3. Demographic aspects of meat consumption

Both the cultural and the product-related characteristics of meat, and red meat in particular, have contributed to give meat consumption and perception a distinct gender profile (Lax & Mertig, 2020). Red meat has been a preferred food for males, while white meat consumption and meat avoidance have been associated with female preferences (Bourdieu, 1984; Kubberød, Ueland, Rødbotten, Westad, & Risvik, 2002; Ueland, 2009). Meat avoidance among young females in Norway has previously been shown to be strongly associated with disgust towards meat (Kubberød, Ueland, Rødbotten, et al., 2002; Kubberød, Ueland, Tronstad, & Risvik, 2002). Kubberød, Ueland, Tronstad and Risvik (2002) found that while males agreed with statements on feeling comfortable and fit after eating meat, the results for females were the opposite. Males were also more positive about sensory attributes and the

pleasure of eating meat. In more recent studies, females still display more meat avoidance than males, and health and ethical concerns are listed among reasons for the avoidance (Gonera et al., 2021). Overall, however, consumers report liking the taste of meat, and good taste is a primary reason for choosing to eat meat (Bugge & Alfnes, 2018; Gonera et al., 2021). Because of attachment to meat, habits, and traditions, many are unwilling to change, and completely avoiding meat is quite unpopular. Some authors have advised strategies aimed at nudging consumers into more plant-based diets focusing on meat reduction rather than meat avoidance (Hielkema & Lund, 2021), which could in fact better fit Norwegian consumers behaviour and perception (Varela et al., 2022).

Recently, more consumers have shown an interest and willingness to try and to change towards a more vegetarian diet. Gonera et al. (2021) found that consumer segments that eat little meat consist of younger people, particularly females, they are urban, have higher education and are positive to change their diets in a vegetarian direction (Gonera et al., 2021). Younger consumers also report that they have changed their diet in a more vegetarian direction compared to older consumers (Bugge & Alfnes, 2018). Despite this change, they also report higher or more frequent meat consumption than older consumers who report eating fish more often. The consumer segments with the highest meat consumption represent consumers that have no strong opinions about meat, consumers that prefer traditional dishes, as well as males who display a very strong meat preference for its perceived healthiness, taste, and meat's value as 'the real thing' (Gonera et al., 2021).

4. Consumer attitudes: Towards more sustainable diets

4.1. Consumer awareness of sustainability, animal welfare and perceived issues in meat production

Consumer concerns in relation to welfare and environmental issues are quite different across cultures when it comes to food decisions. Main reasons underlying food choices in Norway have been reported to be taste and convenience, followed by health and price, while sustainability related motives come much lower in the list (Markovina et al., 2015), in contrast to other countries in Europe (e.g France), where ethical and environmental motives have more weight when it comes to food choices (Alles et al., 2017). Several studies have shown that Norwegian consumers are quite confident that animals produced in Norway have a good life, and that there are sufficient control mechanisms in place to ensure it, which can explain why animal welfare is not a main driver when it comes to food decisions (Ådnegard Skarstad, Terragni, & Torjusen, 2007). Norwegian consumers have the lowest sustainable food practices in terms of buying organic foods or eating seasonal vegetable foods as compared to other Nordic countries (Niva, Mäkelä, Kahma, & Kjærnes, 2014). Although Norwegians were marginally more in favour of limiting their meat consumption. Added to this, changing dietary habits for climate or environmental reasons is not motivating for many Norwegian consumers, as they tend to underestimate the environmental impact of meat production and consumption, and low-meat diets are perceived to conflict with their life quality (Austgulen et al., 2018).

4.2. Consumer attitudes and perception towards processing and meat analogues

Apart from the health issues attached to meat discussed in section 3.2, the concept of ultra-processed foods, as defined by NOVA and other classifications (Sadler et al., 2021), has worried consumers in recent years, particularly in relation to some meat products. A recent consumer survey performed with a representative number of Norwegian consumers (Varela, paper in preparation) showed that processed meats were topping the list of the food categories consumers associated to ultra-processing. This corresponds with various studies done in Latin American countries (Aguirre, Borneo, El Khori, & Borneo, 2019; Ares et al.,

2016), that further show that processed meats were considered low in nutritional quality, highly industrialised, artificial, and unhealthful. Examples cited by those authors were sausages, cold meats, pâté, corned beef, hams, hamburgers.

With the efforts in Western societies to promote lower meat consumption for sustainability and health reasons, several research projects have looked into how to nudge consumers to greener diets, more based in plants rather than meats. Industrial offer of plant-based foods, particularly that of meat analogues, has increased enormously in the last years, also in Norway (see market trends in section 2.2). However, there is still a way to go when it comes to sensory properties of meat analogues, where consumers find texture and flavour not good enough, with sensory aspects still being the main barriers against meat reduction. Consumers refer to the gap between expectations raised by product communication (e.g "tasting like meat") and the often disappointing reality of meat analogues' sensory characteristics, as well as these products often being not satiating, or nutritious enough (Varela et al., 2022). A large range of veggie-burgers in the Norwegian market were sensorially mapped with a trained sensory panel and compared to beef options (Myhrer & Grini, 2021). The results highlighted a diversity of flavours and textures, mainly driven by the main source of protein of the plant-based burgers (beetroot, soy, wheat, peas, beans, mushrooms, etc), but all were quite distinct from the beef burgers, particularly when it came to juiciness, toughness, masticability, or meat taste. Flavour and texture variation also came together with a varied range of protein, fat, and salt contents, which could bring around again the question of the nutritional value of the meat analogues.

Norwegian consumers are divided in their opinions and choices when it comes to meat analogues being suggested as more sustainable options than meat. Varela et al. (2022) highlighted that some Norwegian omnivore consumers are sceptic towards meat analogues, feeling they may be more sustainable than meat, but not necessarily healthier, and they are particularly worried about the intense processing, as well as the content of additives and artificial ingredients of products mimicking meat. In particular, many Norwegian consumers would prefer shifting to fish instead, recommended to be increased in consumption by nutritional guidelines in Norway and as such perceived as healthy, and more adapted to their cultural culinary practices (Helsedirektoratet, 2016). Consumers with different relations to meat (frequent consumption-reduction-avoidance) perceive plant-based products and processing levels differently, with meat avoiding consumers (vegan and vegetarian) the most interested in having clean label products (Noguerol, Pagan, Garcia-Segovia, & Varela, 2021). This is an interesting conundrum, with meat avoiders the main market for highly processed meat analogues. Segments of Norwegian consumers behave differently towards plant-based options, as highlighted by Gonera et al. (2021); data from Norwegian consumers has shown that gender may also be important when it comes to meat reduction and plant alternatives. Females being more open to flexitarian diets, vegetarianism and eating less meat, while segments dominated by, for instance, low-income males show distinct avoidance to the same, in line with previous literature (Modlinska, Adamczyk, Maison, & Pisula, 2020). The importance of considering the issue of meat reduction and dietary shift in a broader, multiparametric perspective becomes apparent, including parameters such as gender, diet, habits, values, attitudes, psychological traits in the picture.

5. Conclusion

Norwegian consumers are becoming more segmented in their meat consumption habits. Some segments are in a transitional phase, slowly changing from a diet where the protein source is mainly meat-based, towards a diet of higher diversity where meat may play a smaller role. Meat has a very strong traditional standing, as well as being framed as one solution to improve Norwegian food security. However, the observed shift show that consumers are more diverse, and consumer segments appear that have stronger views on meat consumption, both

pros and cons, than previously.

Ethical statement

The paper is written according to Nofima's ethical standards and code of conduct as set down by the Ethical Board of Nofima. The paper is designed and written in accordance with the guidelines laid out in the Declaration of Helsinki (revised 2008). It does not present any data that has not previously been through ethical considerations.

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CRedit authorship contribution statement

Øydis Ueland: Conceptualization, Writing – original draft, Writing – review & editing. **Rune Rødbotten:** Conceptualization, Writing – original draft, Writing – review & editing. **Paula Varela:** Conceptualization, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare no potential conflicts of interest.

Data availability

No data was used for the research described in the article.

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