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Limiting meat consumption in the view of the students of the Poznań University of Economics and Business

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Abstract

The aim of the study was to examine the attitudes of students at the Poznań University of Economics and Business towards limiting meat consumption, in the context of global trends related to sustainable development. The two main identified areas of consideration are related to the impact of excessive meat production and consumption on human health and the state of the environment. The survey involved 296 respondents (61.8% women, 37.8% men, 0.4% other). Throughout the study, it was found out that more than half (51.4%) of the respondents limit their meat consumption. The gender of the respondents was important in this regard (63.4% of women and 31.3% of men limit their meat consumption). The most frequently cited reasons for limiting meat consumption include concerns for the environment (42.6% of respondents) and the desire to improve health and well-being (41.9% of respondents). Meat consumption decisions among 30.7% of respondents are not influenced by any arguments.

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- limiting consumption
- environmental concern
- health concern
- Poland

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Introduction

According to a multitude of authors (Hickel, 2020; Jackson, 2017; Klein, 2018; Rogall, 2010), the global economy is facing serious challenges in addressing the need for sustainability. While much of the discussion to date has been about fossil fuels or the overuse of natural resources, as the topic of sustainability has entered the mainstream, it is also beginning to expand to include hitherto less popular issues – one of which is the issue of excessive meat consumption and its impact on the planet (Attenborough, 2021; Gates, 2021; Steel, 2020).

Currently, there are increasing claims about the negative impact of meat production and consumption on human health and the environment. Indeed, despite its high nutritional value, its excessive consumption contributes to the accumulation of a number of problems. For example, excessive meat consumption can lead to many diet-related non-communicable diseases. At the same time, animal husbandry and related meat production are responsible for a significant proportion of global carbon dioxide emissions and are extremely energy inefficient. In the face of the spread of lifestyle- and diet-related diseases of civilisation, as well as growing climate problems and the need to take sustainability into account, movements to reduce meat consumption, including vegetarian and vegan movements, are therefore an important initiative.

In the context of the above considerations, the aim of this paper is to examine the attitudes of students at the Poznań University of Economics and Business (PUEB) towards limiting meat consumption, in the context of global trends related to sustainable development. This will make it possible to compare their level of awareness and knowledge with the most important consequences of over-consumption of meat and other animal products, both from the point of view of human health and the environment. To this end, the following research questions were formulated:

- Do the PUEB students limit their meat consumption?
- Are there differences in limiting meat consumption between respondents from settlements of different sizes?
- Are there differences in limiting meat consumption between respondents of different genders?
- What are the main reasons for the PUEB students to limit their meat consumption?

The first part of the article presents an analysis of global trends relating to meat consumption. The second part aims to characterise the methodology and assumptions of the survey conducted among students of the Poznań University of Economics on their attitude towards limiting meat consumption. In the third part, the results of the survey are presented, together with an indication of possible

directions for its continuation. Finally, a discussion is held comparing the results of the survey with the research questions posed in the introduction.

1. Literature review concerning excessive meat consumption

Animal source foods (ASF), mainly meat, milk and eggs provide a high quality source of ingredients and micronutrients (especially iron, zinc and vitamin B12). Access to ASF is believed to have contributed to the evolution of the unusually large and complex human brain and social behaviour of homo sapiens (Milton, 2003). Throughout the 20th century, ASF have been a growing part of the food supply in western societies, as well as the developing ones (MacRae et al., 2005). From the early 1960s to around 2010, per capita consumption of milk in developing countries almost doubled, of meat tripled and of eggs increased fivefold (Burlingame et al., 2010). This was largely related to rising incomes and urbanisation influencing increased demand among many developing countries – particularly in those, where the consumption of animal products is a marker of social status (Pica-Ciamarra & Otte, 2009).

Despite their high nutritional value, however, excessive consumption of animal products (and meat in particular) contributes to the rise of certain problems. Firstly, excessive meat consumption can lead to diet-related non-communicable diseases such as obesity, cancer and heart disease (EAT-Lancet Commission, 2019). Secondly, meat production accounts for a sizable proportion of global carbon emissions and is extremely energy inefficient—for example, extracting one calorie from beef requires six times the input of feed and plant products (Gates, 2021). Consequently, although beef provides humanity with around 2% of calories, up to 60% of total arable land is indirectly used for its production (Attenborough, 2021).

Therefore, the excessive consumption of meat on a global scale raises two main sets of issues. Firstly, it is worth considering the impact of this situation on human health. While meat consumption in certain amounts is beneficial for maintaining a balanced diet (a maximum of 3.5% of calories are recommended to be extracted from meat), meat consumption currently exceeds recommended levels on a global scale significantly. Weekly meat consumption for an average adult should not exceed 98 g of red meat, 203 g of poultry and 196 g of fish (EAT-Lancet Commission, 2019), the equivalent of about 26 kg of meat per year. Meanwhile, in many developed countries, annual per capita meat consumption is a multiple of this value; in 2019, it was 153 kg in Portugal, 151 kg in the United States and 96 kg in Poland (Our World in Data, 2022). This translates into the rise

of the aforementioned problems related to poor diet and the resulting diseases of civilisation (Migdał, 2007). A comprehensive review of studies related to the health effects of excessive meat consumption suggests that the main problem in this regard is red meat (mainly beef and pork), the consumption of which should be reduced as far as possible (Richi et al., 2015; Mroczek et al., 2018). Therefore, although there is still no irrefutable consensus on this issue, the prevailing view in the literature is that meat consumption—particularly red and highly processed meat—should be reduced, which is the official position of the World Cancer Research Fund (2021) and the World Health Organisation (2015).

Secondly, meat production has a significantly negative impact on the environment. In a paper by Cole & McCoskey (2013), the authors demonstrated that the concept of the ecological Kuznets curve applies to meat consumption worldwide, where—up to a certain income level—meat consumption increases with GDP before starting to decline. However, most countries in the world are still before the inflection point of this curve. It is therefore predicted that, if no action is taken to reduce meat production, the area of land devoted to meat production will need to increase by 30–50% by 2050, contributing to a drastic decline in biodiversity (Machovina et al., 2015). Another important aspect is the CO₂ emissions associated with meat production. In 2013, animal husbandry accounted for 14.5% of total global carbon dioxide emissions (Gerber et al., 2013). Meanwhile, according to the model proposed by the IPCC, in the absence of action to reduce global CO₂ emissions, humanity will have used up all of its remaining ‘carbon budget’ by 2030, making it impossible to stop global warming at 1.5°C above the pre-industrial times (Rogelj et al., 2018). Exceeding this level will contribute to rising sea levels and warming and acidification of the oceans. Longer and more intense droughts will threaten crops, wildlife and freshwater resources (World Wide Fund for Nature, 2021). This, in turn, will be associated with intensifying losses to the global economy from climate change, which could reach up to US \$1.9 trillion per year by 2100 (Sanderson & O’Neill, 2020). In addition to its high carbon footprint, meat also requires a huge amount of fresh water used in the production process. For example, producing 1 kg of beef involves the consumption of 14,500 litres of water (Hoekstra & Heek, 2017). Meanwhile, according to some projections, in the absence of a reduction in global demand for drinking water, the world’s supply will be fully exploited before 2100, with the possibility of “severe drinking water shortages” (in developing countries in particular, but over time also in developed countries) “even leading to armed conflicts” (Meadows et al., 2004, pp. 69–71).

An additional, but more difficult to quantify reason for limiting meat consumption may also stem from moral motives. Ethical dilemmas related to animal husbandry date back to ancient Greece, where the views of Plato and Aristotle resonated most clearly. While Plato viewed the overconsumption of

meat mainly in economic terms (meat as a luxury leading to an unsustainable society, full of conflict and inequality, requiring more land and wars to acquire it) (Plato, 2015), Aristotle already considered animals as sentient beings, some of them even endowed with memory and imagination (Grabowska, 2014). Nevertheless, it was still morally justifiable to inflict suffering on them if there were tangible benefits for humans involved. Contrary to popular perception, St. Thomas Aquinas (Tomasz z Akwinu, 1985, p. 234) was also of a similar opinion, advocating only to refrain from excessive cruelty towards animals, i.e. inflicting suffering on them that was 'unjustified'. For the modern age, however, the key views proved to be those of Descartes, who, in accordance with his doctrine of "I think, therefore I am", drew the conclusion that animals, lacking the capacity to think, are merely (god-made) "machines", incapable of experiencing pain and suffering (Descartes, 1981, p. 65).

The objectification of animals and their reduction to the role of a resource has made it possible to get rid of the remorse associated with inflicting suffering on them, culminating, for example, in industrial poultry farms (up to 99% of the world's broilers and laying hens are reared under industrial conditions), where an average of 0.03 m² of space is available per hen (while it needs about 0.46 m² to lie comfortably) (Foer, 2013). In addition to this, due to genetic modification between 1935 and 1995, the weight of the average broiler increased by 65%, its lifespan shortened by 60% and its nutritional requirements decreased by 57% (Grabowska, 2014); as a result, up to 90% of them have visible bone disorders, contributing to chronic pain (Singer & Mason, 2012, p. 44). Industrial animal husbandry, involving the confinement of animals in cages or overly cramped enclosures, therefore seems increasingly unjustified and cruel. One of the important arguments cited by proponents of reducing meat consumption thus becomes the concept of 'default livestock', according to which animals should be raised in free-range conditions and fed with crop residues or food leftovers, which would mean that the number of farmed animals would have to be drastically reduced compared to industrial farming (Steel, 2021).

In the face of the spread of lifestyle- and diet-related civilisational diseases, growing climate problems and the need to integrate sustainability into economic policy, movements to reduce meat consumption, including vegetarian and vegan ones, are therefore an important initiative. While it would be highly unlikely (and even undesirable for health reasons) to completely abandon meat consumption on a global scale, a realistic task for humanity in the 21st century might be to limit its per capita production to a level that does not exceed recommended consumption, and to consider stopping the production of red meat, which has the highest carbon footprint and the lowest energy efficiency.

Therefore, it seems important to ask what level of consumer awareness exists on this issue. Until recently, calls for a reduction in meat consumption

were mainly associated with the environmental movement and did not really resonate. In this context, the observation that, from the 1950s until 2015, global meat production grew continuously, more than doubling in value during that time (Petrovic et al., 2015), can be considered significant. Less than a decade ago, the question asked by researchers was the following: “Is reducing meat consumption realistic?” For example, in Denmark, in a survey on the frequency of eating meat for lunch in 2011, the most frequently indicated answer was “5–6 times a week” (35% of respondents), and the results did not depend significantly on education (Dagevos & Voordouw, 2013). A 2018 survey in the United States, on the other hand, found that up to 66% of respondents overall were limiting their meat consumption to some extent; although, interestingly, there was a correlation with age, suggesting that the reduction in consumption was due to personal health concerns and possible medical recommendations, rather than environmental motives. However, meat consumption restriction was shown to be positively correlated with education (Neff et al., 2018). In Australia in 2019, up to 88% of respondents regularly consumed meat (the most common response chosen was to eat meat ‘4–6 times a week’, which was the case for 40% of respondents), while only 29% were aware of the negative environmental impacts of animal farming. Furthermore, among those limiting their meat consumption, only 5% did so out of concern for the state of the planet (Marinova & Bogueva, 2019). A study conducted among Polish students (Borusiak & Kucharska, 2020) found that 42% of respondents limit their meat consumption. The most important reasons were concern for the environment (35% of respondents) and attitudes towards animals (32% of respondents). The majority of respondents (46%) were also aware of the negative environmental impact of industrial meat production. The main barrier was the opportunity cost of taking longer to prepare meat-free meals—more than 53% of respondents felt they did not have the time to do so. Financial barriers to switching to a meat-free diet were an issue for 39% of respondents.

Bearing in mind the issues raised so far, it is interesting to compare the negative effects (both on human health and the environment) of excessive meat consumption with the perception of this problem by PUEB students, who belong to an important group for the future implementation of sustainable development solutions in European Union Member States (European Commission, 2019). The present study is a somewhat elaborated version of the study conducted by Borusiak and Kucharska (2020), which did not address issues related to human health. Meanwhile, as demonstrated by Neff et al. (2018), concern for one’s own health can sometimes be the most important motive. For this reason, the following part of this article focuses on the methodology and results of a survey on the opinions of students at the Poznań University of Economics and Business on limiting meat consumption, in the context of the aforementioned regularities.

2. Methodology

The study was conducted in the form of an online survey (Computer-Assisted Web Interview, CAWI) on the Google Forms platform, addressed to students of the Poznań University of Economics and Business, which took place between November and December 2021. The choice of the target group of the survey was based on two issues. Firstly, in light of the regularities cited earlier, it was decided that young and educated people—i.e. students—may be most important for the future of economic policy-making in EU member states. Secondly, due to the limited possibilities for obtaining responses and the pilot nature of the survey, the home university was chosen, which made it possible to use its own networks of acquaintances to distribute the questionnaires. In the future the study may be extended to include a bigger research sample from other Poznań universities, as well as other cities in Poland.

A total of 296 respondents took part in the survey, of whom 183 (61.8%) were female, 112 (37.8%) male and 1 (0.4%) other/ did not wish to specify gender. Due to the distribution method of the questionnaires, the sampling was random using the snowball method (Schroeder et al., 2013). In 2021, the survey population of PUEB students was 7619 (Uniwersytet Ekonomiczny w Poznaniu, 2021), which means that a sample size of $N = 296$ defines it at a confidence level of $P = 95\%$, with a margin of error of $\alpha = 5.58\%$ (Creative Research System, 2012). Data was processed using the MS Excel package, with particular emphasis on the utilisation of pivot tables when aggregating responses according to the variables under consideration.

The survey questionnaire consisted of nine single- and multiple-choice questions. The first two questions were metric in nature and related to place of residence and gender (the question on age was omitted due to the homogeneity of the study population in this aspect). The following questions referred to the impact of excessive meat consumption on human health and the environment as perceived by PUEB students. They asked about: frequency of meat consumption, types of meat consumed, limiting meat consumption, arguments for limiting meat consumption, perceptions of the impact of meat and meat-free diets on health, and perceptions of the affordability of meat-free diets.

3. Findings of the study

During the survey, the respondents were asked to specify the frequency with which they consume meat. Table 1 summarises their responses by gender. It can be seen that the results differ substantially between the genders, with the most

common answer chosen by women being '2–5 times a week' (46.5%) and by men 'more than 5 times a week' (51.7%). Among women, there was also an almost three times higher proportion of meat consumption 'less than once a month or never' (13.1%) than among men (4.5%).

Table 1. Frequency of meat consumption by respondents according to gender (in %)

Specification	Overall	Women	Men
Less than once a month or never	9.8	13.1	4.5
1–5 times a month	13.9	19.1	4.5
2–5 times a week	43.6	46.5	39.3
More than 5 times a week	32.7	21.3	51.7

Source: authors' own elaboration.

The size of the settlement of origin was chosen as a second criterion for the distribution of responses regarding the frequency of meat consumption (the place of residence was not asked, as most respondents probably lived in Poznań due to attending university there) (Table 2). It can be observed that the percentage of respondents consuming meat "less than once a month or never" remains relatively constant regardless of the size of the settlement of origin (between 8.0% and 11.1%). The situation is similar among respondents consuming meat 'more than 5 times a week', where their percentage oscillates between 31.0% and 36.5%. Slightly greater discrepancies appeared for those eating meat '1–5 times a month' (between 8.6% and 19.5%) and '2–5 times a week' (between 40.7% and 48.2%). However, the overall distribution of responses remains comparable regardless of the size of the settlement. It may therefore be concluded that the size of the place of origin is not as significant as gender when it comes to the frequency of meat consumption.

Table 2. Frequency of meat consumption by respondents by place of origin (in %)

Specification	Overall	Village	City of up to 50,000 inhabitants	City of 50–500,000 inhabitants	City of over 500,000 inhabitants
Less than once a month or never	9.8	9.5	8.0	11.1	11.1
1–5 times a month	13.8	10.8	19.5	16.7	8.6
2–5 times a week	43.6	43.2	41.5	40.7	48.2
More than 5 times a week	32.8	36.5	31.0	31.5	32.1

Source: authors' own elaboration.

In the next question, the respondents were asked to identify the types of meat they eat (Table 3). The most frequently chosen answers were poultry (85.1%) and fish and seafood (67.6%). Pork (63.0%) and beef (49.7%) were also frequently selected responses, confirming the greater attachment of consumers in Poland to eating pork compared to the average of EU countries (PKO Bank Polski, 2018).

Table 3. Percentage of respondents consuming specific types of meat (in %)

Type of meat	Percentage
Poultry	85.1
Fish and seafood	67.6
Pork	63.0
Beef	49.7
Venison	10.8
None	8.4

Source: authors' own elaboration.

The respondents were subsequently asked to state whether they limit their meat consumption. The majority of respondents agreed (51.4%), but the results differed sharply between the sexes (Table 4). 63.4% of women and only 31.2% of men limit their meat consumption. This means that with a survey sample close to the actual gender parity found in Poland (51.6% of women and 48.4% of men) (Polska w liczbach, 2021), only 47.8% of respondents would limit their consumption. However, this still means that the survey population limits meat consumption to a greater extent than the national average of 39% in 2021 (Filip, 2021).

Table 4. Percentage of respondents limiting meat consumption by gender (in %)

Specification	Overall	Women	Men
Limiting meat consumption	51.4	63.4	31.2
Not limiting meat consumption	48.6	36.6	68.8

Source: authors' own elaboration.

Table 5 shows the responses to the same question by size of the place of origin. The percentage of respondents limiting meat consumption usually oscillates slightly above 50% (except in cities of 50–500,000 inhabitants, where it is 48.1%). A more significant deviation from this pattern is characterised by the category of cities of up to 50,000 inhabitants, where the corresponding percentage was 57.5%.

The respondents were also asked to indicate which arguments influence their decision to reduce meat consumption (Table 6). The most frequently chosen answers

Table 5. Percentage of respondents limiting meat consumption by settlement of origin (in %)

Specification	Overall	Village	City of up to 50,000 inhabitants	City of 50–500,000 inhabitants	City of over 500,000 inhabitants
Limiting meat consumption	51.4	50.6	57.5	48.1	50.6
Not limiting meat consumption	48.6	49.4	42.5	51.9	49.4

Source: authors' own elaboration.

Table 6. Percentage of respondents limiting their meat consumption due to specific arguments (in %)

Type of meat	Percentage
Ecological/environmental aspects	42.6
Improving health and well-being	41.9
Desire to reduce animal suffering	38.0
None	30.7
Financial considerations	12.0
Other	3.6

Source: authors' own elaboration.

were—in line with the patterns presented so far—‘ecological/environmental aspects’ (42.6%) and ‘improving health and well-being’ (41.9%). The ‘desire to reduce animal suffering’ was also a fairly frequent response (38.0%); however, the decisions of 30.7% of respondents are not influenced by any arguments.

Finally, the respondents were asked to compare meat-free and traditional diets in terms of their impact on human health and affordability (Table 7). Although the majority of respondents (55.8%) do not have an opinion on the subject, the percentage of people who consider meatless diets to be healthier (33.4%) is three

Table 7. Respondents' opinions on meat-free and traditional diets (in %)

Opinion	Agree	No opinion	Disagree
A meat-free diet is healthier than a traditional diet	33.4	55.8	10.8
A meat-free diet is more expensive than a traditional diet	39.6	45.9	14.5
I can financially afford to go on a meat-free diet	60.8	21.3	17.9

Source: authors' own elaboration.

times higher than the percentage who disagree (10.8%). The situation is similar for their perceived affordability, with as many as 45.9% of respondents having no opinion on which diet is more expensive. However, 39.6% of respondents agree that a meat-free diet is more expensive than a traditional diet—almost three times the percentage of respondents disagreeing with this statement (14.5%).

The majority of respondents do not have an opinion on the price differences between meat-free and traditional diets, with as many as 60.8% believing that they could financially afford to switch to a meat-free diet. Only 17.9% of respondents disagree with this statement and 21.3% have no opinion.

Conclusions

The negative effects of excessive meat consumption affect both the state of the environment and human health, as evidenced by the review of existing research in this area in the first part of the article. There is a trend among a growing group of consumers to consciously reduce meat consumption, which may be due to concerns for both the state of the environment (Borusiak & Kucharska, 2020) and their own health (Neff et al., 2018).

Following on from the research questions formulated in the introduction, a study conducted among students at the Poznań University of Economics and Business showed that students limit their meat consumption to a greater extent (51.4% of respondents) than the national average (39%) (Filip, 2021). The size of the settlement of origin was not crucial in this respect – despite some deviations (57.5% of those limiting meat consumption in cities with up to 50,000 inhabitants and 48.1% in cities with 50,000–500,000 inhabitants), in most cases the percentage of those limiting meat consumption was close to the average value of the survey. However, significant gender differences could be observed—among women, as many as 63.4% of respondents limited their meat consumption, while among men it was only 31.2%. The most important reasons for the PUEB students to limit meat consumption were the desire to improve their own health and well-being (41.9%) and concern for the environment (42.6%). For the majority (60.8%) of respondents, switching to a meat-free diet would also not pose a financial problem.

It can therefore be concluded that there is a high level of awareness among the PUEB students regarding the harms of over-consumption of meat, so if the attitudes of students at most universities are similar, then limiting meat consumption to the recommended amounts should not present difficulties for younger generations. In the face of growing climate problems in the 21st century, this is good news because, as Hickel (2020) and Steel (2021) note, the current level

of meat production exceeds the regenerative capacity of the planet and should be reduced to a more sustainable level. However, the still high consumption of pork is of concern, with relatively higher levels of harm than lean meats such as poultry or fish.

These findings may be of relevance for future educational policies aimed at preparing society for the upcoming changes associated with the European Green Deal, which, according to this study, should take gender differences into account, emphasising other aspects that may be crucial for women and men respectively. For example, women might find the arguments around climate issues more important, while men might be more attracted to arguments around looking after their own health and fitness. Future research exploring disparities in meat consumption preferences among students could also take into account their differences in interests and opinions represented by the choice of university as well as variations between several cities in Poland, allowing to tailor the educational policies accordingly.

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