



News on Biodiversity? An Analysis of the Biodiversity Discourse in European News Outlets in 2010 and 2022

RESEARCH ARTICLE

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ABSTRACT

The loss of global biodiversity is recognised by politics and science as a global crisis. Its anthropogenic causes require a radical societal transformation, but stakeholder interests and low political priority decelerate action. The term's complexity and its vague usage in everyday life hinder public engagement and allow for a variety of understandings of the drivers and impacts of biodiversity decline in public discourse. News outlets play a crucial role in shaping how biodiversity is understood and valued. This study explores how European news outlets represent "biodiversity" and traces the evolution of this discourse over time. Using a case study approach, we analysed the discourse on biodiversity in news articles from Austria, Czechia, Germany, Hungary, Italy, the Netherlands, Norway, Switzerland and United Kingdom. For each country, five widely circulated national news outlets with diverse ideological perspectives were selected. For each news outlet, we collected articles mentioning biodiversity published in 2010 and 2022, yielding 169 and 385 articles, respectively. The articles were analysed using a qualitative content analysis in which statements were categorised with a framework focusing on definitions, values, rhetorical functions and actors. The results show that biodiversity is only rarely defined in European media. Over time, its attributed values have shifted from nature-centred ('ecocentric') to human-centred ('anthropocentric'), though the implications of this shift remain unclear. Additionally, while the term used to be frequently associated with scientific actors in 2010, by 2022 a broader range of actors, mainly NGOs and governments, had gained prominence. Cross-country differences were also noted, particularly in the emotional tone of reporting. The analysis offers a broad overview of biodiversity discourse of European news outlets and offers valuable insights for future policy and communication strategies. This nuanced analysis underscores the complexity and plurality of biodiversity values and discourses in Europe.

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INTRODUCTION

Biodiversity loss has been on the political and scientific agenda for several decades, yet tangible success has been limited despite growing recognition of biodiversity's critical importance. Recent decades were marked by extensive research and policy efforts, including the establishment of the Convention on Biological Diversity (CBD) in 1992, the International Year of Biodiversity (IYB) in 2010, and the UN Decade of Biodiversity from 2010 to 2020. So far, policies and technological solutions have not been sufficient to change the trend (Zolyomi et al., 2023). Biodiversity loss, like other commons challenges, is driven by complex, human-induced factors. The recent Transformative Change Assessment report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) highlights three root-causes: 1) disconnection from and domination over nature, 2) concentration of power and 3) prioritization of short-term, individual and material gains (IPBES, 2024a). Addressing these requires profound societal transformation, including shifts in behaviours, political and economic systems, and especially underlying paradigms, goals, and values (IPBES, 2024b). Social psychologists have long stressed the importance of values in shaping environmental behaviour (e.g., Stern et al., 1995), though this link is influenced by beliefs, attitudes, norms (Vaske and Manfredi, 2012), specificity of behaviour, cognitive activation of values and perceived control (Jonsson and Nilsson, 2014; Vaske and Manfredi, 2012). Understanding societal perceptions, values, and beliefs about biodiversity is therefore essential for designing effective interventions.

Discourse analysis helps us understand these societal perceptions of biodiversity (Adger et al., 2001; Dryzek, 2009). Humans simplify complex phenomena into manageable constructs that are personally meaningful and build individual understanding (Kelly, 1955). These meanings are expressed in written or spoken language, contribution to social constructions in a 'discourse' (Dryzek, 2009; Foucault, 1980; Hajer, 1995). We refer to 'small d' discourse as defined by Gee (2015), meaning language in use. Through discourse, societal narratives about nature and human-wildlife relations are produced, challenged and transformed, thereby enabling or constraining biodiversity actions (Dryzek, 2009; Elliott, 2020; Spash & Aslaksen, 2015). The IPBES Values Assessment (IPBES, 2024a) highlights how the global biodiversity crisis is closely linked to how nature is valued in political and economic decision-making. Pascual et al. (2023) similarly argue that the current dominance of market-based values in global policy is a key driver of the biodiversity crisis.

Several studies have traced the evolution of biodiversity discourse. Toepfer (2019) explores the linguistic ideas behind the concepts of biodiversity, while Jetzkowitz et al.

(2017) trace the conceptual history of the term and how the CBD shaped the discourse from 1993 onwards. Bekessy et al. (2018) and Schröter et al. (2014) critically reflect on the introduction of 'ecosystem services' in the 1970s, a reframing aimed at boosting conservation interest, though with mixed success (Bekessy et al., 2018; Zolyomi et al., 2023). Other studies focus on the biodiversity discourse in specific contexts, such as political speeches (Lee et al., 2021), reports by non-governmental organisations (NGOs) (Gustafsson, 2013), or the role of businesses (van den Burg and Bogaardt, 2014) or scientists (Välvirronen, 1998) in shaping the biodiversity discourse.

News outlets play a key role in shaping public discourse and opinion (Carvalho & Burgess, 2005, Sachs and Rubin, 1971). Despite the prevalence of inaccurate or biased (online) news (Bouvier & Machin, 2020), audiences often trust news content without verifying its accuracy (Vosoughi et al., 2018; Robertson et al., 2020). Given the long life of public issues, Carvalho (2008) points out the necessity to understand the evolution in a matter. Moreover, media coverage has been shown to influence public behaviour, including travel choices (Beattie, 2025) and charitable donations (Shao & Yu, 2023).

News outlets give only limited attention to biodiversity relevant topics compared to issues like climate change or popular culture (Legagneux et al., 2018; Mammides & Campos-Arceiz, 2025). Although public interest, as seen through social media and Google trends, is rising (de Oliveira Caetano et al., 2023; Kerle et al., 2021), this is not matched by increased reporting. A range of factors explain this so called 'biodiversity communication deficit' (Legagneux et al., 2018): the terms vagueness (Lindemann-Matthies & Bose, 2008; Takacs, 1996; Töpfer, 2019), complexity (Pollock et al., 2020) and the absence of an easy-to-understand narrative (Mammides & Campos-Arceiz, 2025). Negative framing of environmental issues may further lead to resignation and issue fatigue (de Lange et al., 2022).

While previous studies have mostly quantified biodiversity coverage, few have analysed their content. Brunet et al. (2020) examined how biodiversity was portrayed in Québec newspapers (2006–2012), finding limited definitions and a focus on intrinsic values. In Bangladesh, Sadath et al. (2013) studied media framing of human-tiger conflicts, revealing distinct narratives across political levels. To date, no research has specifically examined biodiversity discourse in European news outlets. Given the complexity of common goods management, context-specific understanding is crucial for effective solutions (Ostrom et al., 2007).

This study aims to deepen understanding of the biodiversity discourse in public news outlets in Europe in the last two decades. We studied major news outlets in Austria, Czechia, Germany, Hungary, Italy, the Netherlands, Norway, Switzerland and UK from the IYB in 2010 to 2022.

The present article contributes to the scientific literature of the context of biodiversity action and provides insights that could lead to more contextually appropriate interventions, thereby increasing their effectiveness and sustainability.

METHODOLOGY

Our research focuses on analysing societal discourses on biodiversity across European news outlets, utilising a discourse analysis. As Europe is not homogenous but rather contains a wide variety of cultures who may understand and use the term ‘biodiversity’ differently, we differentiate our analysis between nine European countries: Austria, Czechia, Germany, Hungary, Italy, the Netherlands, Norway, Switzerland and United Kingdom (UK). These countries were selected because they were all liberal democracies in 2010, as defined by V-Dem (2024). News outlets in liberal democracies should be able to publish without political interference and are therefore open to present the competing discourses on the topic of biodiversity (Hajer, 1995). As this research was carried out as part of the Horizon Europe project PLANET4B, another criterion for country selection was to have a local partner in each country.

We chose a time-sensitive discourse analysis, to portray the long history of biodiversity on the public agenda (Carvalho, 2008). To understand discourse development over time we focused on news articles that were published in two points in time: the years 2010 and 2022. We chose 2010 as it marked the IYB which aimed to raise public awareness on biodiversity and the CBD targets through events and campaigns, implying also a broader coverage of news outlets on the topic. The year 2022 was the year with the most recent, complete dataset when the study started.

DATA COLLECTION

The collection of relevant news articles was carried out by the partners from the PLANET4B project. Firstly, five highly circulated national news outlets that represent a broad scope of ideologies and target demographics were selected per country. The selection of news outlets was based on the expertise of the local partners per country and focused on outlets that are presently popular. In Hungary the local partners identified only four news outlets of relevance for the analysis, while in the UK the partners deemed the analysis of six outlets necessary. Secondly, for each news outlet a Google search on the newspaper website using the keyword ‘biodiversity’ translated to the local language: ‘biodiversity site: www.nameofthenewspaper.com’ and restricted to the years 2010 and 2022 was conducted. When a language uses several terms for ‘biodiversity’, the search was extended accordingly.

The full text of the first ten relevant articles was compiled, excluding those mentioning biodiversity only in an organization’s name or lacking full-text access. Each article was labeled with its publication country, media outlet, and a unique identifier (RA for 2010, RB for 2022). In several cases, 2010 articles were unavailable due to archival limitations. [Table 1](#) summarizes the analysed news outlets.

Given the research team’s language constraints, articles were translated into English using [Deepl.com](https://www.deepl.com). While some nuance may be lost, the core discourse elements relevant to this analysis (see ‘Data Analysis’) remain identifiable. Partner organisations were consulted to clarify uncertain translations.

COUNTRY	NAME OF NEWS OUTLET	NUMBER OF RETURNS IN	
		2010	2022
Austria (AT)	Der Standard	14	196
	Heute	0	89
	Kleine Zeitung	0	73
	Kronen Zeitung	1	46
	Kurier	0	73
Czechia (CZ)	Deník	68	859
	MF DNES	5	na.
	Hospodarske noviny (HN)	1	138
	Lidove noviny	6	99
	Právo	4	na.
Germany (DE)	Bild	1	8
	Die Zeit	24	363
	Frankfurter Allgemeine Zeitung (FAZ)	40	181
	Süddeutsche Zeitung (SZ)	38	159
	Die Welt	61	108
Hungary (HU)	Index	29	58
	Magyar Nemzet	44	55
	Origo	36	102
	Telex	0	27
Italy (IT)	Il Fatto Quotidiano (IFQ)	0	153
	Il Manifesto	0	3360
	Il sole 24 ore (24O)	123	1860
	Corriere della sera (CDS)	1710	27600
	Avvenire	2	56

(Contd.)

COUNTRY	NAME OF NEWS OUTLET	NUMBER OF RETURNS IN	
		2010	2022
The Netherlands (NL)	Algemeen Dagblad	0	303
	De Volkskrant	2	146
	NRC	4	196
	Trouw	15	299
	De Telegraaf	0	na.
Norway (NO)	Aftenposten	6	40
	Dagbladet	0	16
	Klassekampen	0	2
	Nationen	0	28
	VG	0	10
Switzerland (CH)	Tages Anzeiger (TA)	0	136
	Le Matin	0	208
	Blick	0	39
	Neue Züricher Zeitung (NZZ)	0	155
	20 Minuten	1	24
United Kingdom (UK)	BBC	91	1240
	Daily Mail	377	3550
	Financial Times (FT)	3	346
	The Guardian	490	2420
	The Metro	1	82
	The Sun	0	87

Table 1 Overview of the selected news outlets per country and the number of search query returns per year.

Notes: na. = the number of returns is not known.

DATA ANALYSIS

The articles were analysed using a qualitative content analysis, assigning pre-determined codes inspired mainly by the work of Brunet et al. (2020) and Lee et al. (2021), with the addition of coding for ‘Actors’: The coding themes were:

- Biodiversity definition: We coded for definitions of biodiversity, screening whether news articles defined the term ‘biodiversity’ (presence/absence).
- Values: We distinguished between anthropocentric and ecocentric values (Lee et al., 2021).
- Rhetorical function: Guided by the results of Brunet et al. (2020), we classified the news articles according to the rhetoric function about biodiversity that individuals

or groups use to further their agendas: informing, persuading, accusing, entertaining, raising hope, and warning. To establish the categories of the rhetorical functions, two researchers screened roughly 50 articles using inductive coding to identify the main rhetorical functions.

- Actors: This additional category was deliberately added, in order to identify the key organisations and institutions contributing to or addressing the biodiversity crisis. Based on Gustafsson (2013), Väliverronen (1998) and van den Burg and Bogaardt (2014) we distinguish between the following actors: business, scientists, NGOs, government and politics, citizens and the general public, and finance.

Each article was read in full and coded according to the predefined themes, with relevant text segments highlighted. Coded data were compiled in a spreadsheet, including the respondent number, article title, outlet, year, assigned codes per theme, and corresponding text excerpts. Articles could receive multiple codes within a theme—for instance, combining ecocentric and anthropocentric arguments. Coding was conducted by multiple researchers and cross-checked for consistency during the initial and mid-stages of analysis.

We analysed the coded data to compare how often specific codes appeared across news outlets and to conduct a qualitative review of text segments within each theme. The analysis aimed to identify discursive strategies over time (2010 vs. 2022) and across national contexts.

RESULTS

In total, we analysed the biodiversity discourse in 554 articles (169 from 2010 and 385 from 2022) from 45 different news outlets of nine European countries. For all countries, the search query returned fewer articles in 2010 than in 2022. The 2010 data for Austria, Switzerland and Norway were excluded from the analysis due to their small sample size (each returning fewer than 10 articles).

Table 2 provides an overview of the conducted analysis and the aggregated results per country. The numbers in the rows for each code indicate which share of the articles in a country’s sample refer to the code, rounded to 0.05. For example, in the Italian articles published in 2022, 50% mentioned anthropocentric values of biodiversity.

YEAR	AUSTRIA		CZECHIA		GERMANY		HUNGARY		ITALY		THE NETHERLANDS		NORWAY		SWITZERLAND		UK		ALL		
	2022	2010	2022	2010	2022	2010	2022	2010	2022	2010	2022	2010	2022	2010	2022	2010	2022	2010	2022	2010	2022
Articles analysed	48	26	42	41	31	30	31	31	11	43	14	50	50	37	50	33	53	169	385		
Definition																					
Yes	0	0	0	0	0	0.05	0.05	0	0.1	0.05	0	0.1	0.05	0.1	0.05	0.05	0.2	0.05	0.05	0.05	0.05
Values																					
Anthropocentric	0.4	0.25	0.65	0.4	0.35	0.25	0.7	0.75	0.5	0.2	0.2	0.2	0.35	0.75	0.35	0.65	0.6	0.40	0.50	0.50	0.50
Eocentric	0.35	0.7	0.4	0.7	0.2	0.85	0.4	0.65	0.3	0.3	0.55	0.25	0.65	0.65	0.15	0.4	0.3	0.65	0.35	0.35	0.35
Rhetorical function																					
Informing (only)	0.25	0.4	0.15	0.15	0.25	0.15	0.05	0	0.2	0.2	0.55	0.4	0.05	0.05	0.1	0.05	0.15	0.20	0.20	0.20	0.20
Persuading	0.15	0.15	0.4	0.3	0.45	0.25	0.25	0.75	0.35	0.35	0.2	0	0.6	0.5	0.6	0.35	0.25	0.30	0.30	0.30	0.30
Accusing	0.15	0.3	0.25	0.5	0.3	0.35	0.45	0.45	0.3	0.3	0.15	0.2	0.45	0.45	0.4	0.2	0.3	0.35	0.30	0.30	0.30
Entertaining	0	0.15	0	0.35	0.1	0.05	0	0.2	0	0	0	0	0.05	0.05	0.05	0	0.15	0.05	0.05	0.05	0.05
Raising hope	0.25	0.3	0.35	0.45	0.05	0.55	0.5	0.75	0.35	0.35	0.3	0.3	0.3	0.3	0.2	0.1	0.3	0.40	0.30	0.30	0.30
Warning	0.4	0.35	0.5	0.5	0.25	0.65	0.6	0.65	0.3	0.3	0.15	0.25	0.5	0.5	0.35	0.6	0.6	0.50	0.40	0.40	0.40
Actors																					
Industry	0.15	0.35	0.3	0.55	0.45	0.45	0.35	0.55	0.5	0.5	0.5	0	0.35	0.35	0.5	0.3	0.2	0.45	0.30	0.30	0.30
Scientists	0.3	0.6	0.6	0.8	0.6	0.6	0.55	0.45	0.45	0.45	0.45	0.05	0.25	0.25	0.35	0.25	0.25	0.60	0.35	0.35	0.35
NGO	0.3	0.2	0.25	0.35	0.4	0.25	0.3	0.35	0.65	0.65	0.15	0.1	0.25	0.25	0.65	0.15	0.2	0.25	0.35	0.35	0.35
Government	0.3	0.2	0.45	0.4	0.6	0.5	0.4	0.45	0.75	0.55	0.2	0.2	0.75	0.75	0.85	0.3	0.25	0.40	0.50	0.50	0.50
General Public	0.15	0.15	0.1	0.25	0.3	0.35	0.15	0.65	0.4	0.3	0.3	0	0.45	0.45	0.35	0.15	0.1	0.25	0.20	0.20	0.20
Finance	0	0.1	0.15	0.15	0.1	0.1	0.3	0	0.2	0.05	0.1	0.15	0.15	0.15	0.15	0.5	0.35	0.20	0.15	0.15	0.15

Table 2 Overview of the results by country, year and code. The numbers reflect the share of the analysed articles referring to a particular code, rounded to 0.05. Higher values were coloured in darker grey.

DEFINITIONS

Evolution from 2010 to 2022

Overall biodiversity was very rarely defined in European news articles. Of the 169 articles examined from 2010, only 5% attempted to define the term “biodiversity”. This percentage remained the same in 2022. The definitions mainly centred on the concept of variety. Simplistic statements included: “*biodiversity, the genetic diversity of species*” (HU, Origo, RA-52), while more comprehensive perspectives extended beyond variety: “*Biodiversity refers to the great richness of beings living on Earth, as well as to the delicate balance of interdependence and interaction between them and with the physical environment that hosts and conditions them*” (IT, Avvenire, RA-105). Furthermore, some definitions of biodiversity were implicit, for example describing it as the opposite of uniformity (IT, Il Manifesto, RB-163) or focusing on the concept of biodiversity loss. Given the low incidence of definitions, no evolution in their content could be observed.

Differences between countries

While European news articles rarely defined biodiversity, some countries did so more often than others. In the UK (2022), definitions were most common, largely due to the BBC, which defined biodiversity in 6 of 10 analysed articles and was the only outlet to do so in 2010. In Norway, 10–15% of 2022 articles included definitions, compared to none in 2010. In contrast, outlets in Czechia, Hungary, Austria, Germany, and Switzerland defined biodiversity in 5% or fewer of their articles.

VALUES

Evolution from 2010 to 2022

In 2010, 65% of articles reflected an ecocentric view, emphasizing biodiversity’s intrinsic value, while 40% took an anthropocentric perspective. By 2022, anthropocentric framing rose to 50%, while ecocentric statements declined to 35%, with decreases across all countries except Norway.

References to anthropocentric values of biodiversity varied in tangibility and depth. More broad value statements include exemplarily: “*the loss of biodiversity affects not only individual animal species, but also humans*” (HU, Origo, RA-51), and “*some ecosystems may soon reach ‘tipping points’ where they rapidly become less useful to humanity*” (UK, BBC, RA-139). When specifics were provided, details often referred to the value of biodiversity for meeting human needs, including food, clean air, medicine and renewable resources such as wood. In certain cases, these statements highlighted the need to preserve diversity for future potential exploitation: “*Who knows, maybe in 20, 30 years we will discover that one of the berry species from Pavlovsk contains an ingredient unknown today that prevents a*

certain disease” (GE, RA-75). In fewer articles, biodiversity was valued for human-wellbeing, education, and aesthetic enjoyment, for example by arguing biodiversity is important so that “*we don’t have to go to the zoo to see rabbits, larks and other animals*” (Diary, RB-9). Some of the less fundamental and less emotional value statements referred to monetary valuations of biodiversity services such as pollination or the economic system.

Ecocentric values of biodiversity were most often about biodiversity decline and the extinction of species in 2010. Such statements usually focused on the decline of species or on specific threats, predominantly as a result of human activity: “*Species of organisms have of course always been dying out, but at a natural rate of one to two species per million per year. But humans today are wiping out a hundred to a thousand species in a million, a sustainable rate would be ten*” (CZ, Lidove noviny, RA-2). In 2022, we found that ecocentric value statements increased in urgency, compared to 2010. This was most evident in articles from the UK and Germany. The heightened urgency was expressed by predicting consequences of biodiversity loss, and the use of time-bound statements emphasising the immediacy of the crisis, for example: “*every day, about 150 species become extinct in this world. Animals and plants that never return. 150 times a day, the history of a species, millions of years of evolution, is destroyed*” (GE, Bild, RB-72). Also, the ecocentric value statements became more variable in 2022 compared to 2010, covering a broader range of issues and emphasising the interconnectedness of all living things.

Differences between countries

The frequency of value statements varied by country. Articles from Italy, Norway, and the UK often included such statements, while those from the Netherlands, Germany, and Switzerland rarely did—especially in 2022.

Ecocentric statements in UK and German articles tended to adopt a global perspective, whereas Hungarian articles focused more on national or European issues. In Germany (e.g., *Die Welt*) and Hungary (*Origo*), ecocentric values were often linked to systems thinking.

RHETORICAL FUNCTIONS

Evolution from 2010 to 2022

We did not observe significant changes in rhetoric elements in the biodiversity reporting of European news outlets. The goals for which language was used remained similar at both time points. The most frequent rhetorical function was ‘warning’ which was used in 50% of the articles from 2010 and 40% from 2022. Warning often focused on species decline and loss due to resource exploitation or insufficient environmental protection measures, frequently using

dramatic and emotive language such as ‘catastrophic’ (CZ, Lidove noviny, 2010, RA-2), ‘irreversibility’ (HU, Index, 2010, RA-35), ‘permanent destruction’ (UK, Financial Times, RB-271) and ‘extinction’ (UK, Daily Mail, RB-259).

In both years, 30% of articles contained persuasive statements aimed at influencing readers’ attitudes or behaviours. Half of these advocated for national or global action to protect biodiversity, for example ‘*The Netherlands must stop subsidies that harm biodiversity*’ (NL, Trouw, RB-244). Fewer articles advocated for individual action or highlighted human activities as threats to biodiversity.

In 2010, 35% of articles contained accusatory statements focusing on human activities in general or attributing biodiversity loss to agriculture, industry, and pollution: ‘*the consequences of human activity are causing the extinction of far more species than natural diversity can support*’ (HU, Origo, RA-52). There was a slight decrease in accusatory statements to 30% in 2022.

The use of entertaining statements about biodiversity decreased from 15% of articles in 2010 to 5% in 2022, suggesting a shift towards more serious reporting. In 2010 these statements mainly highlighted species’ unusual physical appearances or characteristics. Conversely, in 2022, the statements tended to focus on emphasising the entertaining aspects of scientific findings or political developments, for example: “*Is it true that British scientists have taught bumblebees to play football?*” (CZ, Lidove noviny, RB-28).

In 2010, 40% of the articles aimed to raise hope about biodiversity, focusing on potential positive changes and successful conservation measures: “*it is a special reminder that it is not too late to protect the Earth’s biodiversity*” (HU, Origo, RA-55). A smaller proportion described the discovery of new species and rediscovery of species thought to be extinct as positive news. There were slightly fewer hope raising statements in 2022 (30%).

Overall, only 20% of articles in 2010 and 2022 were identified as informing with no other rhetorical function related to biodiversity. These articles predominantly shared factual information, new scientific findings and the details of events.

Differences between countries

Biodiversity rhetoric varied by country in emotional tone, balance of hope and warning, and targets of accusation. In 2022, purely informative articles were most common in the Netherlands, Austria, and Germany. The Netherlands showed few persuasive or accusatory statements, favoring hopeful coverage of positive developments and government actions. Austria’s discourse was largely informative with evidence-based warnings and fewer accusations. Germany featured more persuasive rhetoric,

advocating action or policy change, with general rather than specific accusations, rarely targeting groups like the agricultural lobby.

In comparison, Italian and British news articles were more emotional. Italian articles featured frequent accusations and warnings, using drastic expressions such as “*Humans will be extinct within a hundred years.*” (IT, CDS, RA-113) and often combining warnings with hopeful statements. The UK biodiversity discourse was also emotional, with frequent use of accusatory and warning rhetoric. To a lesser degree Swiss news articles featured emotional language but focused on persuasive rhetoric statements, with accusations often targeting politicians and public administration.

Norwegian and Hungarian articles from 2022 had the highest frequency of accusatory statements, e.g. targeting the government or businesses of inadequate action (Norway) or the EU’s environmental policies being a threat to agricultural profits (Hungary). Nevertheless, hope was raised in several cases by celebrating the national government projects or praising the actions of Hungarian people.

ACTORS

Evolution from 2010 to 2022

We observed slight shifts in reference to certain actors. Most noticeable was the decrease in references to scientists, falling from 60% of articles in 2010 to 35% in 2022. In 2010, scientists were cited as trusted sources of information, providing warnings about biodiversity loss, showcasing research, studying the effects of interventions, offering assessments of biodiversity status and actively participating in conservation efforts. Scientists were rarely portrayed negatively in the biodiversity discourse. We did not observe a change in the framing of scientists in 2022 articles.

Industry and business actors were also mentioned less frequently in articles from 2022 (30%) compared to 2010 (45%). In 2010, industry was predominantly mentioned in relation to their impacts through agriculture and pollution, and the effects of biodiversity loss on corporations. Agriculture was frequently identified as a major driver of habitat destruction due to intensification and deforestation, often in strong terms like: “*Agriculture is the biggest killer of species*” (Germany, Die Welt, RA-58). Other polluting industries such as manufacturing, tourism and mining were also mentioned, and the economic risk of biodiversity loss for companies was also discussed. We observed no substantial shift in the way industry was portrayed, although in 2022 more articles highlighted businesses’ progressive action toward biodiversity conservation.

Governments were the actors mentioned most often in 2022, featuring in 50% of articles, up from 40% in 2010. The 2010 articles highlighted governments' multifaceted role in addressing the biodiversity crisis, through policy-making, regulation, international collaboration, awareness-building, and financial support. The articles often called for stronger action, increased resources, and stricter industry regulations: "*The future of the planet now depends on governments taking action in the next few years*" (UK, *The Guardian*, RA-165). Many articles in 2010 discussed international and national policy initiatives like the EU's 2020 biodiversity targets. By 2022, the role of governments in global biodiversity action became more prominent, with frequent mentions of political negotiations like the Kunming-Montreal Global Biodiversity Framework and calls for government responsibility: "*This summit is a chance the world must not miss, probably the last chance for governments to turn the tide and save our precious life support system*" (CH, *Le Matin*, RB-115). Criticism of governmental inaction or inadequate responses was prevalent in both years.

NGOs featured in 25% of articles from 2010 and were mainly portrayed to report on the status of biodiversity, engage in biodiversity conservation projects and advocate for biodiversity protection through demonstrations or campaigns. While the topics of NGOs biodiversity action were mostly on a local scale in 2010, we observed a shift to a more global stage in 2022 with NGOs repeatedly being mentioned in relation to the CBD Conference of the Parties (COP) 15: "*In Canada this week, conservationists will attempt to persuade the world's governments to summon up the will to address this crisis*" (UK, *The Guardian*, RB-279). Moreover, some 2022 articles portray the role of NGOs in controversial terms, by criticizing their knowledgeability or uncooperative behaviour.

The share of articles referring to the general public was similar in both years (25% in 2010 and 20% in 2022). In 2010, the articles emphasised the need for changes to individual behaviour and consumption patterns, often highlighting the global implications of lifestyle choices: "*[...] everyone should rethink their behaviour, not eat any endangered fish species and make greater use of local organic products.*" (DE, *Die Welt*, RA-58). Some articles suggested exasperation or frustration with the public's attitudes and behaviours, which seemed to be more common in 2022, with statements blaming the "*culture of waste*" (IT, *Avvenire*, RB-192) or "*over-consumption*" (IT, *Avvenire*, RB-186). The articles had a strong focus on educating the public, placing increased responsibility on individuals, usually providing advice targeting dietary choices or garden management. In both years there are statements that highlight citizens taking an active role in

protecting biodiversity through protests or individual action. Interestingly, it was mainly citizens in poor countries that were portrayed as being negatively affected by biodiversity decline.

Financial actors were mentioned in fewer than 20% of the articles and their roles were portrayed similarly in both years – either discussed in relation to the impact of biodiversity loss on the finance sector or the need for funds to finance nature conservation, especially in the Global South. The British FT, the Swiss NZZ and the German FAZ mainly devoted statements to describe how the finance sector has started to consider biodiversity in their operations: "*As a result, biodiversity is now the fastest developing ESG [environmental, social and governance] theme in global capital markets [...]. In just three years, the issue has moved from being virtually ignored by mainstream institutional investors to being acknowledged by all.*" (UK, FT, RB-268)

Differences between countries

The frequency of actor group mentions in biodiversity discourse varied across countries. Italy, Switzerland, Czechia, Germany, and Norway frequently referenced diverse actors, while the Netherlands, Austria, and the UK showed low mention rates in 2022. Mentions of scientists varied most widely (25–80% in 2010; 5–60% in 2022), exceeding half of articles in Czechia, Germany, and Hungary, indicating greater media reliance on scientific input there. Notably, mentions of scientists in the Netherlands dropped sharply from 45% in 2010 to 5% in 2022.

Finance-related discussions were most common in the UK, where 50% of articles referenced financial actors. UK and, to a lesser extent, German reporting emphasized biodiversity's economic value and loss implications. UK coverage uniquely focused on corporate accountability and regulation, while both UK and German articles critically framed government inaction.

The general public was mentioned most frequently in Norwegian, Italian, Swiss and German news articles from 2022. The media often highlighted grassroots activism or provided actionable recommendations for readers. Conversely, articles from the UK, which rarely mentioned the general public, often linked the loss of biodiversity to poverty and the importance of biodiversity for people in the Global South. The Swiss and Italian news articles also stood out, mentioning NGOs in 65% of articles in 2022. In these articles NGOs were sometimes criticised for lacking expertise or hindering political progress. Statements like "*Berlusconi is not a gynaecologist!*" (IT, IFQ, RB-158) were used to argue that NGO involvement should be based on scientific knowledge rather than emotionalism. This underscores a contentious view of NGOs' roles in biodiversity discourse in these countries.

DISCUSSION

EVOLUTION IN BIODIVERSITY DISCOURSE FROM 2010 TO 2022

The number of news articles reporting on biodiversity was greater in 2022 compared to 2010. Despite the limitations of the Google search, this difference suggests increased media coverage of biodiversity in 2022. Legagneux et al. (2018) would attribute this finding to specific events rather than a general increase in articles about biodiversity, as this pattern was observed in biodiversity articles published between 1990 and 2016. Indeed, our study confirms that coverage of the Kunming-Montréal Global Biodiversity Framework adopted at the COP15 event was very prevalent in the 2022 articles, while the 2010 IYB received less attention. Based on this, we conclude that the increase in the number of returns is likely due to the high-profile COP15 event in 2022 rather than a general trend. However, some evidence indicates that a general trend might contribute to the observation. Legagneux et al. (2018) anticipated increased media attention to biodiversity in the years following the establishment of the IPBES in 2012, due to a better communication strategy. Moreover, there has been a sharp increase in the number of scientific articles on biodiversity that may be driving the increased media interest.

To understand the evolution of the biodiversity discourse from 2010 to 2022, we investigated changes within four coding themes: definitions, values, rhetorical function and actors. First, we observed no shift in the share of articles defining biodiversity – in both years an average of 95% of articles assumed that the term biodiversity was understood by the readership. Our findings are in line with Brunet et al. (2020) who also found a relatively stable and low rate of definitions over a seven-year period in Québécoise newspapers. The lack of definitions might be explained by the availability of easily accessible clear definitions in technical documents such as by the CBD. However, Töpfer (2019) would argue that definitions of the term ‘biodiversity’ are often avoided given its ‘fuzzy’ nature, creating opportunity for the term to be misused for anything remotely connected to nature. This perspective is strengthened by evidence that the concept of biodiversity is not widely recognised or known among Swiss citizens (Lindemann-Matthies and Bose, 2008). Future research exploring how audiences of European newspapers understand the term ‘biodiversity’ would be beneficial.

Second, analysis of the value statements associated with biodiversity revealed a shift from ecocentric to anthropocentric values from 2010 to 2022. The prevalence of ecocentric value statements in 2010 is in line with the analysis of Brunet et al. (2020) who reported that 82.2%

of articles expressed intrinsic values of biodiversity from 2006 to 2012. The authors identify that the link between biodiversity and ecosystem services is increasingly transferred from science to the public sphere, which our results do confirm. We interpret the increase in anthropocentric value statements as a result of a general shift in language, whereby human-centred values are used to underline the urgent need to act on biodiversity loss. Such considerations have been prominent in the biodiversity discourse since 1984, with the introduction and subsequent mainstreaming of the term ‘ecosystem services’ (Bekessy et al., 2018; Jetzkowitz et al., 2017; Schröter et al., 2014). Brunet et al. (2020) explicitly suggests this will strengthen the anthropocentric perspective on biodiversity in public discourse. However, empirical evidence exploring the success of such anthropocentrism strategies for fostering decisive action on environmental challenges remains limited (Bekessy et al., 2018; Zolyomi et al., 2023). As previous work finds that biospheric or self-transcendent values increase the likelihood of pro-environmental behaviour (Stern et al., 1995), we question whether the shift to anthropocentric value statements in the public biodiversity discourse will inspire pro-environmental behaviour in its readers. However, the insights provided here are useful to design biodiversity projects that align with people’s values, which might increase their success (Ihemezie et al., 2021).

As a third perspective on the evolution of the biodiversity discourse, we focused on the purpose of articles referring to biodiversity – their rhetorical function. We observed no major shifts in rhetorical functions of the articles from 2010 to 2022. Overall warning rhetoric was dominant in both years, with a slight decrease in the use of entertaining statements. We interpret these observations as an indication that reporting on biodiversity became more serious from 2010 to 2022. However, a lack of positive narratives risks disengaging readership, because narratives that foster positive emotions are needed for long-term engagement and action (De Lange et al., 2022). Interestingly, very few articles were identified as having an informing purpose and no other rhetorical function. This finding is not surprising given that today’s journalism is often ‘a function of initiatives of social actors to organize their claims’ (Carvalho, 2008, p. 164). Thereby rhetoric in news articles is often influenced by their primary source of information, for example NGOs or companies. Research indicates that this trend has been reinforced in recent years by the rise of ‘churnalism’, which describes a lack of original research and fact-checking in journalism in favour of reusing existing materials such as press releases (van Leuven, 2019). While this practice is vulnerable to harmful claims, with false news spreading faster than ‘the truth’ (Vosoughi et al., 2018), it might also

provide an entry point for biodiversity advocacy. Future research should examine the sources on which the media currently base their reporting.

Fourth, we observed a shift in the mention of certain actor groups as having a stake in biodiversity loss and conservation from 2010 to 2022. While governmental actors and NGOs became slightly more prominent, scientists were mentioned less frequently in 2022 articles. The finding indicates a propagation of the shift from scientific to political discourse in environmental issues, as also reported by Castrechini et al. (2014). For NGOs, we assume that their increased prominence in the biodiversity discourse in 2022 might be explained by a general increase of their activity over the past years enabled by a growth in funding (Kilicalp and Lombardi, 2024).

DIFFERENCES BETWEEN COUNTRIES

We found remarkable differences in the biodiversity discourses between the countries of analysis. First, we observed slight differences in the frequency that definitions were provided, with the UK and Norway having the highest share of definitions in 2022. Second, the Netherlands and Austria were the only countries in which ecocentric values were assigned to biodiversity more frequently than anthropocentric arguments. Third, the differences between countries become most evident in the use of rhetorical functions. While the Netherlands, Czechia, Germany and Austria framed the biodiversity discourse in neutral rhetoric, the rhetoric in Italian and British news articles was more emotional. Accusatory statements were particularly prevalent in Hungarian, Norwegian and Swiss news articles. Fourth, the comparative analysis revealed significant differences in how various actors are portrayed and emphasised across European news outlets, reflecting diverse national perspectives on biodiversity conservation.

LIMITATIONS

When interpreting the results of this study, several methodological limitations must be acknowledged. The Google 'site' query cannot provide an exhaustive list of matching pages, so the number of returns should be interpreted cautiously. Additionally, limiting the search term to 'biodiversity' as highlighted by Legagneux et al. (2018), may have constrained the findings. Furthermore, different researchers coded the materials, introducing potential variability in interpretation. Moreover, the data do not allow conclusions on general temporal trends in the coverage of biodiversity in European news outlets, given the focus on two years in which biodiversity was most likely more present in public discourse. Due to the combination of these factors, the results should be viewed as indicative rather than definitive.

Despite these limitations, the framework based on definitions, values, rhetoric (inspired by Brunet et al., 2020; Lee et al., 2021), and the focus on key actor groups (inspired by Gustafsson, 2013; Välvirronen, 1998; van den Burg and Bogaardt, 2014), provided a powerful lens for understanding the biodiversity discourse. The study touches on practical implications for biodiversity reporting which can impact long-term engagement and action, such as the dominance of warning rhetoric, lack of positive narratives and the spread of misinformation. However, a detailed evaluation of how to overcome these in practice will be the task of future research, along with investigating the understanding of the biodiversity by the readership and which sources news outlets use for their reporting.

CONCLUSIONS

The study aimed to identify whether the discourse around biodiversity, including its definition, values, rhetoric function and actors, changed between 2010 and 2022 and whether this varied between countries. Based on the analysis of 554 articles from 45 European news outlets, we conclude that the biodiversity discourse has evolved from 2010 to 2022. In particular, we observed a shift in the associated value statements from ecocentric to anthropocentric to underline the urgency. It remains to be seen whether this anthropocentrism strategy offers benefits in terms of biodiversity outcomes (Schröter et al., 2014; Zolyomi et al., 2023). We observed a shift in the biodiversity discourse from the scientific to public arena, with scientists becoming less prominent actors in the biodiversity discourse, in favour of increased visibility of NGOs and governments. Moreover, we found differences in the biodiversity discourses between the countries of analysis, especially in the emotionality of the reporting style. These differences can affect transnational efforts to enhance biodiversity conservation, highlighting the importance of comprehensively mapping and analysing national discourses in the future. The analysis offers a broad brushstroke on the biodiversity discourse of European news outlets and thereby contributes to the scientific literature on governing the biodiversity commons. This contextualized knowledge is crucial to inform effective policy and communication on biodiversity (Ostrom et al., 2007).

DATA ACCESSIBILITY STATEMENT

All of the data that were used to generate this report are publicly accessible online on PLANET4B's community data repository, Zenodo (www.zenodo.org/communities/planet4b).

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The authors have no competing interests to declare.

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