Article

Framing Food Transition: The Debate on Meat Production and Climate Change in Three European Countries

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Abstract: The link between meat production and climate change has fostered increasing social debate in recent years. Livestock is a major source of greenhouse gas emissions, among other global problems attached to the meat industry. However, this debate is often presented as one-dimensional, without a comprehensive approach. As the media plays a key role in shaping public perceptions of nutrition, this study aims to examine how the matter of food transition and climate change is addressed by three centre-left media outlets from Germany (*Der Tagesspiegel*), the United Kingdom (*The Guardian*) and Spain (*El País*). A search including the words *meat* and *climate change* in different languages, performed over one year (2021), resulted in a sample of available news items (N = 273). Using quantitative and qualitative methods, we analysed the coverage in terms of scope and use of frames. The results showed a scant number of news items combining climate change and meat consumption, though there were some differences indicating a greater awareness in the United Kingdom. Most of the news items from the three countries applied frames based on solutions from an environmental perspective. Media attention was discontinuous and sometimes determined by political debates, which made it difficult to reflect upon the underlying issues.

1. Introduction

Meat production represents a critical challenge in the climate change debate, as it involves the difficulty of reconciling many conflicting and relevant interests. The Food and Agriculture Organization of the United Nations (FAO) recognises that livestock systems are a major source of greenhouse gas emissions, accounting for almost 14.5% of the total (FAO 2020a), although new research has put the figure at 16.5% (Twine 2021). At the same time, its role is crucial to enhance the livelihoods of almost a fifth of the population since animal rearing on farms can be particularly effective at reducing hunger and poverty (FAO 2022). However, it requires sufficient guarantees for sustainability as the global food structure shoulders the very stability of the Earth system (Rockström et al. 2020).

The dominant agricultural and food systems have been widely criticised for their multiple failures in preventing the depletion of environmental resources and for not providing universal access to healthy food (Hebinck et al. 2021; Firbank et al. 2018). It is not only "the single largest greenhouse-gas-emitting sector in the world", but also "by far the largest cause of biodiversity loss, terrestrial ecosystem destruction, freshwater consumption, and waterway pollution due to overuse of nitrogen and phosphorus" (Rockström et al. 2020, p. 1). Untying the Gordian knot of meat production entails sustainable livestock management, which has the potential to contribute to achieving the Sustainable Development Goals (SDGs) (FAO 2020b) provided that measures to enhance

production efficiency (Gerber et al. 2013) and policies aimed at an urgent and "irrefutable" food system transformation (Webb et al. 2020) are implemented.

World population growth and the increase in meat consumption per capita has resulted in an overall rise in global meat production and consumption (Vranken et al. 2014), driven in part by globalisation practices (Popkin 2006). In 2021, the world's total meat production reached 355.5 million tons, up 4.5% from 2020. Despite the pandemic and logistic problems, meat exports reached 42.1 million tons in 2021, up 0.9% (FAO 2022). Research has focused on the nutrition/health, economic, environmental and social costs of meat overconsumption (Rust et al. 2020; Drewnowski et al. 2020) to underline that unsustainable food production and consumption negatively affect human and environmental health (Nyström et al. 2019). Whilst meat contains essential nutrients and makes a vital contribution to nutrition and food security (Vågsholm et al. 2020), excessive consumption has been associated with adverse health outcomes (Murphy and Allen 2003). In addition to that is the serious pressure of greenhouse gas emissions caused by intensive livestock production (Garnett 2009).

The current context of rising levels of consumption in high meat-eating countries puts the possibility of keeping the global temperature rise below 2 °C at serious risk, as first established at COP15 held in Denmark in 2009, and also limits the chances of achieving the United Nations SDGs (IPCC 2019; UN 2019). Faced with this scenario, transitioning towards sustainable diets is urgently needed and widely accepted (Hawkes and Popkin 2015; Rust et al. 2020; Zou et al. 2022). El Bilali et al. (2019) suggested three main strategies to encourage a sustainable transition of food systems, under the premise that they should be resilient: efficiency enhancement (e.g., sustainable intensification), demand restraint (e.g., sustainable diets reducing meat consumption) and food system transformation (e.g., alternative food systems). However, there is no consensus as to whether this is the best alternative (Zou et al. 2022), and the instruments for such a transformation are very limited (Butler et al. 2021). The urgency has led some authors to call for "suitable and applicable tools for assessing any proposed solutions" (Clément and Ajena 2021), and for fostering a shift towards a sustainable food system that also promotes "livelihoods and food cultures while being fair, just, and equitable" (Drewnowski et al. 2020, p. 1).

The complexity of the issue is reflected in the wide-ranging debate, in which domains such as health, ethics, politics, economics and technology come together. However, this debate is often presented as one-dimensional and lacking in a comprehensive approach that it necessarily entails. This is particularly relevant to the media, which plays a central role in shaping public perceptions on diet and nutrition (Frewer et al. 1995; Mroz and Painter 2022). The aim of this study is to understand how the debate on food transition and climate change is addressed by three European media outlets from Germany, the United Kingdom (UK) and Spain to identify its scope and the predominant frames in media coverage.

1.1. Food Transition and Alternatives

The idea of food transition entails a progressive change in the way humankind produces and consumes in order to reach "a sustainable, affordable, trustworthy and high-quality food system" to "fulfil the needs of a diverse and growing world population" (Kampers and Fresco 2017). The process requires time and various adjustments to fit the diverse pieces of a complex puzzle together and to ensure the availability of "adequate, sustainable and healthy food in a healthy environment" (Kampers and Fresco 2017). The fulfilment of these criteria has multiple implications, from healthy products, protein transition, animal welfare, fair trade, local food, urban agriculture or non-food waste to innovations such as customised food or cultivated meat and also trends such as comfort, exclusivity or going back to nature (Warnaar and Methorst 2017).

Based on the environmental justice approach, Tribaldos and Kortetmäki (2022) advocate a holistic understanding of health under the assumption that it encompasses both human health and ecosystem health. Considering that food system transitions may cause significant adverse effects and aggravate existing inequalities and unsustainability, those authors call for justice issues to be put at the heart of the debate in order to make food

transitions inclusive. In this vein, Almiron and Zoppeddu (2015) highlight the close link between livestock meat production and animal cruelty (e.g., confinement, exploitation, genetic modification, mutilation), which activists, NGOs and scholars have denounced over the past 30 years. In the ethical dimension, there has been criticism of speciesism discrimination (DeGrazia 1996; Singer 2009).

Hundscheid et al. (2022) stress that with a few exceptions, policy interventions supporting a sustainable protein transition—"change from a diet with a high proportion of animal proteins to a higher proportion of plant proteins" (p. 301)—are missing in European countries. Research highlights the symbolic connotations and cultural conventions of meat in Western countries (Siegrist and Hartmann 2020) and its association with individual freedom (Warde 2013), which together hinder the change, even though the issue of meat overconsumption is increasingly entering the public debate (Hundscheid et al. 2022). An example is the article published in July 2021 by the Spanish Consumer Affairs Minister Alberto Garzón, who advocated reducing meat consumption as one of the measures to lower the impact of climate change and also to improve citizens' health. First published by a digital newspaper, the article entitled 'Menos carne, más vida' (Less meat, more life) (Garzón 2021) had a huge impact when the Minister posted a six-minute video on his Twitter account warning that high meat consumption harms our health and our planet. However, the message resulted in a strongly polarised political debate, in which there was verbal confrontation rather than an exchange of ideas or an opportunity to examine the challenge of promoting ecological transition in depth (Palau-Sampio and Picó 2021).

1.2. Framing the Role of Animal Agriculture in Climate Change

Despite scientific evidence of the relationship between animal meat production and its harsh impact on the environment, this issue has received very little attention from Western media (Neff et al. 2008; Almiron and Zoppeddu 2015). Some authors refer to an "awareness gap" (Bailey et al. 2014) when addressing the livestock sector's influence on climate change. Even when the media acknowledged the link, they avoided suggesting changes in individual or public behaviour, as Kiesel (2010) observed. Similarly, research carried out on media from Spain and Italy emphasised the underrepresented role of animal agriculture in climate change and the presentation of "carnist traits more frequently than frames in defence of nonhuman animals" (Almiron and Zoppeddu 2015; Moreno and Almiron 2021). More recently, Hundscheid et al. (2022) stressed that the barrier to transitioning is food that represents the culturally high status of meat within the "Austrian protein regime".

Kristiansen et al. (2021) observed similar patterns in their analysis of the UK and American elite media from 2006 to 2018, with a low volume of coverage and a tendency to mention consumer responsibility more than that of governments or large-scale livestock farms. These results contrast with the 2005–2009 coverage of the Meat Free Monday's campaign in the UK—a civil society initiative that challenged meat-centric diets—that revealed a relatively balanced picture of both positive and negative reporting, and a position that was "slightly more inclined than not to conceptualise eating less meat" (Morris 2018).

Together with underrepresentation, polarisation has been another drawback in media coverage of the issue. The study by Sievert et al. (2022), including four major red and processed meat (RPM) producing and consuming countries (United States, UK, Australia and New Zealand), concluded that polarisation has led to a binary conflict between pro- and antimeat reduction actors. These authors consider that this division may mean that political leaders will give less priority to it in policy agendas and suggest that "nuanced and context-dependent messaging could ensure the narratives around meat are less conflicting and more effective in addressing health and environmental harms associated with RPM" (Sievert et al. 2022).

Regarding the influence of social media as sources of information for many people (Shehata and Strömbäck 2021), the study by Maye et al. (2021) focused on the role of animal agriculture in climate change on Twitter and revealed two key insights: the limited evidence of an encompassing debate and the prominent use of this platform for marketing purposes,

both commercial (#sustainablemeat) or linked to planetary issues or 'vegan' narratives (#eatlessmeat).

A core part of research dealing with the debate on livestock and climate change is that of monitoring how the media presents the impact of innovation and technology on meat production under different names: curated meat, customised meat and in vitro meat. Early studies suggested the influence of media coverage on cultured meat—genuine animal meat produced by cultivating animal cells directly—on consumers' perceptions (Goodwin and Shoulders 2013), highlighting certain aspects of the concept (Laestadius et al. 2016) or shifting individuals' opinions in a positive or negative direction (Bekker et al. 2017).

Goodwin and Shoulders (2013) observed a neutral or positive association in media from both the United States and the European Union, as news articles "commonly discuss cultured meat in terms of benefits, history, process, time, livestock production problems, and skepticism" by relying on sources that are proponents of cultured meat, mainly in print media. Bryant (2020) considers that this fact "may partially explain the more positive attitudes of those who are more familiar with the concept because they presumably become familiar through the media".

The biotechnological component of curated meat opens ethical debates that will shape the future viability of this technology and its acceptability for potential consumers. Research carried out by Dilworth and McGregor (2015) comparing Australian discourses in academic literature and mainstream print media found that, while in the first "discourses relating to in vitro meat's promised environmental, animal welfare and food security benefits are most prominent", "ontological struggles over its 'nature' have emerged as the dominant feature in the Australian print media". Hopkins (2015) noted that Western media gives "a distorted picture of what obstacles are in the path of cultured meat acceptance", especially by overrepresenting the importance of the reception of cultured meat among vegetarians. Furthermore, Bryant and Dillard (2019) demonstrated that frames emphasising the "high tech" elements of cultured meat may be causing consumers to develop more negative attitudes towards it, in contrast to frames stressing the societal benefits of cultured meat or its sensory similarity to conventional meat.

2. Materials and Methods

2.1. Data Collection and Sample

This study analyses how the debate on climate change and meat consumption is addressed in three European countries: Germany, the UK and Spain. This selection follows three criteria: (1) representativity in terms of population, as they are the first, third and fifth most populated countries in Europe; (2) belonging to different media systems (Hallin and Mancini 2004); and (3) a dissimilar presence of the green vote in the 2019 European election (Pearson and Rüdig 2020) (higher in Germany, average in the UK—where the first Green party in Europe was formed—and residual in Spain). Green parties secured 21 seats out of a total of 96 in Germany (B'90/Grüne), 7 out of 73 in the UK (Green Party of England and Wales) and 1 out of 54 in Spain (Catalunya en Comú) (European Parliament 2019).

Previous research has found that right-leaning newspapers showed a higher degree of scepticism and contrarianism in reporting the relationship between meat eating and climate change (Almiron and Zoppeddu 2015). A conservative vision of society is understood as being right leaning, so we focused on progressive left-leaning media—based on ideas such as rights and reform—to observe nuanced differences by country in how the debate is framed. To this end, we selected three newspapers representative of the centre-left editorial line in each country: *Der Tagesspiegel* (TZ), *The Guardian* (GU) and *El País* (EP). All three are published in the state capital of the respective countries, and even though the German *Der Tagesspiegel* has a regional target, it is influential throughout the country. Beyond that, the centre-left ideology has traditionally been more sensitive to environmental problems.

The sample was collected between 1 January and 31 December 2021, following two steps. Firstly, by carrying out a search on two keywords in the Mynews database: *meat* and *climate change* and their respective translation into German—*fleisch* and *kli-

maschutz* *umweltschutz*, as both of the latter are used indistinctly—and Spanish—*carne* and *cambio climático*—we obtained a total of 981 items including these words. Secondly, by means of a manual search, we only selected those articles dealing with the study issues (N = 273). The items returned after this search were extracted in an Excel document including the title, date of publication and link to the digital edition.

2.2. Data Analysis Method

The analysis was based on quantitative methods to identify coverage and relevance patterns and qualitative methods to define the focus. Following the designed datasheet (Table 1), we wanted to discover the emphasis given by the different media outlets in terms of the number and frequency of items published, the section in which they appeared, the journalistic genre presented and the resources invested in reporting and writing the tasks.

Table 1. Datasheet for quantitative analysis.

Reference	Options
Type of text	News, Opinion
Section	International, Politics, Economics, Society (Education, Food, Health, Innovation and Technology), Environment, Opinion, Lifestyle, Other
Genre	Editorial, Column, Piece of News, Analysis, Interview, Reportage, Profile
Professional resources	Bylined by a journalist, Not bylined, News agency, Other

The qualitative analysis relies on framing theory, which states that a media outlet selects a particular approach (frame) to report a fact (Entman 1993). The study of frames allows the premises and representations of the debate on climate change and meat transition to be identified. Starting with the proposal by Moreno and Almiron (2021) and drawing on previous works dealing with the topic (Palau-Sampio and Picó 2021), a codebook was designed after carrying out a process of reading and reflecting on the items included in the sample. Following this path, three macroframes were identified: responsibility for global warming linked to meat production and consumption; diagnosis, i.e., an analysis based on the symptoms observed; and the solutions offered. Each one was further developed into more specific frames (Table 2).

Table 2. Categories used for frame analysis.

	Frame	Characteristics
Responsibility	Negationist	Denial of climate change and liability exclusion
	Corporative	Refers to both farm livestock production and the meat industry
	Political	Focuses on governments, politicians and public policies to regulate the effects of meat production and consumption on climate change
	Human beings	Identifies humans as being responsible for the main impact on climate change since protein diets, traditionally linked to men, cause more emissions

Table 2. *Cont.*

	Frame	Characteristics
Diagnosis	Worsening of human health	Relates the dual climate emissions and health effect of meat overconsumption
	Linked to global problems	Emphasises the connection between meat production and the devastation of rain forest to make space for agriculture and animal grazing, or between meat production and altering land-use practices (i.e., crop replacement) in a context of overpopulation
	Inconsistency of plans and actions	Criticism of public actors responsible for announcing plans that are never implemented, or the incongruency of public actors when defending meat reduction to prevent climate emissions
	Political conflict shadows debate	Underlines that the approach to the topic remains merely as political confrontation and avoids in-depth debate on meat consumption and climate change
Solutions	Sustainable livestock farming and animal welfare	Relates to the environmental, economic and ethical questions involved in livestock farming methods and meat production, e.g., rearing conditions, impact on the ecosystem and effect on costs
	Systemic change	Calls for a holistic treatment of the complex phenomenon, analysing and interrelating multiple factors linked to climate change that should be considered, including just transition measures
	Cultured meat	Presents artificial meat as a solution to replace farmed meat without creating environmental problems
	Plant-based food and insects	Veganism, vegetarianism and meatless diets are the most sustainable ones. Use of insects as a protein source is also emphasised
	Education and consumer responsibility	Highlights the role of citizens in changing their eating habits and the importance of involving schools
	Innovation and technology	Optimism about the climate solutions offered by technologies and innovation
Others		Options not included in the previous sections

The sample was analysed manually by two coders. First, a pre-test of 15% of the sample (41 items) was conducted to calculate intercoder agreement. Scott's Pi formula reached an acceptable error level of 0.87, scoring over 80% for all variables. However, the categories with the biggest mismatches were further developed to improve reliability. A previous round of coding training was also held, so both coders were familiar with the datasheet.

The study results were obtained from a descriptive analysis of the categories. The said analysis was mixed with bilateral tests for the proportion of columns based on the Bonferroni correction, targeting the divergences among the analysed sections, although the z-test for pairwise comparisons was limited due to the size of the sample. The null hypothesis for sections under consideration was equal.

This study aims to answer the following three research questions (RQs) relating to coverage, relevance and the focus of the published text:

RQ1: Which media outlet devoted greater attention to the meat consumption and climate change debate? How was publishing distributed over time?

RQ2: Which genres were employed by the analysed media outlets? Did they allocate in-house professional resources to cover the issue? Which sections hosted the items published?

RQ3: Which main frames were present in the articles analysed? How were they used by each newspaper in specific sections?

3. Results

This section presents, under three subheadings, the results of the quantitative and qualitative analysis, in order of the research questions formulated above.

3.1. Coverage of the Issue

The level of attention that newspapers paid to debates on meat consumption and climate change is an interesting way to assess the media agenda. To answer RQ1, the number of news items on climate change published by each specific newspaper is presented. According to the data collected from the Mynews database (Table 3), these media outlets published a lot of articles on climate change (N = 6506 articles), but its association with meat consumption was limited (N = 981 articles). In 2021 specifically, *The Guardian* had much more news on climate change, whereas *El País* and *Der Tagesspiegel* offered quite an even number of pieces. It should be noted that while references to climate change and meat appeared several times in *El País*, these issues were not dealt with properly, thus explaining why its final sample was 56.

Table 3. Number of articles resulting from a Mynews search of 'Climate change' and 'Climate change and meat'.

Media Outlet	Climate Change [1]	Climate Change and Meat [1]	Final Sample [1]
elpais.com (EP)	1519	457	56
theguardian.uk (GU)	3369	391	156
taz.de (TZ)	1618	133	61
Total	6506	981	273

[1] Translated into the respective language of the newspapers.

As stated, the study results showed that *The Guardian* devoted more attention to the issue, while *Der Tagesspiegel* and *El País* scarcely accounted for a fifth of the sample (Figure 1a). Interestingly, the frequency of publishing and distribution experienced abrupt changes when considered monthly. Although fluctuations could be observed in all three newspapers, these were particularly evident in *The Guardian* and *El País*. Figure 1b shows that the peaks of each media outlet did not follow a common pattern. In this sense, October was the most productive month for *The Guardian*, July for *El País* and March for *Der Tagesspiegel*. In all three, media attention was linked to public agenda issues: COP26 held in Glasgow (GU), the controversy surrounding the video posted by the Spanish Consumer Affairs Minister Alberto Garzón (EP) and the debate on the agricultural reforms under the new government (TZ). A detailed observation showed that July and, to a lesser extent, September, were the only periods in which all three media outlets had a positive evolution.
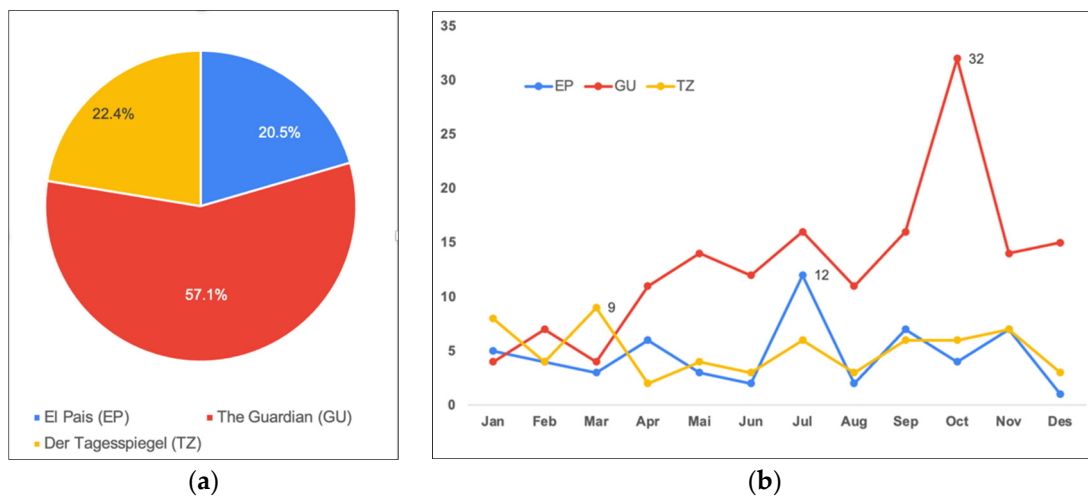
Figure 1. (**a**) Percentage of the sample published by each media outlet including 'Climate change and meat'; (**b**) publishing distribution by month for each media.

3.2. Relevance and Resources Allocated

To answer RQ2, different aspects were analysed. First were the characteristics of the texts published by the media outlet. The results showed that, in all the outlets, opinion pieces prevailed, albeit with varying strength. In this sense, almost 40% of the articles on the issue in *El País* were opinion texts, whereas the figure was below 20% in both *The Guardian* and *Der Tagesspiegel* (Figure 2).
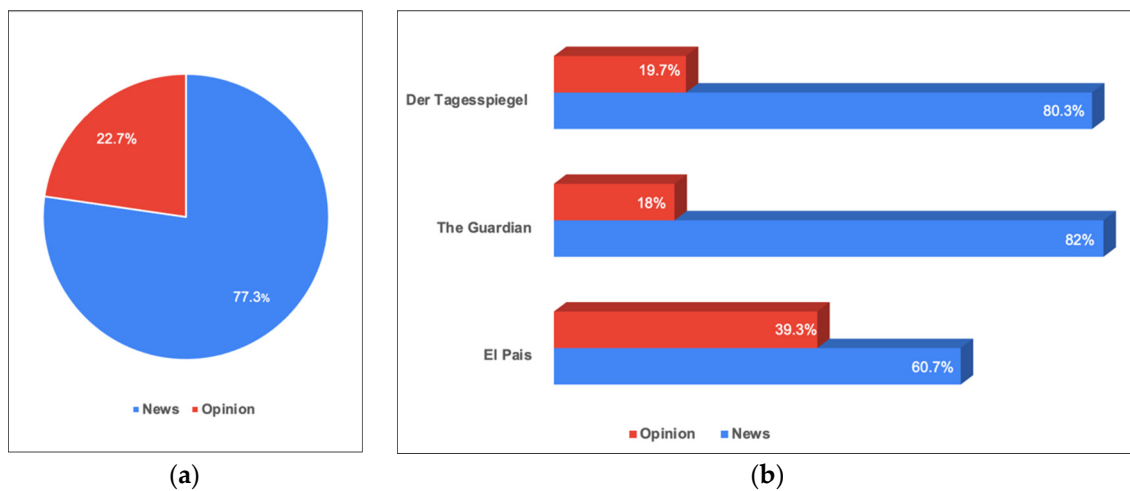
Figure 2. (**a**) Type of text in the sample; (**b**) distribution by media outlet and type of text.

Secondly, to obtain a better understanding of the type of resources allocated, both the pieces produced by journalists or columnists and the genres employed in the articles were considered. On the one hand, it is noteworthy that 94.5% of the texts were bylined, meaning that the newspapers were committed to providing their readers with differentiated and comprehensive information. Only 2.2% of the texts were either not bylined or were presented with a generic identification (e.g., *El País*), and the rest included editorials (not bylined as they represent the editorial position of the media outlet), pieces from news agencies or a mix of the foregoing. On the other hand, news emerged as the most prominent genre in each media outlet, present in almost 46% of the sample. Columns accounted for a fifth of the sample, while editorial pieces accounted for a much lower proportion (2.6%). Considering the sum of the remaining genres, they accounted for less than a third of all articles, distributed as follows: reportage, interview, analysis and profile (Figure 3).
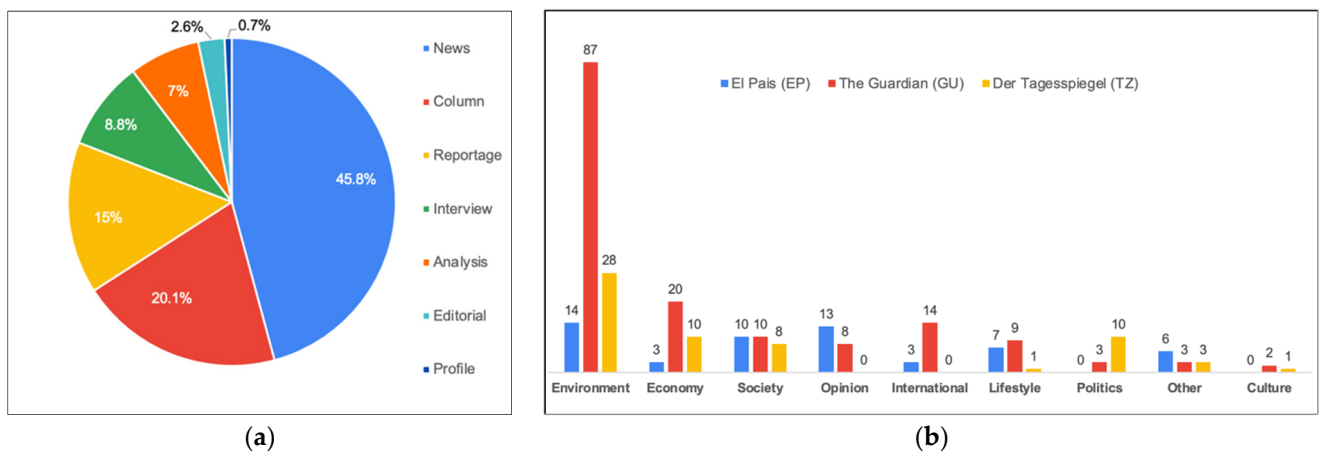
Figure 3. (**a**) Percentage of journalistic genres referred to the items included in the general sample; (**b**) percentage of items per genre published by media outlet (%).

Finally, we analysed the sections that hosted the selected news items in order to monitor their distribution and affiliation (Figure 4). The rubric Environment included almost half of the texts published (47.2%), followed by Economy and Society. The six remaining sections accounted individually for less than 10% of the published articles discussing the relationship between meat production and climate change. While International, Opinion and Lifestyle reached or exceeded 5%, Politics and Culture did not.
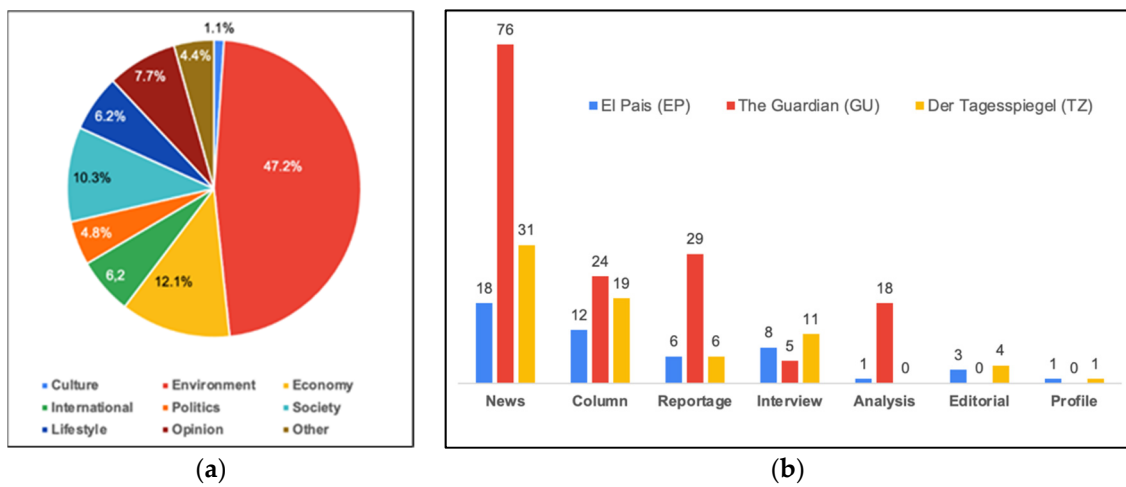
Figure 4. (**a**) Percentage of items published by section included in the general sample; (**b**) percentage of items published by media outlet in each section (%).

3.3. Frames

Regarding the use of frames, as indicated in RQ3, most of the sample focused on frames that tried to provide solutions to the problems reported (59.1%). There was a big difference between diagnosis (24.8%) and responsibility (14.6%). Nevertheless, some divergences between newspapers are noteworthy (Figure 5). *El País* published almost the same number of pieces on diagnosis (46.4%) as on solutions (48.2%). By contrast, the relevance of the solutions was higher in *The Guardian* and *Der Tagesspiegel*, as they published less in the other type of frames.

(**a**)   (**b**)
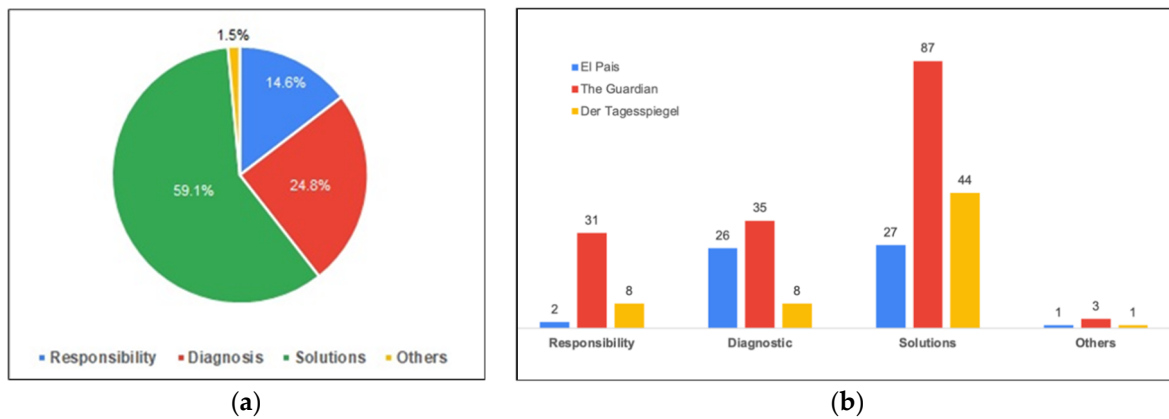
Figure 5. (**a**) Percentage of news by group of frames included in the general sample; (**b**) percentage of items published by media outlet in each big frame (%).

In the same vein, Table 4 furthers our understanding of the specific strategies (frames) employed by the media. In the whole sample, solution frames such as sustainable farming and animal welfare, systemic change and plant-based food and insects were the most mentioned. *The Guardian* gave priority to these frames, which led to these results. Likewise, *Der Tagesspiegel* mostly used a perspective centred on sustainable livestock farming and animal welfare (n = 22). Again, these were contrary to the pattern of *El País*. The Spanish newspaper published a similar number of items in diagnosis frames and solutions frames.

Table 4. Distribution of frames by newspaper according to the proposed categories (raw numbers).

		Total	**EP**	**GU**	**TZ**
Responsibility	Negationist	4	-	3	1
	Corporative	18	-	15	3
	Political	15	2	10	3
	Human beings	4	-	3	1
Diagnosis	Worsening of human health	19	4	11	4
	Linked to global problems	16	7	7	2
	Inconsistency of plans and actions	20	6	12	2
	Political conflict shadows debate	14	**9**	5	-
Solutions	Sustainable livestock farming and animal welfare	**44** [1]	1	**21**	**22**
	Systemic change	**31**	3	**20**	8
	Cultured meat	16	4	10	2
	Plant-based food and insects	**30**	7	15	8
	Education and consumer responsibility	28	**10**	15	3
	Innovation and technology	9	2	6	1
Others		5	1	3	1

[1] Findings in bold indicate interesting trends.

In addition, Figure 6 presents information about the distribution of groups of frames by section. Environment was the main section for all three big frames (responsibility, diagnosis and solutions), with a huge number of published news items on solutions being particularly outstanding. The number thereof (64.2%) was statistically significant at a *p*-value of 0.05 compared with the rest of the sample (N = 273) according to the Bonferroni correction. This pattern was also visible throughout the sample, since many sections mostly covered solutions. Conversely, diagnosis frames were more common in the Opinion (13) and International (9) sections.
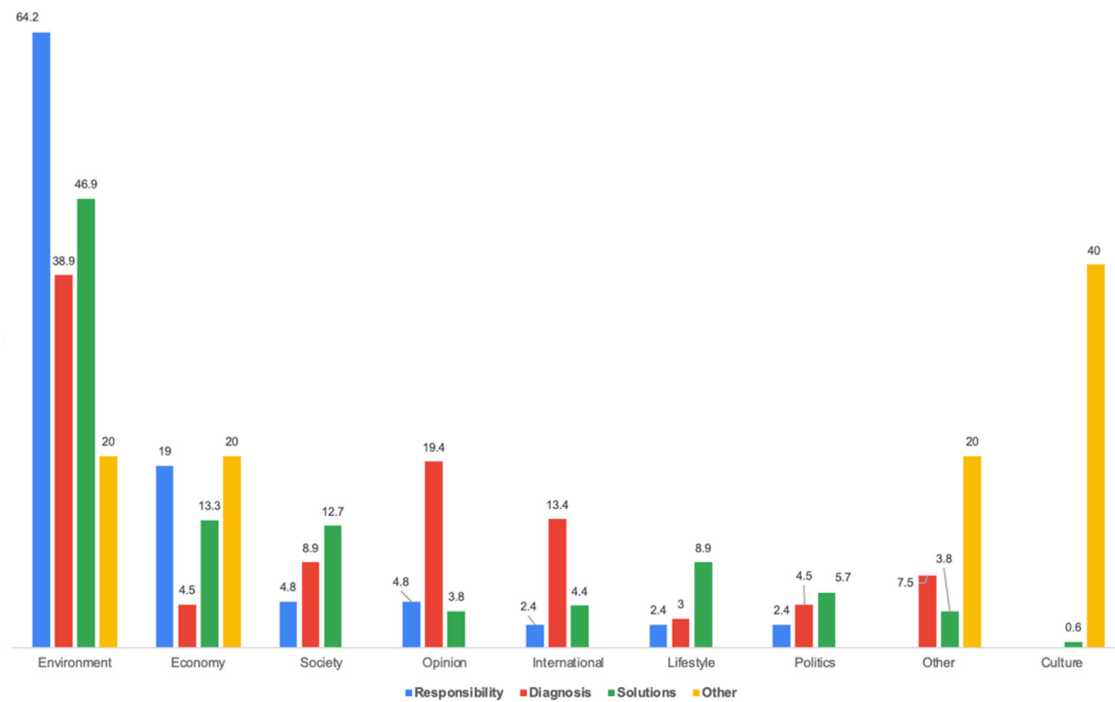
Figure 6. Percentage of items published by frame in each section of the sample (%).

In order to find possible differences between the columns, the statistical analysis performed was a Z test for independent samples. Considering the results, the diagnosis of climate change and meat consumption problems was more likely to be an opinion or a reference to the international sphere, for instance, the United Nations Climate Change Conference (COP). Regarding responsibility, it mostly appeared in Environment (27), but also to some extent in Economy (8). On this matter, how the economy shapes food transition was relevant, showing that economic factors were key to evaluating this debate.

4. Discussion and Conclusions

This article examined the media coverage of the challenging and multifaceted topic that is meat production and climate change, with enormous significance in the sociocultural, political and economic fields. From a comparative perspective, this study focused on media outlets from three European countries, each belonging to a different media system (Hallin and Mancini 2004) yet all having a centre-left editorial line. Three main conclusions can be highlighted.

Firstly, attention to livestock as a major source of greenhouse gas emissions is limited, which is consistent with recent studies carried out in the UK and the US (Kristiansen et al. 2021). Even though the three analysed media outlets are sensitive to environmental issues—they include sections devoted to climate, ecology or environment, and allocate professional resources to cover them—the number of articles published is in line with previous studies (Almiron and Zoppeddu 2015; Kristiansen et al. 2021; Moreno and Almiron 2021). Moreover, the monthly distribution of publishing suffered abrupt changes across the year, particularly in *El País* and *The Guardian*. This finding overlaps with prior scholarship on the discontinuous and biased attention to environmental issues (Neff et al. 2008). However, differences among the outlets can be observed, as *The Guardian* was both the most involved with this topic and the most explicit in labelling its section as 'Climate Crisis', which shows a particular focus on this issue. It is important to stress that in 2021, the year analysed, the UK hosted the United Nations Climate Change Conference in Glasgow, and the peak of publishing coincided with the event.

Secondly, although news was the most prominent journalistic genre, it is worth mentioning that *El País*, belonging to the Mediterranean Polarised/Pluralist media system,

devoted almost 40% of its publications to opinion items. Most of them were concentrated in July, linked to the video posted by the Spanish Consumer Affairs Minister. Most news items were linked to the solutions frame, as news focuses on particular facts, actions or statements but does not allow a more in-depth discussion, as is the case of reportage, analysis, interview or even opinion, a genre associated with the diagnosis frame. So, the multifactorial approach to climate change involving political, social and economic causes and consequences is restricted in the sample considered. Findings relating to frames and genres, focusing on solutions but making an abstraction on the contextual aspects, may be associated with counterproductive messages, as de Boer et al. (2013) stress, considering that, from the perspective of motivation, it is preferable not to isolate the meat–climate issue but to develop an approach that combines multiple values regarding food choices, including health and nature-related ones.

Finally, this study offers insightful findings on the main frames in media coverage, with a particular focus on solution approaches. In this vein, the analysis shows that diagnosis frames aiming to evaluate the actions and implications of meat production and climate change constitute a secondary manifestation. This subordinate role contributes to a partial framing of the meat production and climate change discussion, as the link to human health or global problems and debate regarding plans and actions are underrepresented.

Unlike solution-oriented coverage, responsibility only accounted for a seventh of the items in the sample; consequently, readers may have found it difficult to assess the role of every stakeholder involved in climate change. This also implies the perpetuation of biased coverage of both anthropogenic contributions to global warming and resultant action, as Boykoff and Boykoff (2004) revealed in their work on the American prestige press coverage of global warming. Similarly, a report on the coverage of the 2013 United Nations' Intergovernmental Panel on Climate Change (IPCC) found that many mainstream media outlets extended this bias by amplifying viewpoints questioning the role of human activity in global warming (Greenberg et al. 2013). In contrast to Kristiansen et al. (2021), we observed a shift in the responsibility attribution, with a major focus on corporate and political actors and a pedagogical orientation towards citizens, which is presented as a solutions frame. This issue deserves more attention in future research, as it may be influenced by the editorial line of the newspapers selected.

The solutions frame includes a notable variety of options, since they range from systemic changes—including citizens involvement, sustainability and welfare—to marked technology-oriented solutions. This heterogeneity is consistent with the complexity of the topic and its diverse implications. On the one hand, the call for holistic treatment and consumer responsibility implies an important step forward, with differences among the media outlets analysed; there was a greater focus on systemic change in the UK and Germany, and on consumer responsibility promotion in Spain.

On the other hand, and in contrast to the German and the British newspapers, the very little attention paid to sustainable livestock in the solutions frame by the Spanish newspaper is worthy of note. This is related to two events that happened in 2021: the video posted by the Spanish Consumer Affairs Minister Alberto Garzón and the subsequent interview in *The Guardian* (Jones 2021), in which sustainable livestock was openly addressed by Garzón, as was the need to reduce meat consumption to stop climate change and to improve health conditions. In both cases, however, political conflict shadowed debate. Spain is the biggest consumer of meat in Europe, with a consumption of 99 kg per person per year, and the EU country with the highest livestock population in 2019 (Eurostat 2020), which may explain the influence of the meat production industry in terms of silencing the debate on sustainable farming.

More than a third of the items in the solutions frame are linked to commercial endeavours, frequently under the guise of innovations in food technologies. The coverage—primarily event-driven and based on the frame of cultured meat as a scientific discovery (Botelho and Kurtz 2008)—is consistent with the news genre priority. While some studies stress that high-tech alternatives such as cultured meat (Bryant 2020) are promoted by in-

dustrial lobbies (Orset and Monnier 2020), others are critical of the widespread expectation that solutions require break-through novelties and highlights, and that the high-tech focus shadows meat options with greater sustainability potential, which receive little attention (Van der Weele et al. 2019). According to our study and consistent with prior scholarship (Dilworth and McGregor 2015), ethical discourses critical of the sociocultural ramifications of solutions are currently under represented in the media, regardless of the different discursive trends.

This study's main limitation concerns the sample. We only included one media outlet per country, omitting the regional field and thus making it difficult to obtain representative data for further statistical analysis. Hence, the data need to be interpreted in a national context. However, newspapers with a predominantly rural readership, having a significant animal agriculture make up, are more likely to problematise demands for lower levels of meat eating (Morris 2018). Further research should expand the scope of this work by analysing coverage in urban communities and the countryside. In short, we argue that reporting the food transition involves many factors, which may explain why coverage is focused on environmental solutions. Moreover, in-depth semistructured interviews with journalists will also help us obtain a more nuanced understanding of coverage.

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