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Survey of New Zealand consumer attitudes to consumption of meat and meat alternatives

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ABSTRACT

This study examined consumers' consumption, motivations, and concerns regarding meat and meat alternatives by means of an online survey of 1061 New Zealand consumers and review of literature. Outcomes of the survey indicate New Zealanders are overwhelmingly omnivorous (93%), regard taste as the most important factor in their meat purchasing decision followed by price and freshness and consider environmental impact and social responsibility of less importance. Those surveyed indicated willingness to pay 17–24% more for food safety and sustainability related meat attributes. About half of respondents lowered their meat consumption the previous year, mainly red and processed meats, due to lack of affordability and health concerns. Although those surveyed showed high awareness about meat alternatives, their consumption level of the products was very low and more prevalent for female, younger and more educated individuals. Overall, the outlook for meat consumption and meat industry in New Zealand is positive and is likely to remain so for the foreseeable future.

1. Introduction

The New Zealand (NZ) red meat industry is a major contributor to NZ's economic and social wellbeing. The sector accounts for 92,400 full time equivalent jobs (4.7% of the NZ work force), with 35,700 people directly employed in the meat industry and a further 56,700 people indirectly employed through flow-on impacts (SG Heilbron Economic & Policy Consulting, 2020a). The cited report also notes that NZ exports approximately 88% of beef and 95% of sheep meat produced annually. According to meat industry statistics, in June 2021, the red meat annual sector exports contributed NZ$9.1 billion to NZ's economy, equating to 15.1% of total export value (NZ $60.4 billion) across all sectors (Meat Industry Association, 2021; Statistics NZ, 2021a, 2021b).

There are clearly several well-established, but less well understood, global challenges that could impact on these economic contributions by the NZ red meat industry. These challenges are from diverse sources including competition from alternative proteins from other animals and plants sources, the heightened consumer awareness about the environmental impact of livestock agriculture, the association of red meat with cancer and other non-communicable diseases, the growth in vegetarian lifestyles, and the increased consumer concern for animal welfare (Chen, Gurdian, Sharma, Prinyawiwatkul, & Torrico, 2021; Geiker et al., 2021; Godfray et al., 2018; Hicks, Knowles, & Farouk, 2018). Local challenges for the livestock sector involve urbanisation and government policies. New Zealand has a population of 5.1 million people, of which 87% live in urban areas, which is higher than the OECD (81%) and the EU (75%) (The World Bank, 2020). Urbanisation in NZ is therefore a significant competing land use for agriculture and horticulture, with attendant consequences on livestock and meat production. Other factors that could limit meat production include the 2021 NZ Government initiative He Pou a Rangi - Climate Change Commission that called for a 15% reduction in ruminant livestock numbers by 2030 based on a 2018 baseline, and the international market requirements driving NZ farming practices through market forces. Understanding how these global and local challenges and the issues they represent are perceived by NZ consumers and reflected in their food purchase and consumption behaviour is of outmost importance to the NZ meat industry and its long-term sustainability.

Although global meat consumption continues to increase mainly due to urbanisation and income per capita growth (Milford, Le Mouël,

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Bodirsky, & Rolinski, 2019), there is evidence that peak meat consumption has been reached in several countries (Whitton, Bogueva, Marinova, & Phillips, 2021), as well as the increased market availability and consumption of alternative proteins (Nguyen, Ferraro, Sands, & Luxton, 2022). Meat is currently one of the most controversial foods involving motivating consumption factors such as tradition, culture, sensory and nutritional benefits, while raising concerns linked to human health, the environment and animal welfare (Font-i-Furnols & Guerrero, 2022; Realini et al., 2022). Realini et al. (2022) highlighted positive and strong associations by consumers with meat's culinary and cultural aspects in Uruguay, a meat producing and exporting country like NZ, and indicated that price and health rather than ethical or environmental concerns were related to changes in the amount and type of meat consumed. However, the importance of ethical and environmental motives towards meat consumption is emerging among Westerners and is stronger in EU countries (European Commission, E C, 2020; Sanchez-Sabate & Sabaté, 2019), where a growing interest is evident for alternative proteins (Faber, Henn, Brugarolas, & Perez-Cueto, 2022); showing that trends in motivations around meat consumption, its reduction and alternative proteins vary across regions, countries, and consumer segments. Therefore, this study provides a NZ perspective on consumer attitudes towards consumption of meat and its alternatives. The specific aims were: 1) to assess consumers' attitudes and preferences towards a number of attributes when shopping for meat products, 2) to understand consumers' intentions and motivations to cut down meat consumption, and 3) to explore perceptions of meat alternatives by means of an online survey of NZ consumers.

2. Materials and methods

2.1. Survey method

A structured and self-administered online survey was conducted in NZ in December 2021. The survey was administered through Qualtrics™, a web-based survey system, and had a sample size of 1061 consumers. A summary of the demographic characteristics (gender, age, education) of the participants is shown in (Table 1). Ethical approval was granted for this study by Lincoln University Human Ethics Committee, application number HEC2021–58, and informed consent was obtained from all subjects involved in the study.

2.2. Sampling strategy

In surveys, different ways can be used to obtain random samples of consumers including telephone and/or mail surveys (Dillman, Smyth, & Christian, 2009), and in recent years internet surveys also have become increasingly popular. Obtaining a probabilistic sample in internet surveys can be more challenging than traditional survey methods. In internet surveys, online panels are commonly used, which are considered as non-probabilistic/non-random sampling methods, as not everyone has access to the internet and are likely to include people who are more regular internet users Callegaro, Villar, Yeager, & Krosnick, 2014; Callegaro & Krosnick, 2014). For this study, sampling involved the recruitment of participants from an online panel database of consumers in NZ provided by an international market research company (dynata.com). These panels are profiled, broadly recruited, and frequently refreshed by the company. The company holds a participation history of each panel member. Respondents for each survey are compensated with a retail voucher for completing the survey. Potential respondents were recruited by e-mail which included a short description of the study, a link to start the online survey and instructions to run the survey. In addition, quotas were set for gender to receive an equal split of respondents. Thus, the gender distribution of the respondents matched the general NZ population (males: 49% and females: 51%), while the distribution was skewed towards the older age categories and higher education levels compared with the general NZ population (18–44 years old: 31 vs. 47%, 45–69 years old: 32 vs. 32% and 65+ years old: 38 vs. 20%, respectively; Up to high school-High school: 32 vs. 50%, Tertiary qualification: 29 vs. 19%, University degree-Postgraduate degree: 38 vs. 25% and Other: 1 vs. 6%, respectively) (Statistics NZ, 2018). To ensure data quality, some respondents were removed if they exhibited inattentiveness in survey completion (i.e., speeding through the questionnaire and/or failing the attention check question). The minimum required time for successfully completing this survey was set at 1 min based on a survey pre-testing process. Respondents completing the survey in less time were removed from the data set. In addition, the survey included an instructed response items to screen inattentive respondents from the sample. The survey question "*How important do you think the following meat product attributes are when purchasing?*" included an attribute that read: *"It's important you pay attention to this survey. For this statement, please select the response 'Not at all important'"*. Respondents who failed to select *'Not at all important'* were removed. A total of 153 respondents had to be removed in the data cleaning process, leaving a final sample of 1061 respondents for this study.

Table 1
Demographics (gender, age, education) of the surveyed respondents ($n = 1061$).

Gender	%	**Education**	%
Female	50.8	Up to High School	3.2
Male	49.0	High School	28.8
Diverse	0.2	Tertiary qualification other than Degree (e.g. diploma, vocational, etc)	29.4
Age (years)	**%**	University degree	25.1
18–29	8.6	Post-graduate degree	12.5
30–44	21.7	Other	0.9
45–59	20.0		
60–64	12.3		
65–74	18.6		
75+	18.9		

2.3. Survey structure and implementation

The final survey comprised of three parts. (1) Range of questions to assess consumers' attitudes and preferences towards a number of attributes when shopping for meat products. (2) This was followed by a set of questions to assess consumers' intentions and motivations to cut down meat consumption. (3) Finally, perceptions of meat alternative proteins were assessed. Respondents' demographics were also captured. A complete copy of the survey can be found in Appendix A. Participants that indicated to follow a vegetarian (4%), vegan (2%) or pescatarian (1%) diet (7%, $n = 72$), answered questions related to meat alternatives only; while those that indicated to follow no specific (77%) or other specific (9%) diet and flexitarians (7%) answered all survey sections (93%, $n = 989$). These respondents were screened out if they did not purchase meat products at least once per month.

2.4. Data analysis

The results of the survey were analysed using descriptive statistics to examine consumer attitudes and preferences towards attributes in meat products and meat alternatives in NZ. Further, to assess for statistically significant differences in meat consumption and its reduction, and consumption of meat alternatives as well as willingness to purchase lab-grown/cultured meat across the gender, age, and education groups of participants, a series of tests were applied including: the Mann-Whitney *U* Test, Kruskal-Wallis H-Test, Test of Two Proportions, and a Chi-Square Test of Homogeneity. Pairwise comparisons were performed using Dunn's (Dunn, 1964) procedure with a Bonferroni correction for multiple comparisons and adjusted *p*-values were obtained. The reliability of the measurement design was determined by applying Cronbach's Alpha to two sets of Likert scale questions – the importance of meat product attributes (Cronbach's Alpha = 0.874, 24 items); and reasons for

reducing overall meat consumption (Cronbach's Alpha = 0.796, 12 items). This is consistent with alpha range recommendations made by MacMillan and Schumacher (2001).

3. Results

3.1. Meat purchase and consumption

Results of this study showed that chicken was the main type of meat consumed regularly, accounting for about 33% of the meals within an average week, followed by beef (22%), fish (13%), pork (10%), lamb (8%), and processed meat (7%). Plant-based meat products, venison, game/hunted meat, and other meat types only make up a minor portion in participants' weekly diets (≤2%). Further, about 22% of the meat purchased per week is minced.

Participants spend approximately NZ$46 per week on meat and meat products, and 87% often purchase meat from mainstream supermarkets. About half of the respondents would sometimes purchase meat from takeaways (62%), butcher shops (50%), and café/restaurant (45%). Most consumers (>75%) never bought meat from other suppliers, such as home kill (88%), farmers' market (86%), online (84%), alternative outlets and specialist stores (76%).

Meat consumption patterns were evaluated across different age, gender, and education groups. Participant education level did not influence meat consumption ($p > 0.05$). Male respondents indicated higher levels of pork and lamb consumption ($p < 0.01$), while females indicated higher consumption of chicken and venison ($p < 0.05$). Pairwise comparisons showed that older participant age groups (60–64, 65–74 and 75+ years old) indicated higher levels of pork, lamb and fish and lower levels of chicken consumption than some of the younger paired groups (18–29, 30–44, 45–59 years old) ($p < 0.05$).

3.2. Importance of meat product attributes when purchasing

Participants were asked to indicate the importance of a series of meat attributes when purchasing (Fig. 1). The most important attribute was taste (71% 'very important') followed by price (55%) and then use-by date (51%). The majority of consumers considered attributes that can be related to food safety as 'very/moderately important' such as food safety certification (78%) and no use of chemicals (81%), growth hormones (72%), antibiotics (70%) or genetically modified animal feed (63%). Being a locally produced (78%) and chilled product (74%) was also important for most consumers, as well as other meat quality attributes beyond taste such as texture (77%), colour (72%), higher quality of cut (70%) and low-fat content (62%). Animal welfare certification was considered important by about half of consumers (58%) as well as branding (52%). Other aspects related to environmental impact of production and social responsibility were of lower importance to

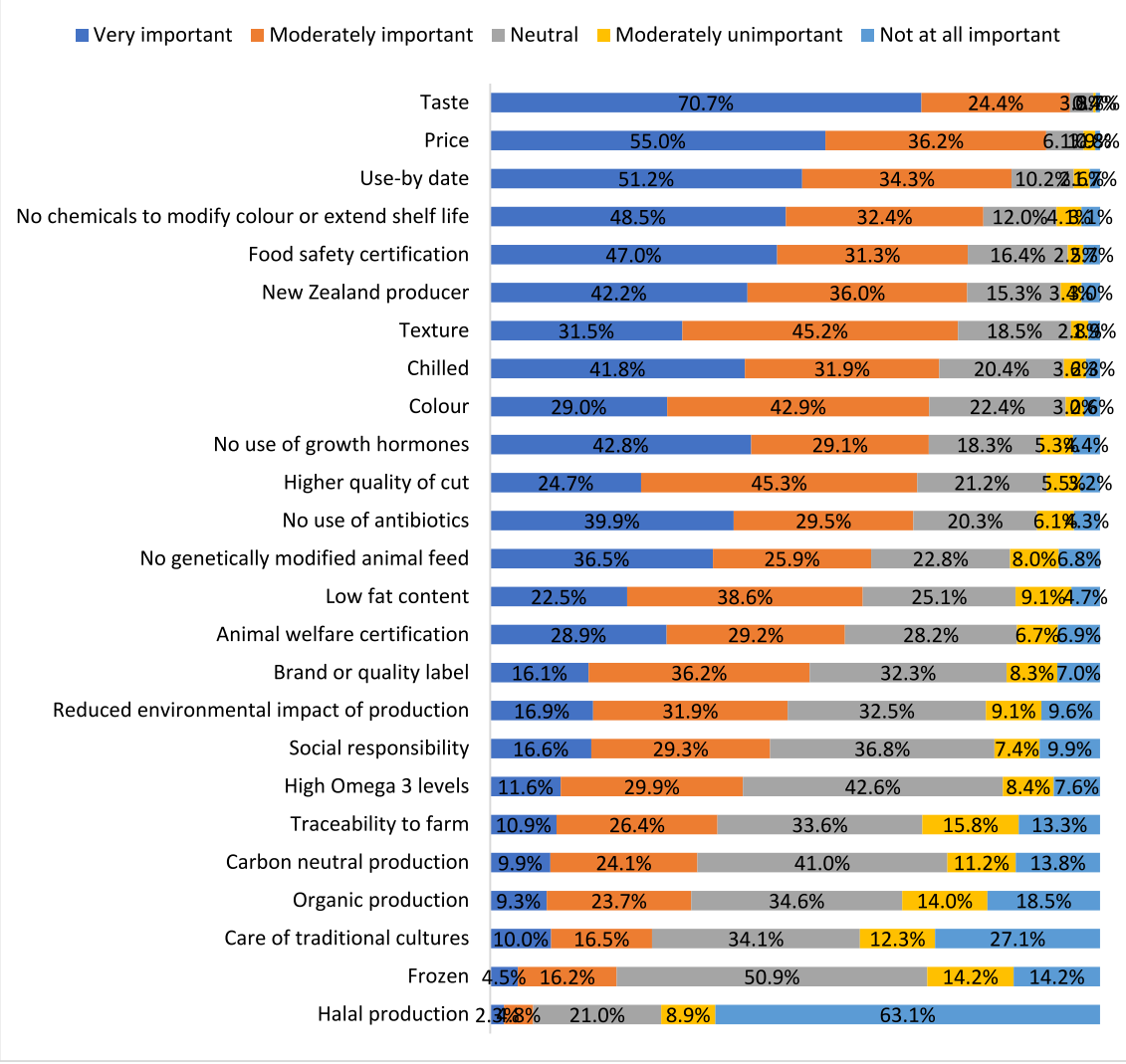

Fig. 1. Importance of attributes for respondents when purchasing meat.

respondents. Relatively few consumers indicated care for traditional cultures as important and most respondents indicated Halal production as unimportant (72% moderately/not at all important) when purchasing meat.

3.3. Consumers' perception of sustainability and willingness to pay for credence meat attributes

Participants were asked to indicate the top 3 factors or words that they considered important to define sustainability for meat production (Fig. 2). The most frequent words include 'animal welfare', 'environmental impact' and 'grass-fed'. These were closely followed by 'carbon/GHG emissions', 'free range' and 'farming methods'. Respondents were also asked to indicate the importance of meat products from animals raised in an environment that was certified sustainable. A majority (62% very important/important) think that it is important to have certified sustainable meat, while 18% were neutral and 10% indicated to be unimportant or not at all important. Consumers indicated willingness to pay (WTP) 17–24% above the price they normally pay for a range of attributes associated with food safety, animal welfare and sustainability. Participants were WTP 22–24% more for sustainable production and no use of genetically modified animal feed, antibiotics, and growth hormones, followed by 19% for animal welfare and '100% organic' and 17% for carbon neutral production and traceability to farm.

3.4. Meat consumption reduction and its motivating factors

Over the past year, nearly half of respondents (47%) lowered their meat consumption; most of them (69%) have consumed less meat overall while the rest of meat reducers (31%) only lowered the consumption of particular meat products, especially processed meat, followed by red meat (beef, lamb and pork) and then venison. Consuming chicken seemed to be a minor concern for the meat reducers. Most meat reducers (>70%) expressed concerns about their financial status and considered affordability (80%) and saving money (74%) as the most important reasons when reducing their regular meat consumption (Fig. 3). Health was a secondary factor contributing towards meat reduction, including personal and family health, disease prevention and losing weight. About 75% and 65% of respondents reduced their meat consumption due to concerns over health, with higher reduction indicated by females than males ($p < 0.05$). Ethical considerations on animal welfare, environment (e.g., reduced carbon emission), and food safety (e.g., avoiding GMOs) were lower contributors towards reducing meat consumption relative to meat price and personal and family health. Religious/spiritual reasons and curiosity about other dietary options were considered neutral or unimportant for their decisions on meat reduction.

3.5. Meat alternatives

Survey results indicate that about 70% of respondents have heard of traditional (e.g., Tofu and Falafel) and meat-like plant-based products (e.g., Quorn and Impossible Burger), while 50% approximately have heard of edible insect products and lab-grown/cultured meat; suggesting that overall, surveyed consumers are reasonably aware of the meat alternatives currently available in the market. However, this level of awareness only translates to a low level of purchase or consumption with 79%, 65%, and 96% of respondents having never consumed meat-like plant-based (e.g., Quorn), traditional plant-based (e.g., Tofu), or edible insect products, respectively. Also, only 17.8% said yes to being willing to purchase cultured meat if it was available and affordable in NZ.

Female respondents indicated consuming meat-like and traditional plant-based products more regularly compared to males ($p < 0.05$), while gender did not influence consumption levels of edible insects ($p > 0.05$). Pairwise comparisons showed that younger participant age groups (18–29 and 30–44 years old) indicated more regular consumption of meat-like and traditional plant-based products and edible insect products than most of the older paired groups (60–64, 65–74 and 75+ years old) ($p < 0.05$). Pairwise comparisons also showed that participants with higher level of education (Tertiary qualification and/or University degree) indicated more regular consumption of meat-like and traditional plant-based products and edible insect products than those with lower level of education (High school) ($p < 0.05$).

With regards to cultured meat, participant gender did not influence willingness to purchase if commercially available in NZ ($p > 0.05$). However, a higher proportion of younger respondents (18–29 and 30–44 years old) and those with higher level of education (Tertiary qualification, University and Post-graduate degree) were more likely to purchase cultured meat than older participants and those with lower level of education (High school or lower), respectively ($p < 0.05$).

4. Discussion

New Zealand is one of the leading exporters of beef, lamb, and venison globally, yet results of our survey found that chicken is domestically the most consumed meat. Similar findings reported in 2019 showed that meat consumption in NZ consisted of poultry/chicken (52%), pork (26%), beef (17%), lamb (4%) and mutton (<1%) (Beef + Lamb New Zealand, 2021). The impacts of demographic characteristics including gender, age groups, and education levels on consumption of meat were further investigated in this study and results revealed that males indicated to have higher consumption levels of pork and lamb and lower consumption levels of chicken, venison, and plant-based products than females. This variation of preferences between genders, may be because women are more inclined to pick up health messages and purchase products which are advertised as lean (e.g. chicken and venison) or healthy (e.g. plant-based), while men tend to link meat consumption with strength and masculinity and negatively respond to health-conscious information (Ghvanidze, Velikova, Dodd, & Oldewage-Theron, 2016; Rothgerber, 2013).

The age of the survey respondents influenced their meat consumption with older participants indicating higher levels of pork, lamb and fish and lower levels of chicken consumption than younger respondents. On the other hand, younger participants indicated more willingness to purchase cultured meat if commercially available. Younger consumers tend to be more health conscious, consider food as a social factor, and prefer foods that align with their dietary nutrition goals (e.g., body building), bring in enjoyment and could also become resources to be shared through their social media platforms. Thus, younger consumers like to follow the trend to consume low fat, plant-based diets, and alternative foods, since such behaviour is considered fashionable and potentially beneficial for the environment (Pilař, Stanislavská, Kvasnička, Hartman, & Tichá, 2021). The busy lifestyle of younger consumers and their lack of financial resources could further explain why chicken has become a preferred option for this demographic, since chicken is cheaper than other meat types, easier to prepare, and widely available in restaurants and takeaways (i.e., convenient).

Education level of participants did not influence meat consumption but respondents with higher level of education were more likely to consume meat alternatives and purchase cultured meat if commercially available, suggesting that more educated individuals are more open to try new food products leading to segmentation of food markets (Meiselman, King, & Gillette, 2010; Rabadán, 2021).

Taste emerged in our survey as the most important attribute in the NZ consumer choice to purchase meat. This finding is corroborated by New Zealand Trade and Enterprise (2021) in its report, indicating that taste is a top driver of food purchases in NZ's markets. According to Verbeke (2006), taste and flavour are of primary importance in food choice and consumers are usually not willing to compromise on these attributes at the expense of other food attributes including health benefits. Other studies in NZ have also shown that taste and the enjoyment

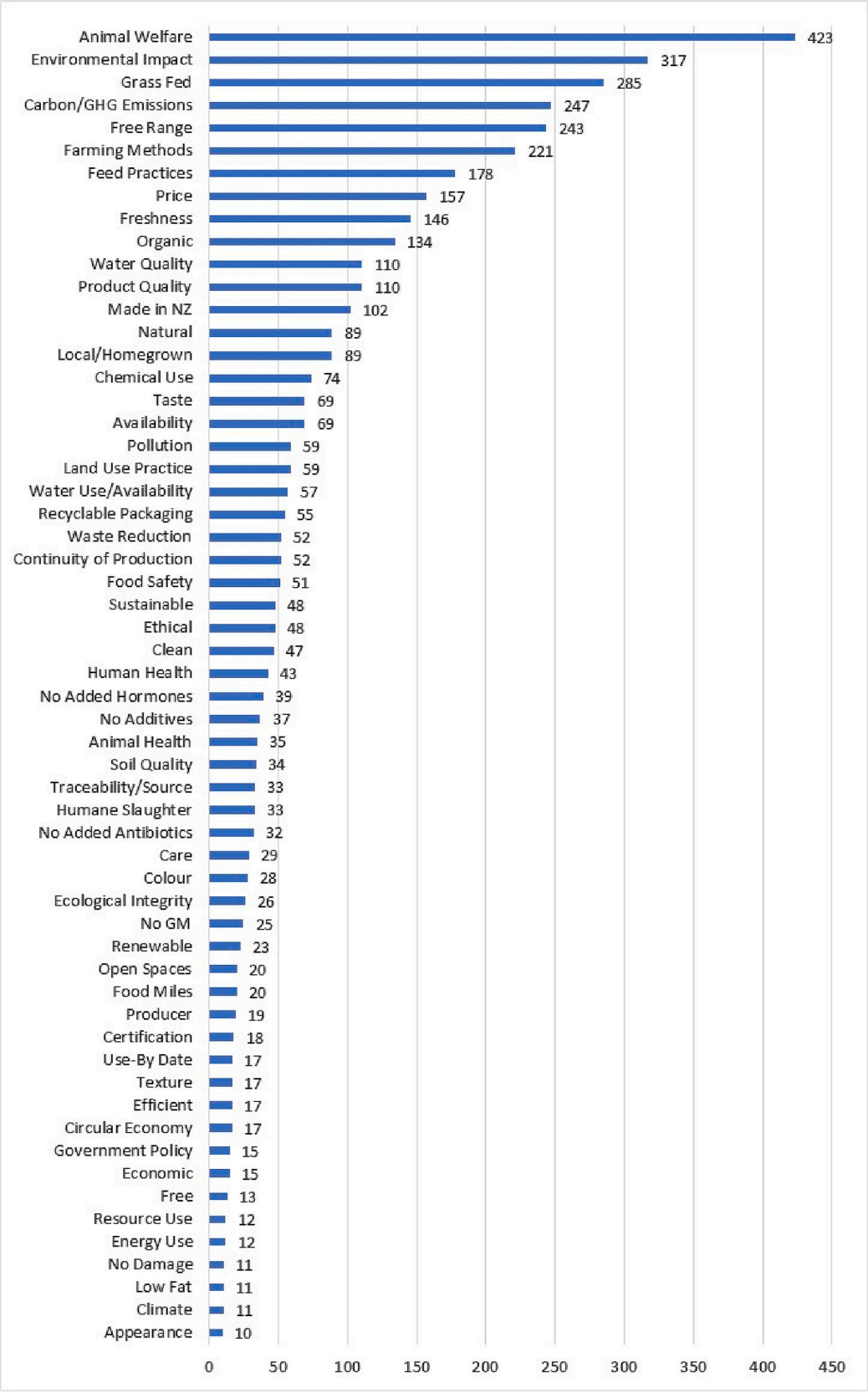

Fig. 2. Bar graph showing the frequency of factors or words that respondents considered important to define sustainability for meat production. The top 3 factors or words were: 'animal welfare', 'environmental impact' and 'grass fed'.

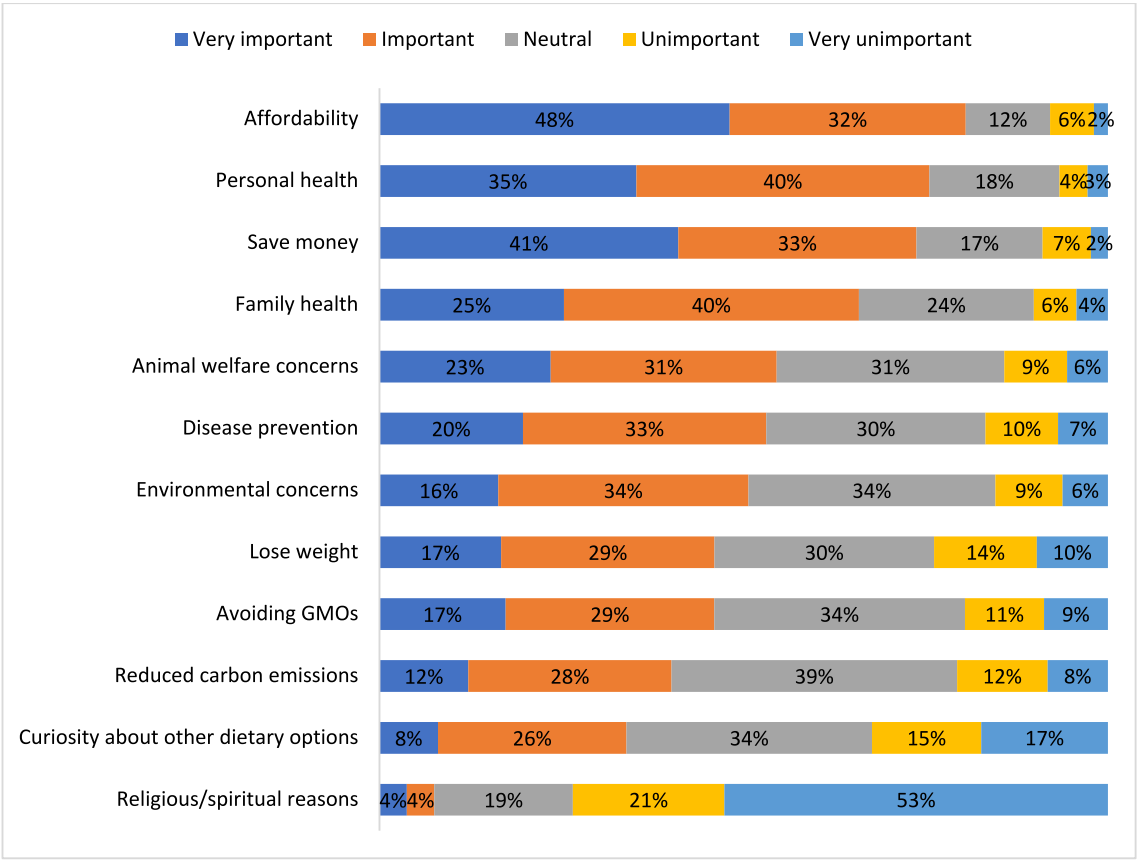

Fig. 3. Importance of factors for respondents in motivating to cut down on regular meat consumption.

of eating meat are a primary motivation for meat consumption (de Koning, Dean, Vriesekoop, Aguaiar, et al., 2020; Kemper, 2020; Latimer, Peddie, Scott, & Haszard, 2022) and the strongest perceived barrier for meat reduction, especially for males (Pohjolainen, Vinnari, & Jokinen, 2015).

The second attribute after taste in importance for NZ consumers when it comes to meat purchase is price. This finding of our survey agrees with those in previous studies that indicated strong influence of food price in the purchasing decisions of NZ consumers (Kemper, 2020; Lentz, Connelly, Mirosa, & Jowett, 2018). Meat is an expensive source of protein in NZ with a broad range of price depending on the type of cuts and meat products. The increasing consumers' concerns about the impact of COVID-19 on the global, local, and personal financial situation may have also contributed to a greater focus on price relative to other factors when purchasing meat.

Other significant factors influencing meat purchase decisions following taste and price were product freshness (use-by-date), since most meat is purchased chilled, and those related to food safety (food safety certification and no use of chemicals, growth hormones, antibiotics, or genetically modified animal feed). Product integrity, safety and naturalness (e.g. hormone-free, GMO-free, grass-fed) is increasingly important for domestic and international consumers (McDermott & Scrimgeour, 2016).

Most participants also indicated local production (NZ producer) and animal welfare as important criteria for meat purchasing. Origin of meat has been highlighted as a meat safety indicator (Cowan, 1998) and is linked to the value of 'locality' and 'consumer sense of belonging' (Bernués, Olaizola, & Corcoran, 2003). New Zealanders are aware of how the meat in their country is produced, with pastoral scenes being an integral part of the visual landscape and a sense of identity for them (SG Heilbron Economic & Policy Consulting, 2020b). Thus, pasture-raised livestock products, such as those produced in NZ involving free-range, GMO-free, hormone-fee and responsible use of antibiotics (O'Neill, 2015), could easily be perceived by NZ consumers as providing a cleaner environmental footprint and care for animal welfare (Stampa, Schipmann-Schwarze, & Hamm, 2020).

Although taste was the most important attribute for meat purchasing decisions, other meat quality attributes such as texture, colour, higher quality of cut and low-fat content were also found to be important for most NZ consumers. The importance of meat texture, colour and fat content varies with the type of meat and processing; however, a good taste and flavour is expected from all meat and meat products. Some of these attributes (e.g., texture and taste) can only be inferred at the point of purchase, so brand/labelling was also important for half of the participants.

Other aspects related to environmental impact of production and social responsibility (reduced environmental impact, traceability, carbon neutral, organic production, care for traditional cultures) were of lower importance to respondents, although most of them were willing to pay 17–24% above the price they normally pay for attributes associated with sustainability. The word frequency chart (Fig. 2) shows that most consumers related sustainability to terms such as 'animal welfare', 'environmental impact', 'grass fed', 'carbon/GHG emissions', 'free range' and 'farming methods', indicating a clear association with care for animals and for the environment using responsible farming practices. Halal production was regarded as unimportant in meat purchasing decisions, probably due to a small percentage of the participants, and the NZ population in general, specifically interested in Halal products.

The widely reported trend in affluent countries of the reduction in meat consumption is also evident in NZ. This started over ten years ago, mainly for beef products with no major changes in lamb and pork during the same period. Conversely, consumption of chicken increased by about 50% from 2008 to 2018, followed by a decrease of about 10% in 2019 (Beef + Lamb New Zealand, 2021). In this study, red and processed meat

were the main types of meat reduced by the respondents over the last year. The changes of meat consumption behaviour in NZ could be driven mainly by the concerns over the economy, health, and environment, as reported in previous studies by Kemper (2020) and Lentz et al. (2018), that the cost and health impact of meat were the main factors linked to NZ consumers' decision to reduce meat consumption. The cost of meat consumption was the primary consideration for meat reducers in this study. According to Statistics NZ (stats.govt.nz), the retail prices (per kg) for beef steak (sirloin) and lamb chop increased over the last five years (2016–2021) by 7% and 37% respectively, while the price for pork meat generally remained stable. On the other hand, a decreasing trend was seen for chicken meat with a price drop by 13%, 8%, and 4% for breast, pieces, and whole chicken, respectively. Such changes in price could in part explain why meat consumers mainly reduced red meat products and not chicken. Other reasons for the reduction in red meat consumption in NZ could be the unsubstantiated link (Geiker et al., 2021; Jakobsen, Bysted, Mejborn, Stockmarr, & Trolle, 2021) between red meat consumption and non-communicable diseases such as cardiovascular disease and colon cancer (Wolk, 2017), or the negative environmental impact of red meat production (Godfray et al., 2018). Studies found that such negative messaging regarding meat production and consumption affects female consumers more than males (Milfont, Satherley, Osborne, Wilson, & Sibley, 2021), which could be the reason more females than men reduced their meat consumption last year in NZ.

The global demand for alternatives to meat and meat proteins including plant-based and insects' protein is said to be rising, mostly driven by concerns for animal welfare, environmental sustainability, and human health. Allied Market Research (2022) in their recent report on the global meat substitute market which included Tofu, Tempeh, TVP, Seitan, and Quorn based, valued the size of the market at $5477.7 million in 2020, with projection to reach $11,230.1 million by 2030. This positive trend, however, is not that apparent in NZ. Milfont et al. (2021) analysed the self-reported dietary behaviour of New Zealanders from the NZ Attitudes and Values Study and found that omnivore was the most prevalent dietary category (94.1%), then vegetarian (4.6%) and then vegan (1.2%). This agrees with the findings in this survey, albeit using a smaller number of respondents, that 7% of NZ consumers can be classified as flexitarian, 1% as pescatarian, 4% as vegetarian, and 2% as vegans. The remaining 86% of the respondents who adhere to no specific or other specific diets, or precisely the 32% among them who indicated in the last one year that have cut down on their overall meat consumption, may constitute a pool from which any future growth in the consumption/purchase of plant-based meat alternatives may occur. Although, outcomes of consumer surveys such as ours may be considered limited, a recent analysis of about 39,000 individual-transaction household scanner data in USA found that most (86%) plant-based meat alternative (PBMAs) buyers also buy meat and that only about 2.8% of households only purchased PBMAs (Neuhofer & Lusk, 2022). Another analysis of scanner data found that the market share of PBMA patties and burgers only ranged from 0.05% in Texas to 0.34% in North Carolina and Kansas, in USA, far below the averaged 46% market share for beef (Zhao, Wang, Hu, & Zheng, 2022), prompting the authors to suggest that despite the booming popularity of the new generation PBMA in recent years, the actual demand remains low. There is no way of knowing for sure what the future growth in the consumption of alternative meat proteins will be in New Zealand. However, if one coupled the strong tradition of meat eating in NZ with what recent studies found regarding the complexity around the adoption of meat alternatives and their higher cost (e.g., the costs/kg of Woolworth Supermarket lean beef mince, Impossible Burger, Quorn mince, and Falafel are NZ$16.0, NZ$42.0, NZ$23.3, and NZ$25.0, respectively), the perceived and experiential importance of meat, and the yuk factor and food neophobia often associated with meat alternatives (de Koning et al., 2020; Latimer et al., 2022), it is easy to foresee a very slow growth for this market segment in NZ. The study by Milfont et al. (2021) underscored this forecast with the finding that among New Zealanders, the probability of shifting from an omnivore diet to a vegetarian or vegan diet over a one-year period was low, and that veganism was the least stable dietary category. In other words – using the 4Ns from Piazza, Ruby, and Loughnan (2015) – for New Zealanders, meat is what is 'nice', 'normal', 'necessary', and 'natural', and may likely remain so for the foreseeable future.

NZ meat industry is export-orientated with 95% of sheepmeat and 88% of beef production exported to >110 countries (Meat Industry Association, 2021). The remaining 5 and 12% respectively, of the sheep meat and beef produced is consumed locally by a mix of individuals (93% of our survey respondents) ranging from those who consider themselves flexitarians (7%) and the 47% meat-reducers, to those at the other extreme who are jokingly referred to as 'meatarians' or 'secondary vegetarians' that prefer to let ruminants do the unique conversion of pastures into protein and then eat the meat. With this overwhelmingly omnivorous population and the ongoing strong demand for protein, and a wide range of overseas markets, the future of the NZ red meat sector both locally and internationally looks positive. Despite this encouraging outlook, the NZ meat industry is striving to keep growing through its strategies to: (1) keep its current markets open and create new ones; (2) achieve in-market differentiation of its products; (3) continue to innovate and invest in world-class research and development; (4) continue to highlight the industry's sophistication, natural production system, and environmental sustainability; and (5) promote the role of NZ pasture-raised red meat in a balanced diet (Beef + Lamb New Zealand, 2020). Perhaps, a change by the NZ meat industry to maximise the value for each customer rather than from each carcass may be required for the future sustainability of the industry. Also, to better serve both local and export markets, cater for everyone including the 5% of respondents who are vegetarians or vegans, the meat industry might consider to re-brand itself into a "Meat and Complementary Products Industry" to get into the business of producing alternative meat proteins, in case the sector grows in the future as is being widely predicted (Hicks et al., 2018).

Despite the limitations of non-probabilistic sampling indicated in the methodology section, results from the present study align with those reported recently in NZ involving other sampling methods, approaches, and greater number of participants (Kemper, 2020; Latimer et al., 2022; Lentz et al., 2018; Milfont et al., 2021). Further in-depth analysis of the meat alternative proteins market, the role of the neurobiological aspects of taste, familiarity, and adoption on the low usage of alternative meat proteins in New Zealand, and the impact of environmental constraints on meat consumption would improve our understanding of consumer attitudes towards consumption of meat and its alternatives. Finally, the results presented and discussed in this study will complement the contributions from other countries in forming a wider global picture on meat consumption in this special issue.

5. Conclusions

Results provided a comprehensive insight on NZ consumer's motivations and concerns regarding the consumption of meat and its alternatives. For NZ omnivorous consumers the taste of meat is the king decider for purchase and consumption, and when it pertains meat consumption reduction, lack of affordability and health concerns are their key drivers. Consumers acknowledged the importance of sustainability linked to care for animals and the production environment and are willing to pay a premium (17–24%) for a range of meat attributes associated with these social aspects. Although respondents' awareness of alternative proteins is high, their consumption of the products is very low compared to what is reported in other countries. Overall, results confirm NZ consumers' positive attitude and attachment towards meat and given the complexity and paradoxical nature of the factors driving consumer meat consumption choices, meat reduction rather than elimination from food systems seems more plausible. Thus, the meat industry is challenged with consumer centric tailoring of meat offerings that provide sensory and nutritional qualities, while addressing the key

issues associated with meat production, processing, and pricing.

CRediT authorship contribution statement

C.E. Realini: Conceptualization, Methodology, Resources, Supervision, Visualization, Writing – original draft, Writing – review & editing, Funding acquisition. **T. Driver:** Investigation, Formal analysis, Writing – original draft, Writing – review & editing. **R. Zhang:** Investigation, Writing – original draft, Writing – review & editing. **M. Guenther:** Investigation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **S. Duff:** Data curation, Formal analysis. **C.R. Craigie:** Writing – original draft. **C. Saunders:** Conceptualization, Methodology, Resources, Writing – original draft, Writing – review & editing, Funding acquisition. **M.M. Farouk:** Conceptualization, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

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